



MONASH University

Enhancing the uptake of evidence-based practice with allied health professionals: A quasi-experimental study.

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Abstract

Background

Evidence-based practice (EBP) can improve patient outcomes and safety, reduce variation in health care delivery and make better use of health care resources. It is therefore not surprising that consumers of health care and organisations involved in delivery of health care, expect that allied health professionals will be evidence-based in their practice. However, there remains a gap between the services and interventions that are currently being provided by allied health professionals, and the evidence base of what should be provided. Known as the research-practice gap, studies suggest that it is largely a result of the lack of knowledge and confidence of allied health professionals to undertake the steps required to translate evidence into clinical practice.

The objective of this research was to evaluate if a tailored intervention could enhance allied health professionals' EBP attitudes, beliefs, skills, confidence and behaviours.

Methods

This research was undertaken in three phases:

1. Phase 1: Mixed-methods baseline data collection exploring allied health professionals' attitudes, beliefs, skills, confidence, behaviours, barriers to and facilitators for EBP. The theory of planned behaviour provided the framework for interpretation of the findings.
2. Phase 2: Development and implementation of a multifaceted tailored intervention using the findings from Phase 1.
3. Phase 3: Evaluation of the effects of the tailored intervention using a quasi-experimental pre-intervention-post-intervention design with two parallel control groups.

Results

Phase 1 of the research identified that allied health professionals generally have positive attitudes towards and beliefs about EBP. However, they have weak perceived behavioural control in relation to their own skills to undertake the steps necessary to translate evidence

into practice. Furthermore, they also have weak control beliefs in relation to being able to overcome contextual barriers, such as lack of resources, to engage in EBP activities.

Phase 2 of the research developed several strategies to address the barriers identified and included a skills-based workshop, academic mentoring and protected time to engage in EBP activities.

Phase 3 of the research found that allied health professionals had improved in their propensity to engage in EBP behaviours including reviewing literature for clinical practice and using research studies to inform clinical decisions.

Conclusion

This research found that a tailored intervention can enhance allied health professionals' EBP attitudes, beliefs, skills, confidence and behaviours. Prior research on this topic has typically resulted in improvements in EBP skills and knowledge but failed to effect a change in behaviours. It is likely that the prospective identification of context specific barriers was a critical component to ensuring that the intervention targeted the barriers as perceived by the participants in this research. It is also likely that the explicit use of a theoretical framework supported a more comprehensive understanding of allied health professionals' experience of and engagement with EBP, which informed the tailored intervention.

Further research is necessary to determine if the intervention can be generalised to other settings or whether it would need to be re-tailored according to the barriers specific to the participants and context.

Thesis including published works declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes four original papers submitted for publication in peer reviewed journals. The core theme of the thesis is allied health professionals' experience of and engagement with evidence-based practice. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the student, working within the School of Primary and Allied Health Care under the supervision of Professor Terry Haines and Associate Professor Fiona McDermott.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research. In the case of Chapters 3, 4, 5 and 6, my contribution to the work involved the following:

Table 1 Thesis including published works declaration

Thesis Chapter	Publication Title	Status	Nature and % of student contribution	Co-author name(s) Nature and % of Co-author's contribution	Co-author(s) Monash student Y/N
3	EBP and allied health professionals: Differences in perspectives across disciplines and settings.	Under review	Responsible for concept of study, data collection and analysis, first draft of paper and subsequent preparation and submission of manuscript. Contribution 60%.	Terry Haines: assisted with concept of study and data analysis, reviewed manuscript drafts: contribution 30% Fiona McDermott: assisted with concept of study and reviewed manuscript drafts: contribution 10%	No
4	How soon do allied health professionals lose confidence to perform EBP activities? A cross-sectional study	Published	Responsible for concept of study, data collection and analysis, first draft of paper and subsequent preparation and submission of manuscript. Contribution 60%.	Terry Haines: assisted with concept of study and data analysis, reviewed manuscript drafts: contribution 30% Fiona McDermott: assisted with concept of study and reviewed manuscript drafts: contribution 10%	No
5	Does the theory of planned behaviour explain allied health professionals' EBP behaviours? A focus group study.	In press	Responsible for concept of study, data collection and analysis, first draft of paper and subsequent preparation and submission of manuscript. Contribution 60%.	Fiona McDermott: assisted with concept of study and data analysis, reviewed manuscript drafts: contribution 20% Terry Haines: assisted with	No.

				concept of study and reviewed manuscript drafts: contribution 20%	
6	Can a tailored intervention enhance the uptake of EBP with a large group of allied health professionals? A quasi-experimental study.	Under review	Responsible for concept of study, data collection and analysis, first draft of paper and subsequent preparation and submission of manuscript. Contribution 60%.	Terry Haines: assisted with concept of study and data analysis, reviewed manuscript drafts: contribution 30% Fiona McDermott: assisted with concept of study and reviewed manuscript drafts: contribution 10%	No.

I have renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

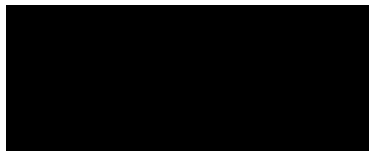
Student signature:



Date: 30th May 2018

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the student's and co-authors' contributions to this work. In instances where I am not the responsible author I have consulted with the responsible author to agree on the respective contributions of the authors.

Main Supervisor signature:



Date: 5th June 2018

Conference presentations by candidate

Table 2 Conference presentations during candidature

Date	Conference Details
February 2017	International Congress on Rehabilitation. Pakistan. Oral presentation. “Building evidence-based practice with allied health professionals.”
June 2015	National Occupational Therapy Conference. Australia. Poster presentation. “EBP and allied health professionals.”
April 2015	Melbourne Health Research Week. Australia. Oral presentation. Can clinicians drive research?
May 2014	OT Victoria Conference. Australia. Oral presentation. “Enhancing the uptake of EBP with allied health professionals.”
October 2013	National Allied Health Conference. Australia. Oral presentation. “Allied health clinicians and the theory of planned behaviour: Building evidence-based practice.”

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I can no other answer make but thanks, and thanks, and ever thanks...

(William Shakespeare)

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Abbreviations

AHP	Allied health professionals
AHPRA	Australian health practitioner regulation agency
CAT	Critically appraised topics
CI	Confidence intervals
EAS	Evidence alert system
EBM	Evidence-based medicine
EBP	Evidence-based practice
EBPAS	Evidence-based practice attitude scale
JB	Joanna Briggs Institute
KT	Knowledge translation
LOS	Length of Stay
NHMRC	National Health and Medical Research Council
OTseeker	Occupational therapy systematic evaluation of evidence
PEDro	Physiotherapy evidence database
PICO	Patient/Population, Issue/Intervention, Control/Comparison, Outcome
RU	Research utilisation
SpeechBITE	Speech pathology database for best interventions and treatment efficacy
TPB	Theory of Planned Behaviour

Glossary of terms

This following is a list of terms used throughout this thesis:

EBP	The integration of clinical expertise with the best available research evidence and patient values when making decisions regarding patient care
EBP attitudes and beliefs	A clinician's perspective on the importance, need and use of EBP in practice
EBP behaviours	<p>Any activities a clinician engages in as part of the 5-steps of EBP described in the Sicily Statement (Dawes et al., 2005) as follows:</p> <ol style="list-style-type: none">1) Ask. Formulate a question from a clinical need or problem.2) Access. Develop and execute a search strategy to answer the question.3) Appraise. Critically appraise the evidence using appropriate tools.4) Apply. Evidence is applied to the clinical setting.5) Assess. Evaluate impact of evidence and adapt if/as needed.
EBP confidence	A clinician's perception of their ability to undertake any one or more of the 5-steps described in the Sicily Statement.
EBP knowledge	A clinician's understanding of the definition of EBP and awareness of EBP behaviours.
EBP skills	A clinician's ability to undertake the 5-steps described under EBP behaviours.
TPB attitudes	The degree to which an individual has a positive or negative evaluation of the behaviour

TPB subjective norms	The beliefs of the individual regarding whether important people approve or disapprove of the behaviour
TPB perceived behavioural control	The perceptions of the individual of how easy or difficult it is to perform the behaviour
Undergraduate education	Used interchangeably with the term entry-level degree. Refers to the academic degree required to qualify to practice as an allied health professional. NB. Some allied health professional training is provided at a post-graduate level e.g. Master of Social Work. This is considered to be an entry level qualifying degree and included in this category.
Postgraduate education	Used interchangeable with the term higher degree research. Refers to further formalised learning beyond the undergraduate degree, resulting in additional qualifications e.g. PhD or Master of Public Health.

Chapter 1: Introduction

Overview

This chapter will begin by defining evidence-based practice (EBP) and describe evolution of the model since its original inception. Advantages and disadvantages of using EBP within the health care context will be reviewed using published literature on the topic. A description of allied health professionals from both a national and international perspective will be provided before exploring the relationship between allied health professional groups and their experience of EBP.

1.1 Evidence-based practice

EBP is not a new concept in the health professional fields. There is a large body of literature on this topic spanning more than 50 years. Interest in EBP has not waned over this lengthy period due to several factors. First, there remains concerns about how well understood the concept of EBP is and whether it is being applied effectively in clinical practice. Second, there is ongoing debate about whether EBP does in fact result in the improvements in patient outcomes that it purports to do. Third, some question whether EBP is the most appropriate framework for the delivery of a client-centred practice. None the less, EBP is a model of significant interest to medicine, nursing and allied health and warrants ongoing research to determine effectiveness and to identify if and how it is being applied in daily clinical practice.

This section will provide a description on the development of the model and arguments for and against the use of EBP within a health care context.

1.1.1 Definition and evolution

Evidence-based practice (EBP) stemmed from evidence-based medicine (EBM) so this section will commence by exploring the evolution of EBM. It should be noted that EBP and EBM are often used interchangeably but for allied health professionals and non-medical individuals, the term EBP is more commonly used. Following exploration of the history of EBM, the term EBP will be exclusively used.

EBM is defined as the “conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients” (Guyatt, Meade, Jaeschke, Cook, & Haynes, 2000). It is both a philosophical approach to health care and a set of behaviour(s)

when applied in practice. The process of evidence based practice involves integrating individual clinical expertise with the best available external clinical evidence derived from systematic research with consideration to the patient's values and wishes (Haynes, Devereaux, & Guyatt, 2002). EBM can be illustrated using a three-circle model (Figure 1-1) with consideration given to each of the three elements i.e. evidence-based clinical decision making is a result of the influence of the evidence, experience of the clinician and the patient's values.

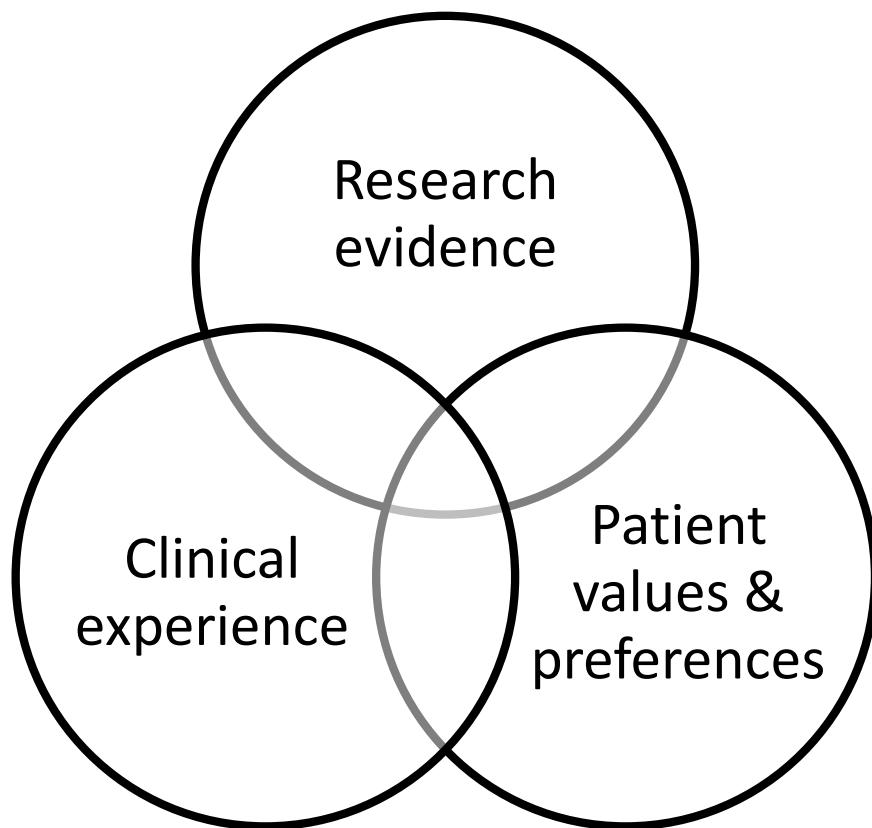


Figure 1-1 Contemporary model of evidence-based practice

EBM was conceived of in the early 1960s at McMaster University in Canada (Smith & Rennie, 2014). This newly established academic facility introduced a medical curriculum called 'problem-based learning' which combined the traditional scientific studies in medicine with a focus on clinical problems gleaned from the bedside of patients. Simultaneously, McMaster University also established the world's first department of clinical epidemiology and biostatistics. The director of this department, David Sackett, was instrumental in ensuring that the new medical curriculum incorporated subjects on clinical epidemiology and biostatistics. Sackett subsequently developed a short course on critical

appraisal of published literature which was eventually published in eminent medical journals, including the Journal of American Medical Association.

In 1990, Gordon Guyatt organised a new medical residency program at McMaster University, based on the critical appraisal methods developed by Sackett (Sur & Dahm, 2011). The course was called “Evidence-Based Medicine”. Guyatt was a strong and vocal proponent for ensuring that medical students have the skills to consume, understand and apply research in clinical practice. His goal was to shift the paradigm from one based on rhetoric and opinion to an objective scientific practice that relied on evidence from rigorous studies.

Supported by the Journal of American Medical Association (JAMA) editorial board, Guyatt and a group of international colleagues formed the EBM Working Group. Their purpose was to publish papers on EBM with a strong focus on using the critical appraisal techniques developed by Sackett. The appeal of publishing papers as a working group was that the information was presented as a consensus, rather than one individual’s perspective or opinion. The outcome of this series of papers and the efforts of the EBM Working Group, was essentially a worldwide shift to EBM as the preferred model of practice (Zimmerman, 2013).

Both Gordon Guyatt and David Sackett have been recognised for their instrumental roles for the inception and further development of the EBM model. Progression over the last 40 years can be well illustrated using a graph of the number of references to the concept “evidence-based medicine” in articles indexed to PubMed. As Figure 1-2 shows, the number of publications that include the term EBM has continued to increase dramatically since Gordon Guyatt first coined the term.

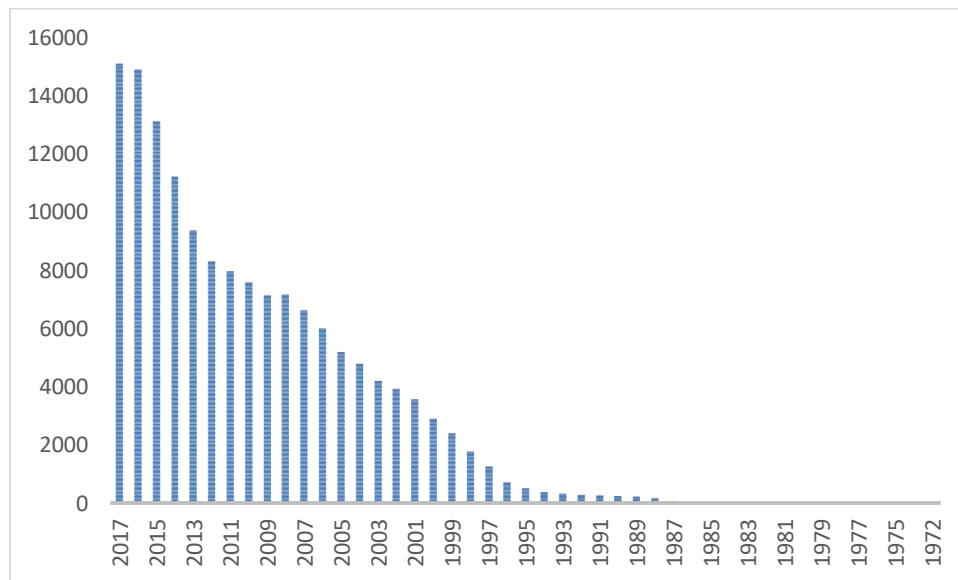


Figure 1-2 Publications that include the term evidence-based medicine

1.1.2 Education and training in evidence-based practice

Ten years after the EBM working group published their seminal articles in the Journal of American Medical Association, it was recognised that there was a significant gap between the evidence available, and application of this within clinical practice. In 2003, a group of international leaders in EBP convened a conference called “Signposting the future of evidence-based health care” (Dawes et al., 2005). From this meeting, a consensus statement (Sicily Statement) was published and included a clear description of the process of EBP and the skills required to implement it in clinical practice.

1.1.2.1 Sicily Statement: the process of evidence-based practice

The 5-step process of EBP, and related skills, are as follows:

1. Translate clinical uncertainty to a question which can be answered. The health professionals must be able to develop a measurable question when confronted with a problem in clinical practice.
2. Access and retrieve the best available evidence. The health professional must be able to effectively design and conduct a search strategy. This includes selection of appropriate terms and databases.
3. Critically appraise and assess the evidence. The health professional must be able to identify and then use a suitable tool or method to evaluate the validity, relevancy and overall applicability of the evidence.

4. Apply the evidence in practice. The health professional must be able to use the findings from the previous steps in a clinical setting or in response to the research question.
5. Integration, adaptation and evaluation of the evidence. The health professional must be able to evaluate effectiveness of the evidence in practice, and adapt to the context

1.1.3 Arguments for evidence-based practice

Those in favour of the EBP model advocate for a greater consideration of published evidence and patient preferences in clinical decision making. This is in direct contrast to the earlier “expert-driven” model of clinical decision making that was largely driven by the opinion(s) and/or experience of the clinician with little to no regard for published research evidence (Sur & Dahm, 2011). The inclusion of patient’s preference along with research evidence is thought to have the following benefits.

1.1.3.1 Improved patient outcomes and safety

At the heart of the EBP movement is the drive to deliver safe and effective treatments to consumers of health care. An evidence-based approach to delivering health care should include evidence derived from high quality research that has proven effectiveness. A recent Australian study found a significant improvement in the early identification and management of patients presenting with sepsis to the emergency department, following implementation of evidence-based guidelines (Romero, Fry & Roche, 2017). This pre-post study measured if a context specific implementation strategy, including education packages, could improve clinician utilisation of the evidence-based sepsis guidelines. The results indicated a significant change in the behaviour of clinicians and subsequent improvement in rapid triaging of patients presenting with sepsis, and early access to evidence-based treatments. This is one of several examples showing a correlation between health professionals’ implementation of EBP and improved patient outcomes (Emparanza, Cabello, & Burls, 2015; Morris et al., 2011; Peiris, Taylor, & Shields, 2011; Tinetti et al., 2008).

1.1.3.2 Better use of resources

Health care organisations have finite resources. Nowhere is this more evident than in public health care facilities and organisations where budgets are often severely limited. Delivery of effective interventions can reduce the number of patients re-presenting to health facilities and reduce the incidence of complications. A study by Tinetti et al (2008) found a significant reduction in falls-related health service utilisation following interventions aimed

at enhancing the uptake of evidence-based strategies with primary health care professionals. The reduction in emergency department visits and/or hospital admissions was estimated to have saved more than \$21 million over a two-year period.

1.1.3.3 Reduced variability in health care delivery and practice

In health care systems based on egalitarian principles, consumers expect to receive equal care, irrespective of who delivers the health care or where the health care is delivered. EBP aims to reduce variability in delivery of health care. The initial development of the model arose from recognition that there were significant variations in care dependent on which 'expert' was delivering the care. An example of the correlation between EBP and reduced variation in health care is clinical pathways. The objective of clinical pathways is to link evidence to practice and therefore maximise efficiency and patient outcomes by reducing variation in the provision of clinical care. A Cochrane review measured the effect of clinical pathways and found a reduction in hospital related complications, reduced length of stay and considerable cost-savings for the health care organisation when compared to conventional treatment (Rotter et al., 2010).

1.1.4 Arguments against evidence-based practice

Despite the body of literature demonstrating the benefits of EBP, the movement has had a number of critics who argue that the model has significant limitations, both for patients and health care professionals. These disadvantages will now be described in further detail.

1.1.4.1 The evidence – rigour, availability & generalisability

One of the most frequently cited criticisms is that there simply isn't adequate evidence or the evidence that is published is of low quality. Furthermore, application of the findings from systematic research is viewed as being difficult, particularly when the findings are from a randomised trial with stringent inclusion criteria (Nevo & Slonim-Nevo, 2011). However, where there is high quality evidence, this is still not being applied in practice. This suggests there are other factors at play affecting the translation of evidence into clinical practice, rather than weakness in the body of evidence.

1.1.4.2 The clinician – time, training and resources

EBP requires the user to have skills in the various steps related to EBP i.e. formulating a question, finding and appraising evidence, applying it in practice and then evaluating the

outcomes. It is not sufficient to have acquired these skills, but one must also maintain them through a semi-regular practice. The evidence-based practitioner must also have access to computers, internet and most importantly, the time to complete the steps previously described. Critics of EBP argue that this approach to health care is resource intensive (Shlonsky, Noonan, Littell, & Montgomery, 2011). However, this must be weighed against the cost of not providing evidence-based interventions measured by both the consumer experience and health care expenditure.

1.1.4.3 The model – fit with client centred care

There are several misperceptions about the EBP model which feature in arguments related to difficulties applying it in practice (Mullen & Streiner, 2006). The most common argument is that it is a recipe-driven approach which cannot possibly cater to the individual needs of a patient. The limitations with this argument is that it assumes that the model is static in nature and overly reliant on one source of evidence i.e. published research. This is not the case. EBP comprises an integration of three sources of evidence that are of equal value. This suggests the model is in fact individualized and can be adapted to the needs of the patient within their specific context and according to the available resources, including the expertise of the health care professional (Guyatt, Cook, & Haynes, 2004).

1.1.5 Summary of arguments for and against evidence-based practice

The benefits of providing health care utilising the three-circle model of EBP, appear to be more significant than the arguments against using this model. However, it is important to acknowledge that there are numerous issues related to the implementation of EBP in practice. Rapid development of medical innovations and health interventions over the last 50 years have significantly increased the body of knowledge. This increase in available evidence and knowledge does not automatically result in its actual use within everyday clinical practice. The need to embed evidence in clinical practice remains a significant challenge for all health professionals, including those from allied health fields.

1.2 Allied health professionals

This section will begin by describing who allied health professionals are and their role within the broader context of health care delivery. Evolution of the EBP model in allied

health will be explored, including training and the role of professional and regulatory bodies. The gap between available evidence and implementation of this in clinical practice will be introduced as a lead in to the subsequent sections reviewing the literature on this topic.

1.2.1 Allied health professionals defined

There is no universally agreed upon definition for the term allied health professional. Instead, the definition is by inclusion or exclusion of professional groups. For example, in Australia, an allied health professional is a clinician from one of several health professional groups that are non-medical and non-nursing. They are also typically university qualified and have expertise in preventing and/or diagnosing and/or treating a variety of conditions (Allied Health Professions Australia, 2017). Allied health professionals often work in a multidisciplinary team but may also work independently in either public or private practice.

In Australia, there are 20 professional groups under the banner of allied health (Allied Health Professions Australia, 2017) including (but not limited to) dietetics, occupational therapy, physiotherapy, psychology, podiatry, social work and speech pathology.

Internationally, there may be other professions grouped under allied health, such as diabetes educator, which is considered to be a nursing role in Australia and is therefore not included as an allied health profession.

1.2.2 Australian allied health professional workforce

In Australia, allied health professionals are the second largest health workforce group, with nursing being the largest. It is difficult to determine precise numbers of allied health professionals for several reasons: (1) allied health professionals are not required to contribute to any national datasets, (2) some allied health professional groups do not have mandatory national registration or compulsory professional association membership. As a result, the exact numbers of allied health professionals is difficult to ascertain. The most recent report on numbers of allied health professionals in Australia was published by the Australian Department of Health (Australian Institute of Health and Welfare 2013; Department of Health, 2015) but only includes the professional groups registered with the Australian Health Practitioner Regulation Agency. Figure 1-3 demonstrates the numbers of some of the larger groups of allied health professionals and includes average age and hours

worked. Allied Health Professions Australia estimate there are 195,000 allied health professionals in Australia, including those that aren't registered with the Australian Health Practitioner Regulation Agency (Allied Health Professions Australia, 2017) This large group of health professionals deliver more than 200 million health services every year.

Registered and Employed in Australia - 2015				
Profession	Head count	Total FTE	Average Age	Average Total Hours
Aboriginal and Torres Strait Islander Health Practitioners	451	484	45.6	40.8
Chinese Medicine Practitioners	3,933	3,137	48.1	30.3
Chiropractors	4,483	3,837	41.4	32.5
Dental Practitioners	19,075	17,641	42.5	35.1
Medical Practitioners	88,599	93,752	46.1	42.3
Medical Radiation Practitioners	12,833	11,982	39.1	35.5
Nurses and Midwives	306,472	270,396	44.4	33.5
Occupational Therapists	15,060	13,118	36.7	33.1
Optometrists	4,559	4,250	41.4	35.4
Osteopaths	1,833	1,627	38.7	33.7
Pharmacists	23,130	21,752	39.3	35.7
Physiotherapists	23,568	21,521	38.0	34.7
Podiatrists	4,131	3,926	37.5	36.1
Psychologists	24,522	20,938	46.1	32.4
Total	532,649	488,361	43.8	35.2

Figure 1-3 Allied health workforce registered with the AHPRA in 2015

1.3 Evidence-based practice in allied health

EBP has been a topic of interest in published literature related to allied health professionals for more than 20 years. One of the earliest publications on the topic was in 1990 (Bohannon, 1990) and focused on how physiotherapists make clinical decisions. Allied health professional groups were early adopters of the EBP model although the uptake has not been equal across all groups or settings. This next section will describe allied health training in EBP from both an undergraduate student and practicing clinician perspective. The role of regulatory and professional bodies in relation to EBP training will be reviewed. Finally, the impact of EBP on allied health services and interventions will be explored.

1.3.1 Allied health training in evidence-based practice

The Sicily Statement (Dawes et al., 2005) included a series of recommendations to academic institutions and professional bodies regarding the inclusion of EBP training within their programs. It was suggested that training focus on all 5-steps of EBP and teaching to incorporate theoretical and practical components. From an Australian perspective, there has been significant commitment to these recommendations through the creation of a national registration and accreditation scheme. The Australian Health Practitioner Regulation Agency (AHPRA) was established in 2010 as a single system of registration for a variety of health professional groups in Australia. The role of this organisation is to support the national boards of each affiliated health professional group to regulate the practice of their members. National accreditation documents are incorporated within this scheme and set out scope of practice and competency standards. EBP skills, such as consuming research and being evidence-based, are included in these documents. For example, Standard 2 in the Australian Occupational Therapy Competency Standards (2018), mandates that occupational therapists must apply “... current and evidence-informed knowledge...” (Occupational Therapy Board of Australia, 2018, p. 7). The allied health professional groups regulated by the Australian Health Practitioner Regulation Agency include chiropractic, occupational therapy, optometry, osteopathy, pharmacy, physiotherapy, podiatry and psychology. Figure 1-4 illustrates the process of accreditation and relationships between regulatory bodies and education providers.

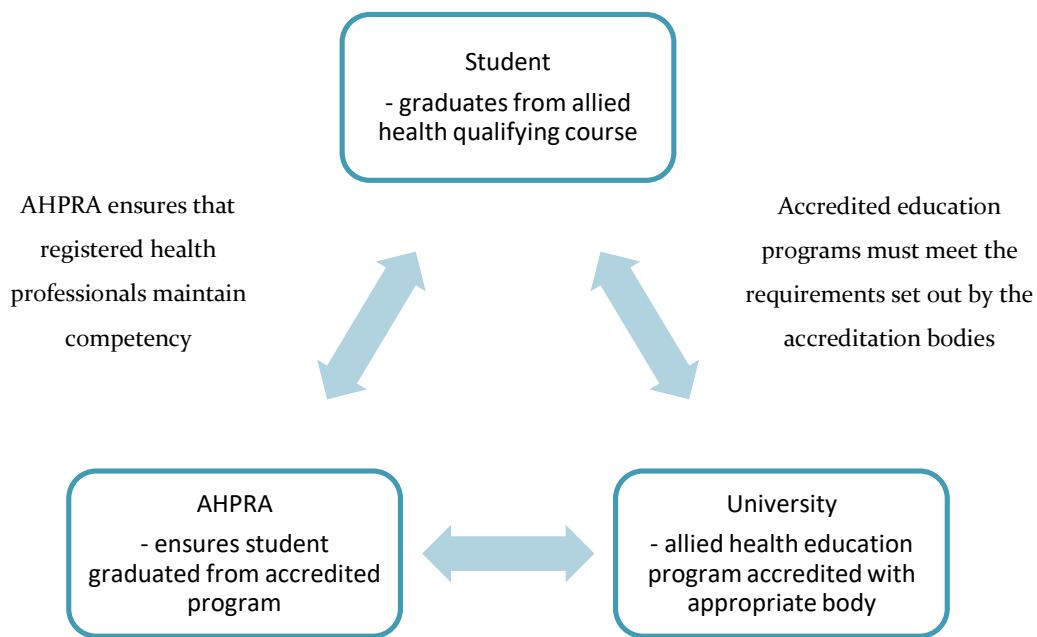


Figure 1-4 Relationships between academic institutions, accreditation bodies and AHPRA

There are several allied health professional groups who are not members of AHPRA. This includes some of the larger groups such as dietetics, social work and speech pathology. Many of these groups have professional associations that have developed competency standards and codes of ethics and/or conduct documents. These documents were reviewed for this study to determine if there were references to any aspect of EBP. Table 1-1 sets out each allied health professional group and whether they are AHPRA registered and/or whether other professional documents include a reference to EBP.

Table 1-1 EBP reference in scope of practice or ethics documents

Allied health professional group	Mandatory professional registration with AHPRA	EBP referenced in other relevant documentation	
		Details	Mandatory registration
Arts Therapy	X	X	X
Audiology	X	AA – National competency standards	√
Chiropractic	√	CCEA – Education & competency standards	X
Dietetics	X	DAA - Competency standards (2015)	√
Exercise Physiology	√	Accredited EP scope of practice (2016)	X
Genetic counselling	X	X	X
Music Therapy	X	AMTA code of ethics	X
Occupational Therapy	√	OTA Scope of practice (2017)	X
Optometry	√	Optometry Aust. – competency standards	√
Orthoptics	X	Aust. Orthoptic Board -CPD program	√
Orthotics / Prosthetics	X	AOPA – competency standards (2014)	X
Osteopathy	√	X	X
Perfusion	X	ANZCP mandatory CPD program	√
Physiotherapy	√	APA – competency standards for different specialities	X
Podiatry	√	X	X
Psychology	√	APS code of ethics	X
Social Work	X	AASW practice standards (2013)	X
Speech Pathology	X	Speech pathology code of ethics (2010)	X

It is important to note that most of the professional associations do not require compulsory registration for the individual health professional to practice. The table above includes 10 allied health professional groups that are not registered with the Australian Health Professional Regulation Agency. Of these, six do not require registration with the appropriate professional body in order to practice. It is therefore impossible to determine how many of these allied health professionals are engaging in training or continuing

professional development aimed at maintaining currency of knowledge and/or being evidence-based in clinical practice.

1.3.2 Are allied health professionals implementing EBP?

The previous paragraph in this chapter described the evolution of EBP and adoption of this model by allied health professional groups. Training and ongoing commitment to EBP were discussed under the context of national registration, accreditation and affiliation with professional bodies. It would be reasonable to assume that most recent Australian allied health graduates have had some exposure to training in EBP. Yet, there remains a concern regarding how much available evidence is being used by allied health professionals within daily clinical practice. This problem is referred to as the research-to-practice gap i.e. the gap that exists between what is known and what is currently being done. An example to illustrate the research-to-practice gap within allied health is the inconsistent adoption of evidence-based recommendations made by the National Stroke Foundation in Australia. Results from the 2016 national audit of rehabilitation services indicate that only 9% of patients with upper limb impairment received constraint induced movement therapy. This was measured against those patients deemed eligible to benefit from this highly researched and effective treatment (Stroke Foundation, 2016). This is one of several examples where there remains a gap between the services and interventions delivered by allied health professionals, and the available evidence regarding what should be delivered.

It is important to understand what factors contribute to allied health professionals' abilities and skills to be able to undertake EBP and if an intervention can enhance the uptake of EBP.

1.4 Systematic literature review 1: What are the barriers to and facilitators for EBP in allied health?

A systematic literature review was undertaken to understand allied health professionals' experience of and engagement with EBP. The questions guiding the literature review were:

1. *Do allied health professionals value EBP?*
2. *What are the barriers to and facilitators for EBP within allied health?*

The following sections detail the methods, results and interpretation of data that was synthesised as part of the literature review.

1.4.1 Methods

1.4.1.1 Search strategy and selection

Studies were considered for inclusion in the review if they measured barriers and/or facilitators and/or motivators related to allied health professionals' experience of EBP. As described earlier in this chapter, the EBP model was conceptualised as a sequence of five steps which were set out in the Sicily Statement (Dawes et al., 2005). A clinician must first know how to convert a clinical dilemma into a research question. They must then be able to conduct an effective search of the literature and critically appraise the studies. If the evidence is found to be suitable, it must then be applied in practice and the outcome evaluated. Published literature pertaining to allied health experience throughout any of these five steps was considered for inclusion and reflected in the search terms. Intervention studies were included in the second systematic review described later in this chapter and therefore excluded from this review.

Study design could be systematic review with or without a meta-analysis, cohort / prospective observational study, cross-sectional study and case reports. Both qualitative and quantitative studies were included in order to capture the full breadth of data related to the questions guiding the review. Studies needed to have involved one or more of the professional groups listed within the Australian definition of allied health (Allied Health Professions Australia, 2017). This included but was not limited to arts therapy, audiology, chiropractic, dietetics / nutrition, exercise physiology, genetic counselling, music therapy, occupational therapy, optometry, orthoptics, orthotics / prosthetics, osteopathy, perfusion, physiotherapy, podiatry, psychology, rehabilitation counselling, social work, sonography and speech pathology. The outcome of the study needed to measure barriers and/or facilitators related to allied health professionals' experience of EBP. Studies focusing on students were excluded unless they followed the respondents through graduation and during clinical practice. Any studies that were not available in English text were also excluded.

Literature which met the above-mentioned inclusion criteria was identified using a combination of approaches. The electronic databases of Medline, Cumulative Index to Nursing and Allied Health (CINAHL), PsychInfo, Scopus and Cochrane Library were all searched up until June 2018. The initial strategy commenced with combining within-group terms using the Boolean operator "OR". The resultant yield from each term was then

combined using the Boolean operator “AND”. Finally, the Boolean operator “NOT” was used to exclude students and any studies that focused on treatment or management of specific conditions or patient populations. For example, studies on barriers to providing a specific treatment, such as interpersonal therapy or neuromuscular stimulation, were not included as the data typically related only to that intervention. Table 1-2 illustrates the search strategy utilised to identify relevant published literature on the topic.

Journals specific to the topics of EBP and allied health were individually searched and included the International Journal of Evidence Based Health care, The Journal of Allied Health, the Journal of Evidence Informed Social Work and The Internet Journal of Allied Health Sciences. Finally, reference lists from seminal articles and documents were also hand searched for any literature that may have been missed in the previously mentioned strategies.

Table 1-2 Search strategy guiding literature review 1

Search	PICO	Terms	Limits
1	Population	“allied health profession*” or “allied health” or “allied health clinician” or “arts therap*” or audiolog* or chiropract* or diet* or nutrition* or “nutrition therap*” or “exercise physiolog*” or “genetic counsel*” or “music therap*” or “occupational therap*” or optometr* or orthoti* or orthopt* or prostheti* or osteopath* or perfusion* or physiotherapy* or “physical therap*” or podiatry* or psycholog* or neuropsycholog* or “radiograph*” or “rehabilitation counsel*” or “social work*” or sonograph* or “speech pathology*” or “speech therap*” or “speech and language”	NOT students
2	Interest	EBP or “evidence base* practice” or “evidence base” or “evidence base* medicine” or “research utili*ation” or “research implement*” or “knowledge translation” or “knowledge exchange” or “knowledge synthesis” or “practice evaluat*”	NOT treat* or manage*
3	Outcome	Attitude* or skill* or knowledge or behavio* or belief* or barrier* or facilitator*	
4	Combined	SI AND S2	
5	Combined	SI AND S2 and S3	

* Truncation symbol

1.4.1.2 Data appraisal and extraction

Data extracted from the published studies that met the inclusion criteria were recorded in summary tables according to the methodology of the study. The information consisted of: (1) author and year of study publication, (2) objective(s) of the study, (3) study design, population, sample and setting, and (4) key findings related to the questions guiding the review i.e. attitudes/belief, barriers, facilitators and behaviours pertaining to EBP.

The quality of each study was appraised using one of three tools. Cross-sectional studies were evaluated using the Estabrooks’ Quality Assessment and Validity Tool for Cross-Sectional Studies (Squires, Estabrooks, Gustavsson, & Wallin, 2011). This tool assesses

sampling, measurement and statistical analysis techniques against 12 criteria. The Estabrooks' Quality Assessment and Validity Tool for Cross-Sectional Studies has been utilised in a number of published systematic reviews on EBP within health professional groups (Lizarondo, Grimmer-Somers, & Kumar, 2011; Squires et al., 2011).

Qualitative studies were evaluated using the CASP (Critical Appraisal Skills Program) Qualitative Research Checklist (CASP, 2018). This tool assesses the quality of the study using 10 criteria to measure data collection and analysis, recruitment, ethical issues and overall contribution of the study to the body of knowledge.

Systematic reviews were assessed using the AMSTAR (Assessment of Multiple Systematic Reviews). This tool evaluates studies using up to 16 criteria related to study selection, method of study selection and data extraction, risk of bias assessment and conflict of interest. The AMSTAR has been used in a number of published systematic reviews and has established validity and reliability (Kang et al., 2012).

The final quality rating of each study was calculated based on a method developed by de Vet et al. (1997). The total number of points the study achieved is divided by the total possible points, resulting in a score between 0 and 1. The classification of the quality outcome score was as follows: weak <0.50, moderate-weak 0.51-0.65, moderate-strong 0.66-0.79 or strong 0.80-1.0. This method of rating the overall quality of a study has been utilised in numerous published systematic reviews, including those exploring the topic of EBP (de Vet et al., 1997).

1.4.1.3 Data synthesis

The data were analysed using a framework approach as this method is particularly suited for cross-sectional descriptive data typically found in health services research (Ritchie & Lewis, 2003). Framework analysis involves a five-step process as follows:

1. Familiarisation. The researcher becomes immersed in the data by reading through the sources, taking notes and becoming familiar with any recurrent concepts and themes and differences between studies.
2. Identifying a thematic framework. Themes, concepts and important issues are identified and designated a name or descriptive code. A priori issues can be the basis of themes or the themes may emerge 'organically through the analysis process.

3. Indexing. Data is categorised according to themes and ideas. This may be either a numerical system or descriptive.
4. Charting. Data that has been indexed are arranged in charts of themes.
5. Mapping and interpretation. Charts of themes are analysed and schematically presented to illustrate relationships.

The first four steps of this approach were completed by the author of this thesis, with input from the supervisors for the themes identified. Mapping and interpretation were completed by all three investigators, resulting in a conceptual model to explain the interactions between the themes. Each of the investigators has a professional background in different allied health fields and it is noted that this may be perceived as having potential to bias synthesis of the results obtained. However, ensuring the investigators were from different professional backgrounds and collaborating on the development of the theoretical framework was anticipated to minimise the potential for “discipline-specific” favouritism with regards to interpretation of the results.

1.4.2 Results

1.4.2.1 Selection of studies

The search strategies initially identified a total of 5,321 citations which were further refined by excluding students, studies specific to a treatment and text not available in English. This resulted in 197 full-text citations which were retrieved to determine if eligible for inclusion. Studies that published multiple papers on the same dataset were combined and reviewed as a single study if appropriate. Studies utilising mixed-methods were evaluated separately using the appropriate quality appraisal tool.

A total of 67 studies were excluded for the following reasons: (1) Focus on a single outcome measurement tool for a single diagnostic population, (2) Focus on a single treatment / intervention, (3) Focus on organisation policies / processes, (4) No data on barriers, facilitators or EBP behaviours and (5) Focus on students or interns with no follow-up post-graduation.

The flow of studies through the different phases of the review are illustrated in Figure 1-5.

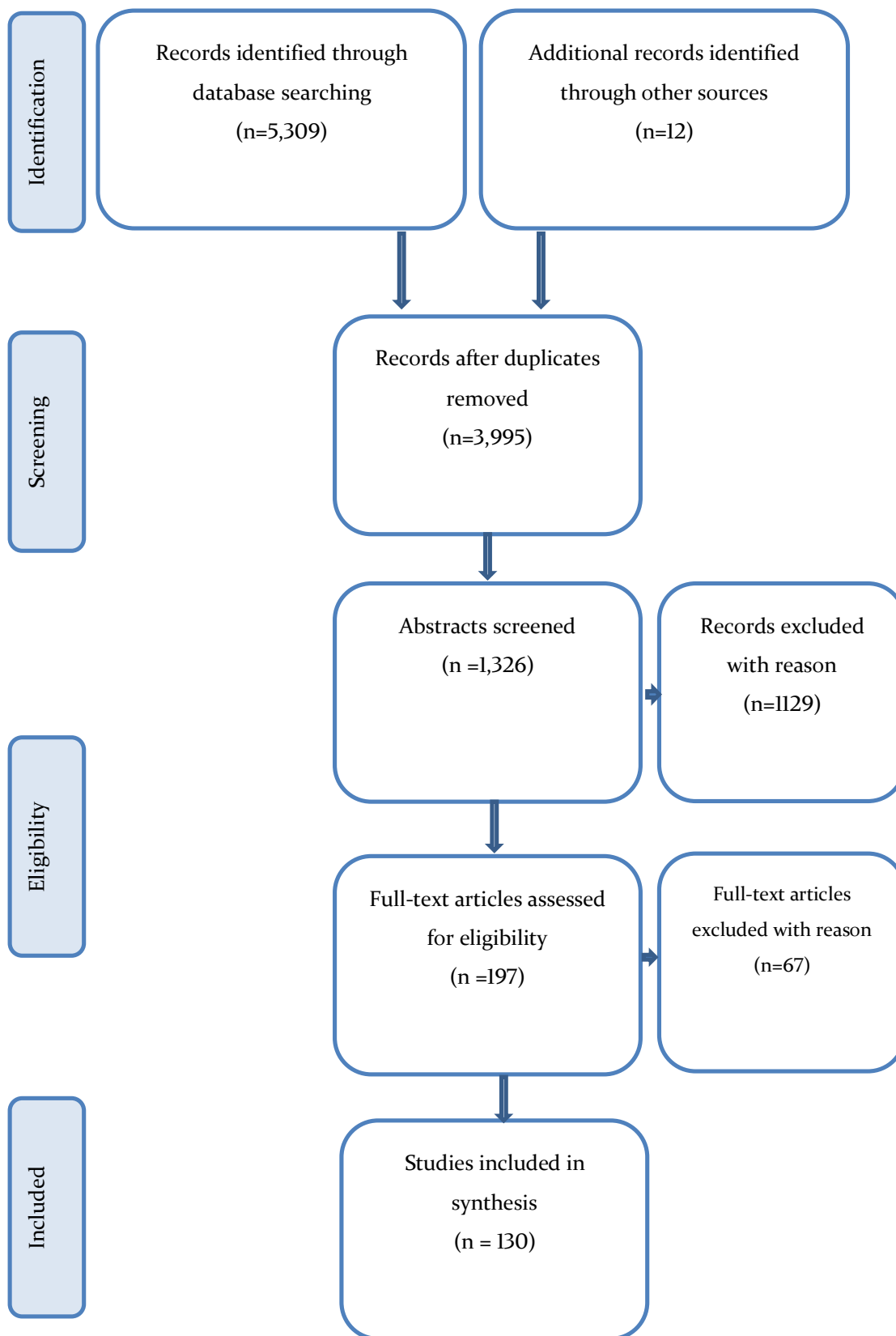


Figure 1-5 Flow of studies through systematic review 1

1.4.2.2 Description of studies included

The final 130 studies included in the synthesis comprised of nine systematic reviews, 90 cross-sectional studies and 31 qualitative studies. Summaries of study characteristics and key findings for all published articles included in the synthesis can be found in Appendix 1, Appendix 2 and Appendix 3.

Figure 1-6 illustrates the distribution of the cross-sectional and qualitative studies with the majority originating from Australia and New Zealand (29%), followed by the USA (21%), United Kingdom (21%), Europe (15%) and Canada (9%). Most of the professions included under the definition of allied health had at least one published study related to EBP barriers, however, most of the studies focused on the broader allied health or multidisciplinary team (MDT 26%), occupational therapy (22%), physiotherapy (21%) and social work (12%).

The studies were heterogeneous in nature with a variety of outcomes measured and study designs utilised. As a result, a meta-analysis was unable to be completed as the large range of instrumentation used made comparison and pooling of outcomes difficult.

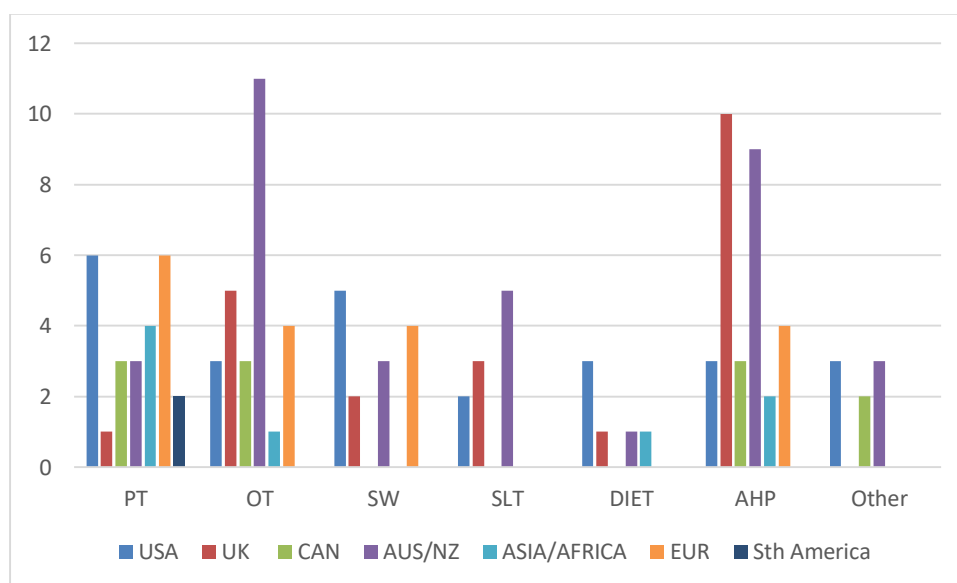


Figure 1-6 Number of publications by country of origin & professional group

1.4.2.3 Methodological quality of studies

1.4.2.3.1 Systematic reviews

Methodological quality of the nine systematic reviews was generally weak. Although most of the studies reported a rigorous literature search strategy, final selection of studies included in the review and data extraction was typically completed by only one author. Excluded

studies were often not listed and/or justified and only one study addressed the issue of heterogeneity in the sample. No reviews completed a meta-analysis, presumably due to the large variation in outcomes measured and instrumentation used. Quality scores utilising the AMSTAR are recorded in Appendix 4.

1.4.2.3.2 Cross-sectional studies

The majority (89%) of cross-sectional studies had methodological limitations related to poor sampling strategies, low response rates and use of instrumentation that had no validation or reliability studies. Statistical analyses were primarily descriptive in nature with only 13 studies (14%) reporting on probability values and/or confidence intervals. Quality scores utilising Estabrooks' Quality Assessment and Validity Tool are recorded in Appendix 5. Distribution of quality scores according to allied health professional group are illustrated in Figure 1-7 and country of origin in Figure 1-8 below.

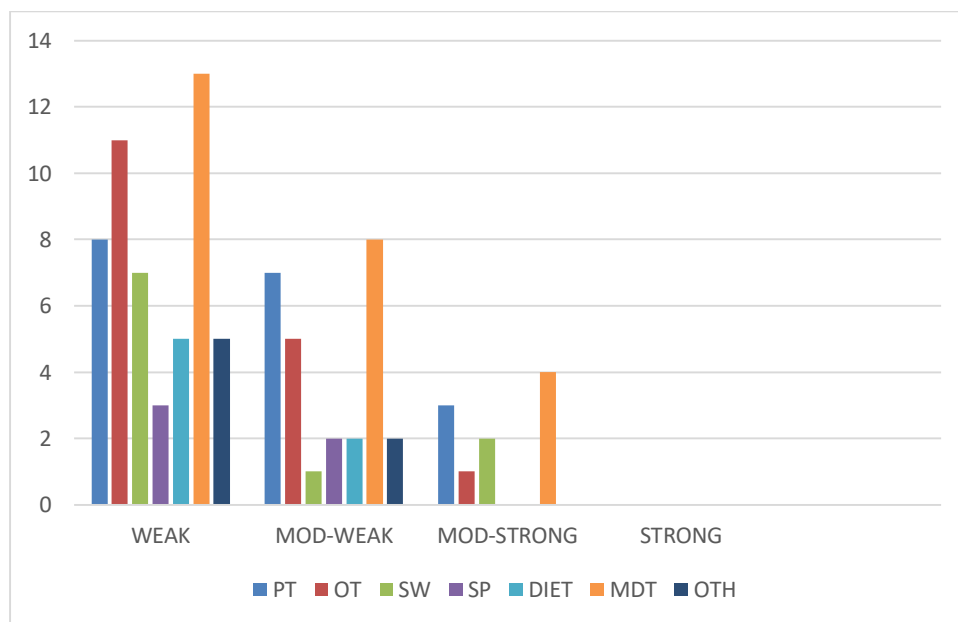


Figure 1-7 Quality of studies according to professional group

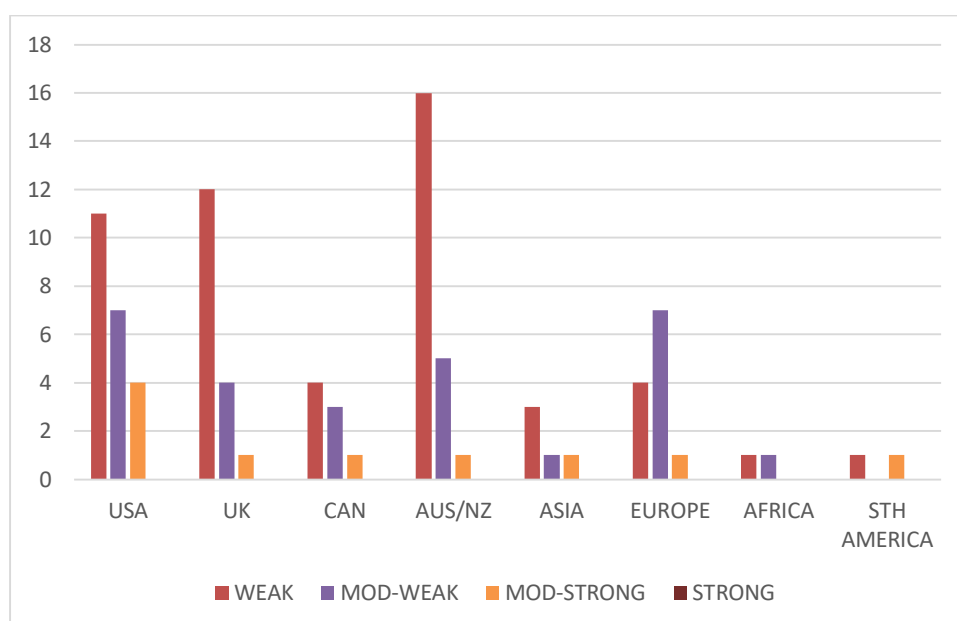


Figure 1-8 Quality of studies according to country of origin

1.4.2.3.3 Qualitative studies

Qualitative studies exploring allied health professionals' experience of EBP were varied in terms of quality with 45% being weak to moderately-weak and 55% scoring moderately-strong to strong. Figure 1-9 illustrates the quality scores according to the allied health professional group who were a focus of the study. Most of the publications related to the larger allied health professional groups including physiotherapy, occupational therapy, speech pathology, social work and the multidisciplinary team. The majority of studies collected data utilising focus group methodology (57%) while only three studies explicitly utilised a theoretical model and/or framework to explain the data. Advocates of EBP have argued that a theoretical model should be utilised when explaining health professionals perceived barriers, enablers and behaviours related to EBP (Eccles, Grimshaw, Walker, Johnston & Pitts, 2005; Francis et al., 2009; Grimshaw, Eccles & Tetroe, 2004; Grimshaw, Eccles, Lavis, Hill & Squires, 2012). The quality of each study was evaluated using CASP and the results can be found in Appendix 6.

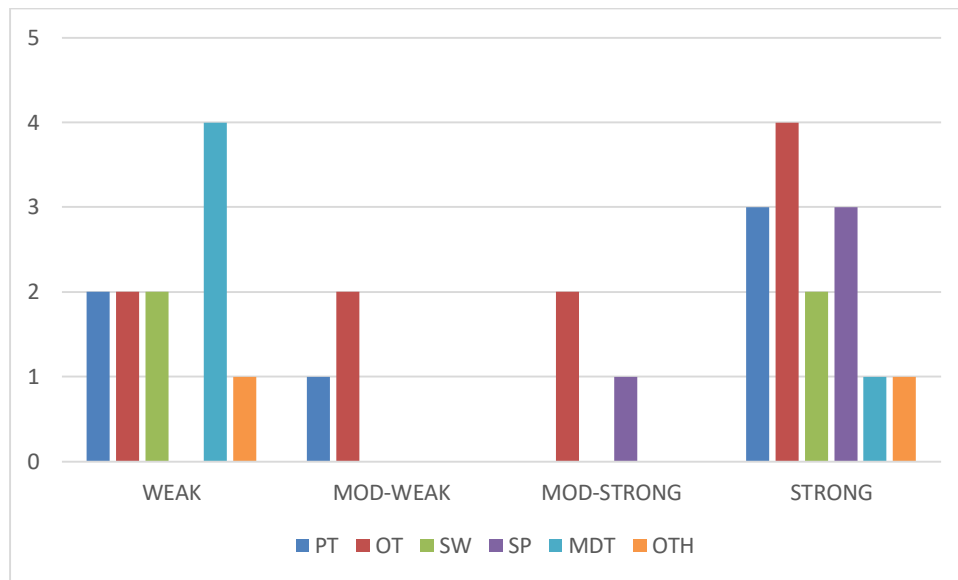


Figure 1-9 Quality of studies according to professional group

1.4.3 Synthesis of findings from the literature review

A theoretical framework was developed from the three elements which were apparent in the data extracted from the 121 studies: clinicians, the organisation in which they operate and the research evidence (Figure 1-10). Education providers, professional associations and regulatory bodies were identified as a fourth key element but were not conceived to overlap with the other three elements in the same way. Rather, they were seen as influencing the other elements.

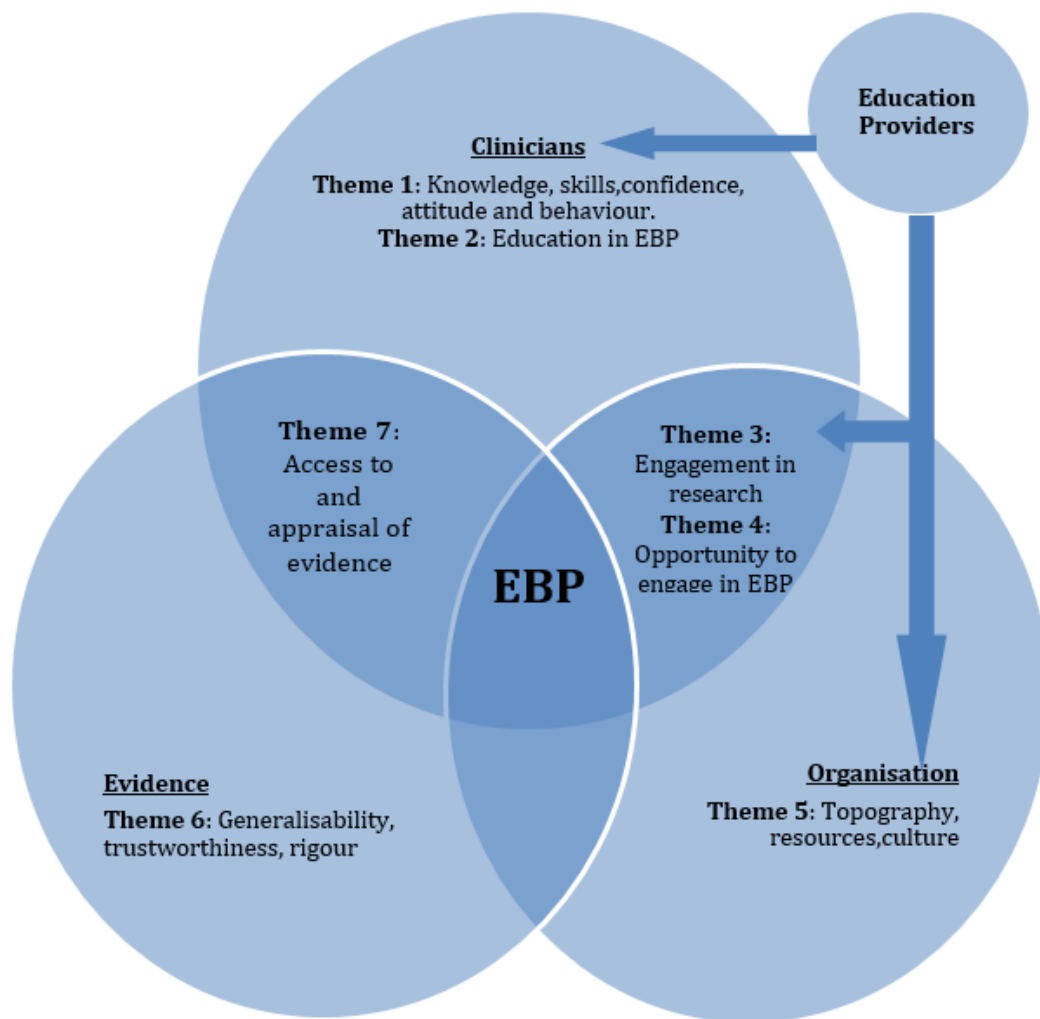


Figure 1-10 Theoretical framework of barriers and facilitators for EBP

Although the model appears static in terms of the relationships between key elements, the themes are in fact dynamic and may occur across all key elements. For example, the notion of time to implement EBP may be reflective of the culture of the organisation and/or the clinicians' skill-set. Further to this, some of the barriers identified as sub-themes may act as enablers in certain situations. It is important to note that this model was developed to enable a visual conceptualisation of the findings from this literature review.

1.4.3.1 Theme 1: Clinician knowledge, skills, confidence, attitudes and behaviour related to EBP

Central to the EBP movement is the assumption that clinicians understand both the philosophy and how to apply it in practice. However, several studies have identified that allied health clinicians have limited knowledge of the 3-circle model of EBP.

Physiotherapists from a variety of different NHS settings in the Wessex region were found to vary greatly in their understanding of what constitutes evidence based practice as well as their understanding of the steps required to translate evidence into practice in the clinical setting (Barnard & Wiles, 2001). Psychology graduates were also found to have limited understanding of EBP with only 3.7% of 1,195 respondents to a cross-sectional survey able to identify all three components of the model. The majority (81.2%) identified only one component, which was utilising research findings (Luebbe, Radcliffe, Callands, Green, & Thorn, 2007). These results were similar to qualitative data collected in focus group discussions with clinical psychologists which demonstrated that the concept of evidence based practice was not well understood (Wilson, Armoutliev, Yakunina, & Werth Jr, 2009a). Respondents in all three studies included a significant number of recent graduates or junior staff who presumably would also have graduated recently. It is surprising that studies continue to reveal the lack of understanding of EBP, given that most recent graduates of allied health professional courses are likely to have been exposed to education and training on EBP.

1.4.3.1.1 Clinician skills and confidence related to EBP

Confidence in EBP requires both knowledge of the model and skills in the steps required to implement EBP in practice. The majority of studies included in this synthesis identified that allied health professionals either do not have these skills or the confidence in these skills to enable the subsequent EBP behaviour. An important early step of EBP requires the clinician to be able to locate evidence. Over the last 60 years, significant technological progressions have resulted in an extraordinary growth of online resources, including evidence databases. Many journals are no longer available as catalogue items. Instead, the clinician who is seeking evidence must have adequate computer skills and knowledge of databases in order to be able to locate the information they are seeking. The clinician must also know how to combine and exclude words with Boolean operators and use MeSH terms in order to maximise outcomes of the search strategy. Therefore, proficiency in computer use and

search strategies can now be considered a fundamental skill necessary to effectively and efficiently search for and locate relevant evidence. Allied health professionals have been found to rate their technical skills with computer use as very poor (Upton, 1996). A large scale study with 790 Australian allied health professionals found that confidence in technical computer skills was positively associated with higher rates of use of an online evidence system (Gosling & Westbrook, 2004b). Interestingly, there was no relationship between having received training specific to the on-line evidence system and the frequency or success in locating information using the system. From this, it would appear that general computer skills literacy may be more important to promote efficiency in locating information than program specific training. However, caution must be taken with this conclusion as there was no appraisal of the quality of the education program for use of the online evidence system.

Once clinicians have sourced the information to answer their clinical questions, they must be able to critically analyse it for validity and usefulness. Physiotherapists from both public and private practice report a lack of confidence in critically appraising published research studies (Fruth et al., 2010; Iles & Davidson, 2006; Jette et al., 2003). Occupational therapists rate their skills in critically appraising literature as low with one of the most commonly reported barriers to adopting EBP being limited searching and appraisal skills (Dubouloz, Egan, Vallerand, & von Zweck, 1999; Lyons, Brown, Tseng, Casey, & McDonald, 2011; McCluskey, 2003; Salls, Dolhi, Silverman, & Hansen, 2009). Similar results were found for other allied health disciplines including speech pathology (Metcalf et al., 2001; Zipoli & Kennedy, 2005), podiatry (Upton & Upton, 2006) and dietetics (Thomas, Kukuruzovic, Martino, Chauhan, & Elliott, 2003)

1.4.3.1.2 Clinician attitudes and beliefs about EBP

There has been a considerable amount of research exploring allied health clinicians' attitudes and beliefs about EBP. Attitudes and beliefs refer to a clinician's perspective on the importance, need and use of EBP in practice (Dizon & Grimmer-Somers, 2011). For example, does a clinician identify assessing the quality of research evidence as an important aspect of clinical decision making? Physiotherapists across a variety of settings, specialities and geographical locations generally hold positive attitudes and beliefs towards EBP (Grimmer-Somers et al., 2007a; Iles & Davidson, 2006; Jette et al., 2003; Kamwendo, 2002; Salbach et al., 2007; Scholten-Peeters et al., 2013; Schreiber et al., 2008b; Scurlock-Evans et

al., 2014). However, it must be noted that this is dependent on when the respondent graduated as two studies have found a correlation between years of practice and beliefs about EBP i.e. clinicians who had been licensed for less than 5 years were more likely to agree that EBP is necessary and improves patient care ((Jette et al., 2003; Salbach et al., 2007).

Occupational therapists hold similar positive attitudes towards EBP. A systematic review of publications exploring occupational therapists' relationship with EBP found that all 32 studies reported positive attitudes towards EBP to at least some degree (Upton et al., 2014). As per physiotherapy, these findings were consistent across various specialities (Lyons et al., 2010) and regions (Bennett et al., 2003; Brown et al., 2010b; Döpp et al., 2012). However, it is important to note that there is a small but significant proportion of respondents who held a negative attitude towards EBP, reporting that it is "too complicated" and requires too much effort to use in daily practice (Upton et al., 2014). Qualitative studies also revealed that some occupational therapists feel threatened by EBP due to their concerns about the repercussions related to being unable to deliver evidence-based treatments (Dubouloz, 1999).

Other allied health disciplines including dietetics, speech and language therapy, social work and psychology all report high levels of positive attitudes and beliefs towards EBP (Aarons & Sawitzky, 2006; Byham-Gray, Gilbride, Dixon, & Stage, 2005; Jansen, Rasekaba, Presnell, & Holland, 2012; McCurtin & Roddam, 2012; Muttiah, Georges, & Brackenbury, 2011; Pignotti & Thyer, 2009; Thomas et al., 2003; Vogt, Byham-Gray, Parrott, & Touger-Decker, 2012; Wilkinson, Hinchliffe, Hough, & Chang, 2012; Zipoli & Kennedy, 2005). As per occupational therapy, some studies found there were a number of respondents who were threatened by EBP. Foster et al's in-depth interviews with a group of speech pathologists revealed that the many perceived barriers to implementing EBP resulted in the clinician feeling frustrated and disempowered (Foster, 2015).

A number of researchers have explored if there is a difference in beliefs and attitudes towards evidence-based practice between the different allied health professional groups. The findings have varied from study to study. For example, a cross-sectional survey of 182 allied health professionals found that occupational therapists and social workers had lower EBP use scores than dietitians, physiotherapists and psychologists (Wilkinson et al., 2012).

Another study found that speech and language therapists and dieticians are more likely to perceive research as being important for professional practice as compared to both physiotherapists and occupational therapists (Metcalf et al., 2001). Yet another study found that dieticians were more likely to report a need to increase the use of evidence in their daily practice as compared to physiotherapists and occupational therapists (Heiwe et al., 2011). The variation in findings may be related to several factors including the different tools used to measure the dependent variable (EBP beliefs and attitudes) and the limited statistical analyses conducted on the data. None of the studies investigated the impact of factors such as higher qualifications or workplace setting on the allied health professionals' experience of EBP.

1.4.3.2 Theme 2: Clinician education in EBP

It would be reasonable to assume that clinicians who have graduated within the last 10 years have received some formal training on EBP. Studies support this premise with the majority of recent occupational therapy and physiotherapy graduates agreeing they have learnt about EBP as part of their academic preparation (Salbach et al., 2007; Salls, Dolhi, Silverman & Hansen, 2009). Most of these studies found that there is a negative correlation between time since graduation from entry level degree and knowledge of EBP i.e. respondents with more than 15 years of experience are less likely to agree that they have learnt about EBP as part of their undergraduate training.

A number of studies found that respondents with post-graduate qualifications have a more positive attitude towards EBP and are more confident with the technical terms and skills necessary to retrieve and critically analyse research (Byham-Gray et al., 2005; Hadley, Hassan, & Khan, 2008; Jette et al., 2003; Scurlock-Evans et al., 2014; Upton et al., 2014; Zipoli & Kennedy, 2005). This is not a surprising finding as higher-level degrees, particularly at Masters and Doctorate level, typically include a large research component. However, a distinction must be made between qualifying courses at a post-graduate level and higher degree research courses. Over the last 10 years in Australia, there has been a notable increase in many allied health qualification courses being offered at a postgraduate level. For example, a Master of Occupational Therapy enables students who have a degree in another field to complete an accelerated course to obtain entry level qualifications as an occupational therapist. These entry level qualifying post-graduate courses do not have a

significant focus on research so it is possible that these graduates may experience similar barriers to those allied health professionals graduating with a Bachelor level of qualification.

1.4.3.3 Theme 3: Clinician engagement in research

Numerous studies with all of the larger allied health professional groups have found that exposure to and engagement in research activities improves EBP attitudes and beliefs, reduces perception of barriers and is a predictor for EBP behaviours, such as implementing research into practice (Brown et al., 2010a; Grimmer-Somers et al., 2007a; Lyons et al., 2010; Salbach et al., 2007). However, the number of allied health professionals engaging in research appears to be low, although they report a desire to participate in such activities (Byham-Gray et al., 2005; Pighills, Plummer, Harvey, & Pain, 2013; Zipoli & Kennedy, 2005, Metcalfe et al., 2001; Taylor, 2009).

1.4.3.4 Theme 4: Opportunity to engage in EBP

Several factors have been identified in the literature as important features necessary to support engagement in EBP, including time, peer support and organisational systems and structure.

Lack of time was the most commonly cited barrier to the implementation of EBP across all the allied health disciplines in the literature reviewed (Byham-Gray et al., 2005; Delany & Bialocerkowski, 2011; Döpp et al., 2012; Fruth et al., 2010; Gosling & Westbrook, 2004b; Grimmer-Somers et al., 2007a; Heiwe et al., 2011; Jette et al., 2003; Kamwendo, 2002; Lai, Teng, & Lee, 2010; McCluskey, Vratsistas-Curto, & Schurr, 2013a; McCurtin & Roddam, 2012; McKenna, Bennett, Dierselhuis, et al., 2005; Mota da Silva, da Cunha Menezes Costa, Garcia, & Costa, 2014; O'Connor & Pettigrew, 2009; Pighills et al., 2013; Robertson, Graham, & Anderson, 2013; Salbach et al., 2007; Salls et al., 2009; Schreiber et al., 2008b; Scurlock-Evans et al., 2014; Fern Swedlove & Etcheverry, 2012; Thomas et al., 2003; Upton, 1999; Upton & Upton, 2006; Valdes & von der Heyde, 2012; Vogt et al., 2012; Zipoli & Kennedy, 2005). Clinicians argue there is insufficient time to look for evidence, read research and then integrate the findings into practice. In Scurlock-Evan's systematic review, physiotherapists reported lack of time and workload pressures as the most significant barrier to the uptake and implementation of evidence based practice (Scurlock-Evans et al., 2014). Robertson's qualitative study exploring occupational therapists' views of evidence found that there was no time factored in to a day for sourcing evidence. The participants

reported that finding evidence needed to be quick, and reading literature was the least preferred option for sourcing evidence (Robertson et al., 2013). Similarly, McCurtin found that up to 81% of speech and language therapists reported lack of time to read and implement research as the single greatest barrier to EBP (McCurtin & Roddam, 2012).

Some allied health disciplines have developed tools to assist clinicians to quickly and easily locate and interpret research, including PedRO, OTSeeker and SpeechBite. OTSeeker is a database of published studies that have already been critically appraised for validity and interpretability. Clinicians type in the topic of interest and published studies are listed with scores for validity and statistical reporting. A study exploring a group of occupational therapists' use of OTseeker, found that only 56% of 213 respondents had accessed it, of whom the majority had done so infrequently. This is despite 86% having heard of this electronic evidence database which was developed to assist allied health professionals to easily locate and interpret research. Insufficient time was the primary reason identified for lack of use of OTseeker (McKenna, Bennett, Dierselhuis, et al., 2005). A study on the uptake of SpeechBite also found that time was a barrier to use of this tool (Smith et al., 2010).

Few studies differentiate between time "on the job" to conduct EBP activities versus the clinician's personal time. One study found that "family situation" such as valuing free time, was a barrier to engaging in research activities (Kamwendo, 2002). There appears to be a perception that the organisations in which allied health professionals work do not generally provide protected time for EBP activities and research engagement. However, this perception may not be entirely accurate in the Australian context where allied health professional groups are professionally autonomous and typically responsible for their own clinical time. It is possible that allied health professionals may be 'allowed' to take time to engage in EBP activities but experience other barriers which prevent them from doing so.

1.4.3.5 Theme 5: Organisation – Site topography, resources and culture

The organisations in which clinicians work play a critical role in supporting EBP.

Organisational features which have been identified in the literature as facilitators or barriers to EBP include site location / type / size / affiliations, availability of EBP resources and culture.

A number of studies found a relationship between EBP behaviours, the number of staff in a department and affiliations with academic institutions. Physiotherapists, occupational

therapists and members of multidisciplinary teams, such as those found in stroke care, are more likely to receive workplace training on research and implement research in practice, if they work in an organisation with more than 20 full-time clinicians (Salbach et al., 2007, Pain et al., 2004; Barnard & Wiles, 2001; Döpp et al., 2012; Kamwendo, 2002; Salbach et al., 2007). This is most likely due to increased opportunities to engage in research which are likely to arise in larger institutions, particularly those with strong connections to universities.

Some studies have found that clinicians working in facilities in rural settings have less access to EBP resources such as hard-copy journals and the internet (Salbach et al., 2007). By contrast, clinicians working in urban areas have better access to lectures on research findings and are more likely to have been trained in EBP and have higher levels of qualifications (Bennett et al., 2003; Pain et al., 2004). However, not all studies have found a relationship between facility type and research utilisation. A survey of 165 allied health professionals compared perceived research use and knowledge across work environments and found no significant relationship between size and location (urban or rural) and self-perceived use of research. This is despite clinicians in urban settings reporting better access to research related presentations and libraries (Pain et al., 2004). This would suggest that enhanced access to resources does not necessarily correlate with an increase in EBP behaviours, such as consuming research literature.

Resources commonly associated with EBP include computers, journals, library facilities, funding to attend courses / workshops and staffing. All of the allied health professional groups have identified a lack of these resources as a significant barrier to EBP. The most commonly cited barriers throughout the published literature was lack of time, lack of funding and staff shortages (Fruth, 2010; Salls, 2009; Byham-Gray, 2006; Upton, 2006). However, one study that explored clinicians' use of an online evidence retrieval system found that although staff shortages, access to resources and time were cited as barriers, there was no objective differences in these measures between high and low use sites (Gosling, Westbrook, & Coiera, 2003). This would suggest that difficulties accessing resources may be overcome by some clinicians, although the reasons for this remain unclear.

Workplace culture can be defined as the "collective behaviour, values, expectations and attitudes of people, which are developed and maintained as a direct result of an

organisation's policies, practices, systems, structures and staffing processes" (Commonwealth of Australia, 2000, p. 27). Examples of organisational behaviours which demonstrate an evidence-based culture include, but are not limited to, partnering with academic institutions, offering training / education on research and provision of journal clubs. Several studies have found that a lack of research focus or priority within the organisation is a barrier to clinician engagement with EBP (Aarons & Sawitzky, 2006; Delany & Bialocerkowski, 2011; Robertson et al., 2013; Upton et al., 2014). A qualitative study investigating the factors influencing variations in medical staff and allied health clinicians' use of an online evidence retrieval system found that the difference between hospitals and professionals groups use of the system was due to the presence of champions and an organisational culture which support EBP (Gosling et al., 2003).

1.4.3.6 Theme 6: Evidence insufficiency, lack of generalizability and rigor

Clinicians across all allied health fields report a lack of relevant research as a reason why published evidence does not guide their practice. (Fruth et al., 2010; Jansen et al., 2012; Jette et al., 2003; Metcalfe et al., 2001; O'Connor & Pettigrew, 2009; Salbach et al., 2007; Scurlock-Evans et al., 2014; Upton et al., 2014; Wilson et al., 2009a; Zipoli & Kennedy, 2005). Where evidence is identified, the relevance of that evidence to the clinical question is another barrier to its use in informing clinician decision-making. A survey of 488 physiotherapists found that lack of generalizability of research findings to specific patient populations and difficulty in applying findings to patients with unique characteristics were commonly identified barriers to the implementation of research findings in clinical practice (Jette et al., 2003). A similar survey of 715 allied health clinicians (occupational therapists, physiotherapist, speech and language pathologists and dietitians) found that 53% of respondents reported problems with evidence, including poor generalisability and conflicting results, as significant barriers to implementing research (Metcalfe et al., 2001).

Finally, even if evidence has been identified and deemed to be relevant to the clinical question, poor methodological rigor of the evidence has been cited as a reason for not using it to inform decision making. Speech pathologists in particular have identified methodological inadequacies in published research as a barrier to applying the findings in practice (O'Connor & Pettigrew, 2009). Although other disciplines have identified conflicting results in the literature as a significant barrier to the implementation of EBP,

further analysis revealed that speech pathologists perceive more barriers than both occupational therapists and physiotherapists (Metcalf et al., 2001).

Another argument forwarded by allied health professionals against the use of research evidence in practice is that it does not consider the circumstances particular to individual clients. This relates in part to the studies available and to the paradigm of some fields of practice and/or health professional perspectives. Studies on EBP in social work indicate tension between the EBP philosophy and the epistemological perspectives of social workers i.e. the nature of knowledge and truth (Simmons, 2012, p. 14). More recently, both occupational therapy and physiotherapy research on evidence based practice have found that clinicians experience a sense of discomfort and tension between the philosophies of evidence based practice whilst trying to maintain a client-centred practice (Scurlock-Evans et al., 2014; Upton et al., 2014).

1.4.3.7 Theme 7: Clinician access, appraisal and application of evidence

This theme is closely related to the previous theme regarding evidence insufficiency and difficulties with generalisation of research findings. However, this theme focuses on the clinician's engagement with the evidence. As discussed in the previous section, clinicians commonly cite a lack of evidence as a barrier to their implementation of EBP in daily practice. However, there is a caveat to this argument in that relevant evidence often does exist. Allied health professionals may not be accessing this evidence for a number of reasons including an inability in the first instance to locate it. Nowhere is this more apparent than in the poor uptake of highly disseminated guidelines. A cross-sectional survey of 271 physiotherapists working in primary care found that only 13% knew where to find guidelines relevant to their work and 47% of these respondents implemented guidelines in their practice on a frequent basis (Bernhardsson, Johansson, Nilsen, Oberg, & Larsson, 2014). A multidisciplinary qualitative Australian study exploring the barriers to implementing stroke guidelines found that some clinicians had poor beliefs about their capabilities to apply the evidence in practice. Other clinicians frequently forgot to either provide, or document provision of evidence based treatments recommended in the guidelines (McCluskey et al., 2013a).

Another study by McDermott et al found that social workers predominantly relied on past experience to guide their clinical decision making, despite the availability of a repository of

empirical evidence (McDermott, Henderson, & Quayle, 2017). The repository consisted of systematic reviews relevant to social work interventions and had been established by students and the participants in this qualitative study. This would suggest that even though the social workers were aware of where they could access current evidence, and had been specifically involved in establishing an evidence repository, they did not use empirical evidence when making clinical decisions.

Several studies have noted low levels of self-perceived ability to identify relevant literature amongst allied health professionals (Bennett et al., 2003; Delany & Bialocerkowski, 2011; Gosling et al., 2003; Schreiber et al., 2008b; Thomas et al., 2003). Further to this, some clinicians may have access to only a limited number of sources of information coupled with the perception of insufficient time to conduct a search creating conditions conducive to clinicians not being able to find relevant research that may exist (Byham-Gray et al., 2005; Fruth et al., 2010; Salls et al., 2009; Stevens, 2011; Upton & Upton, 2006).

Some clinicians have reported that they do not trust the information that is provided in research articles due to perceived methodological inadequacies in the research (O'Connor and Pettigrew, 2009). This can be argued as being a positive finding supporting EBP as it demonstrates that clinicians may be critically appraising the evidence they encounter. However, it may also be an excuse to not begin searching for evidence to a new clinical question where previous searches on other questions have only been able to identify methodologically flawed research. Grimmer-Somers et al (2007) found that clinicians who had concerns about methodological strengths of available research were more sceptical of the EBP movement. This concern should also be weighed against the consideration that many allied health professionals report having little confidence in their ability to assess the methodological quality of a range of research designs.(Salbach et al., 2007; Schreiber et al., 2008b; Thomas et al., 2003). Related to this was another finding by Grimmer Somers that those with higher levels of research training were less likely to have this scepticism, suggesting they could account for these methodological flaws while identifying useful elements of research. This indicates that the real barrier to using evidence in clinical decision making may be the skills and confidence of clinicians to appraise and identify limitations within a study, yet still draw out useful information instead of “throwing the baby out with the bath water”.

1.4.4 Discussion

The objectives of this literature review were to obtain a better understanding of allied health professionals' experience of EBP and to answer the following questions:

1.4.4.1 Do allied health professionals value EBP?

Allied health professionals generally have a positive attitude towards EBP and research utilisation. Most of the studies revealed that respondents believe that published evidence can improve patient care and that allied health professionals have an ethical obligation to provide evidence-based treatments. However, there were also a number of respondents who were threatened and disempowered by EBP or felt it did not fit a client-centred model of practice. Some studies found that respondents who engaged in research improved in their attitudes and beliefs towards EBP. It is possible that a negative attitude towards EBP may be influenced by a lack of exposure to EBP activities and consequent lack of confidence with the skills required to translate evidence into practice.

1.4.4.2 What are the barriers to and facilitators for EBP within allied health?

The many barriers and facilitators to EBP were organised into a series of themes relating to one or more of three elements: the clinician, the organisation and the evidence. Factors relating to the clinician included EBP knowledge, skills, confidence and attitudes. Numerous studies identified a lack of skills in locating, appraising, implementing and evaluating research within clinical practice. This was apparent across all the allied health professional groups, all work settings, many countries and most specialities within the professional groups. It is surprising to find that the most recent studies continue to identify a lack of skills as a significant barrier given that EBP is reported to be incorporated into undergraduate training for most, if not all, allied health professions. This would suggest there are other factors which influence the perception of barriers. This is supported by Grimmer-Somers' study which found that allied health professionals who are positive about undertaking research are less likely to perceive barriers to the uptake of evidence-based practice (Grimmer-Somers et al., 2007b). Furthermore, studies have also shown a strong correlation between prior engagement in research and a more positive attitude towards and higher engagement in EBP activities. It can be argued that providing clinicians with the opportunity to engage in research may succeed in reducing anxiety about EBP and decreasing the perception of barriers such as time.

Barriers and facilitators related to the organisation included location and size of the workplace, availability of resources and overall culture. Time constraints were the most commonly reported barrier to EBP and this appeared to relate directly to increased workloads and lack of protected non-clinical time. Qualitative studies provided in-depth information on allied health professionals' struggle to meet clinical demands and how this impacted on EBP behaviours. However, another study found that there was no difference in clinician use of an online evidence-retrieval database between those respondents who identified a lack of time and resources as a barrier and those respondents who did not identify such barriers. Once again, this would suggest that there are additional factors that influence allied health professionals' engagement with EBP.

The evidence itself was the third element contributing to barriers and facilitators for EBP. Allied health professionals perceive that the evidence base is limited, difficult to translate into practice and often methodologically flawed. Furthermore, clinicians argue that the evidence does not often suit their particular client / population, leading to an argument that the philosophy of evidence-based practice conflicts with client-centred practice. One of the reasons for the argument against the quality of evidence may relate more to a clinician's ability to firstly locate the evidence and then critically analyse it before finally implementing it into practice. It is possible that there is sufficient evidence, but the clinician does not have the skills at one or more of the stages described in the Sicily Statement (Dawes et al., 2005) to be able to find the evidence and subsequently implement it. One of the most persuasive arguments for this is the poor and inconsistent implementation of evidence based clinical guidelines. One study indicated only 13% of physiotherapist knew where to find guidelines relevant to their practice (Bernhardsson et al., 2014). Another study found that clinicians did not implement the recommendations from clinical guidelines due to lack of confidence in their skills to provide the intervention and/or assessment (McCluskey et al., 2013a). These studies suggest that although there may be relevant evidence available, clinicians still do not access and/or apply it in practice.

1.4.5 Conclusion

The systematic review included a total of 130 studies exploring the barriers to and facilitators for EBP as pertains to allied health professionals. The findings were synthesised into a conceptual framework and some recurrent themes were identified. Allied health

professionals have positive attitudes towards and beliefs about EBP but lack confidence to undertake the steps required to translate evidence into practice.

The next section will explore published studies on efforts to enhance the uptake of EBP with allied health professionals.

1.5 Systematic literature review 2: Can allied health professionals' EBP attitudes, beliefs, skills, confidence and behaviours be enhanced?

The first literature review conducted as part of this thesis identified that allied health professionals perceive numerous barriers which impact on their ability to undertake EBP activities, such as appraising and implementing evidence in practice.

The questions guiding this second literature review were:

1. *“Can allied health professionals EBP attitudes, beliefs, skills, knowledge, confidence and behaviours be changed?”*
2. *“What is the effectiveness of different interventions to enhance the uptake of EBP with allied health professionals?”*
3. *“Are different interventions effective for different allied health professional groups?”*

The following sections detail the methods, results and interpretation of data that was synthesised as part of the review.

1.5.1 Methods

1.5.1.1 Search strategy and selection

Studies were considered for inclusion in the review if the objective was to influence the uptake of EBP with at least one of the allied health professional groups. As described earlier, the Sicily Statement defined the process of EBP as a series of 5-steps including formulating a research question, locating and appraising evidence, then implementing this evidence into practice and evaluating the outcomes. Published literature on interventions to enhance allied health engagement in any one of the five steps was considered for inclusion in this review.

Study design could be systematic reviews with or without a meta-analysis, randomised or non-randomised trials, quasi-experimental or pre-post intervention design and formative

evaluations. Both qualitative and quantitative methodologies were included in order to capture the full breadth of data related to the questions guiding the review. Studies needed to involve one or more of the professional groups listed within the Australian definition of allied health (Allied Health Professions Australia, 2017). This included but was not limited to arts therapy, audiology, chiropractic, dietetics / nutrition, exercise physiology, genetic counselling, music therapy, occupational therapy, optometry, orthoptics, orthotics / prosthetics, osteopathy, perfusion, physiotherapy, podiatry, psychology, rehabilitation counselling, social work, sonography and speech pathology. The outcome of the study needed to measure change in any one or more of EBP attitudes, beliefs, knowledge, skills, and/or behaviours. These constructs were operationalised as follows: EBP attitudes and beliefs refer to a clinician's perspective on the importance, need and use of EBP in practice; EBP behaviours refer to any activities a clinician engages in as part of the 5-steps of EBP as described in the Sicily Statement; EBP knowledge refers to a clinician's understanding of the definition of EBP and awareness of EBP behaviours and EBP skills refer to a clinician's ability to undertake the 5-steps described under EBP behaviours. Change in any of these constructs needed to be objectively measured using methods / tools such as surveys, adherence to protocols / pathways and medical record audits. Studies on students were excluded unless they included data following graduating and during clinical practice. Any studies that were not available in English text were excluded.

Literature which met the above-mentioned inclusion criteria was identified using a combination of approaches. The electronic databases of Medline, Cumulative Index to Nursing and Allied Health (CINAHL), PsychInfo, Scopus and Cochrane Library were all searched up until April 2018. The initial strategy commenced with combining within-group terms using the Boolean operator "OR". The resultant yield from each term was then combined using the Boolean operator "AND". Finally, the Boolean operator "NOT" was used to exclude students and any studies that focused on treatment or management of specific conditions or patient populations. For example, studies on barriers to providing a specific treatment, such as interpersonal therapy or neuromuscular stimulation, were not included as the data typically related only to that intervention. Table 1-3 illustrates the search strategy utilised to identify relevant published literature on the topic.

Table 1-3 Search strategy guiding literature review 2

Search	PICO	Terms	Limits
1	Population	“allied health profession*” or “allied health” or “allied health clinician” or “arts therap*” or audiolog* or chiropract* or diet* or nutrition* or “nutrition therap*” or “exercise physiolog*” or “genetic counsel*” or “music therap*” or “occupational therap*” or optometr* or orthoti* or orthopt* or prostheti* or osteopath* or perfusion* or physiotherapy* or “physical therap*” or podiatry* or psycholog* or neuropsycholog* or “radiograph*” or “rehabilitation counsel*” or “social work*” or sonograph* or “speech pathology*” or “speech therap*” or “speech and language”	NOT students
2	Interest	EBP or “evidence base* practice” or “evidence base” or “evidence base* medicine” or “research utili*ation” or “research implement*” or “knowledge translation” or “knowledge exchange” or “knowledge synthesis” or “practice evaluat*”	NOT treat* or manage*
3	Outcome	Attitude* or skill* or knowledge or behavio* or belief* or barrier* or facilitator*	
4	Combined	S1 AND S2	
5	Combined	S1 AND S2 and S3	

* Truncation symbol

Journals specific to the topics of EBP and allied health were individually searched and included the International Journal of Evidence Based Health care, The Journal of Allied Health, the Journal of Evidence Informed Social Work and The Internet Journal of Allied Health Sciences. Finally, reference lists from seminal articles and documents were also hand searched for any literature that may have been missed in the previously mentioned strategies.

1.5.1.2 Data appraisal and extraction

Data extracted from the published studies that met the inclusion criteria were recorded in summary tables according to the methodology of the study. The information consisted of:

(1) Author and year of study publication, (2) Objective(s) of the study, (3) Study design, population, sample and setting, and (4) Key findings related to the questions guiding the review i.e. attitudes/belief, barriers, facilitators and behaviours pertaining to EBP.

The quality of each study was appraised using one of four tools. Randomised trials were evaluated using the PEDro scale. This widely accepted assessment tool consists of up to 11 items addressing features such as blinding, sampling strategy and statistical analyses. The PEDro has well established reliability and validity (de Morton, 2009).

Pre-post intervention studies were evaluated using Estabrooks' Quality Assessment and Validity Tool (Squires et al., 2011). This tool assesses sampling, measurement and statistical analysis techniques against 12 criteria. The Estabrooks' Quality Assessment and Validity Tool has been utilised in a number of published systematic reviews on EBP within health professional groups.

Qualitative studies were evaluated using the CASP (Critical Appraisal Skills Program) Qualitative Research Checklist (CASP, 2018). This tool assesses the quality of the study using 10 criteria to measure data collection and analysis, recruitment, ethical issues and overall contribution of the study to the body of knowledge.

Systematic reviews were assessed using the AMSTAR (Assessment of Multiple Systematic Reviews). This tool evaluates studies using up to 16 criteria related to study selection, method of study selection and data extraction, risk of bias assessment and conflict of interest. The AMSTAR has been used in a number of published systematic reviews and has established validity and reliability (Kang et al., 2012).

The final quality rating of each study was calculated based on a method developed by de Vet et al. (1997). The total number of points the study achieved is divided by the total possible points, resulting in a score between 0 and 1. The classification of the quality outcome score was as follows: weak <0.50, moderate-weak 0.51-0.65, moderate-strong 0.66-0.79 or strong 0.80-1.0. This method of rating the overall quality of a study has been utilised in numerous published systematic reviews, including those exploring the topic of EBP (de Vet et al., 1997).

1.5.1.3 Data synthesis

Findings from the data were synthesised using a pre-defined framework from the Cochrane Effective Practice and Organisation of Care (EPOC) group. The EPOC group developed a taxonomy of health systems interventions consisting of four main domains: delivery arrangements, financial arrangements, governance arrangements and implementation strategies. Each domain includes major categories and subcategories. The domain of implementation strategies is described as interventions targeting changes in behaviour of health care professionals or the organization or use of health services by consumers. Categories within this domain include organisational culture, interventions targeting health care workers and intervention targeting specific conditions, types of practice or settings. The aim of this review was to identify literature on interventions that aim to change allied health professionals' behaviours. Therefore, findings were grouped using the EPOC taxonomy for interventions targeting health care professionals' behaviour.

1.5.2 Results

1.5.2.1 Selection of studies

The search strategies initially identified a total of 1,578 citations which were further refined by excluding students, studies specific to a treatment and text not available in English. This resulted in 151 full-text citations which were retrieved to determine if eligible for inclusion. Studies that published multiple papers on the same dataset were combined and reviewed as a single study. Studies utilising mixed-methods were evaluated separately using the appropriate quality appraisal tool.

A total of 129 studies were excluded for the following reasons: (1) No intervention component (n=121). These studies were included in the first literature review, (2) Focus on a single treatment / intervention (n=4), (3) Focus on organisation policies / processes (n=1), and, (4) Opinion pieces with no data captured (n=3).

The flow of studies through the different phases of the review are illustrated in Figure 1-11.

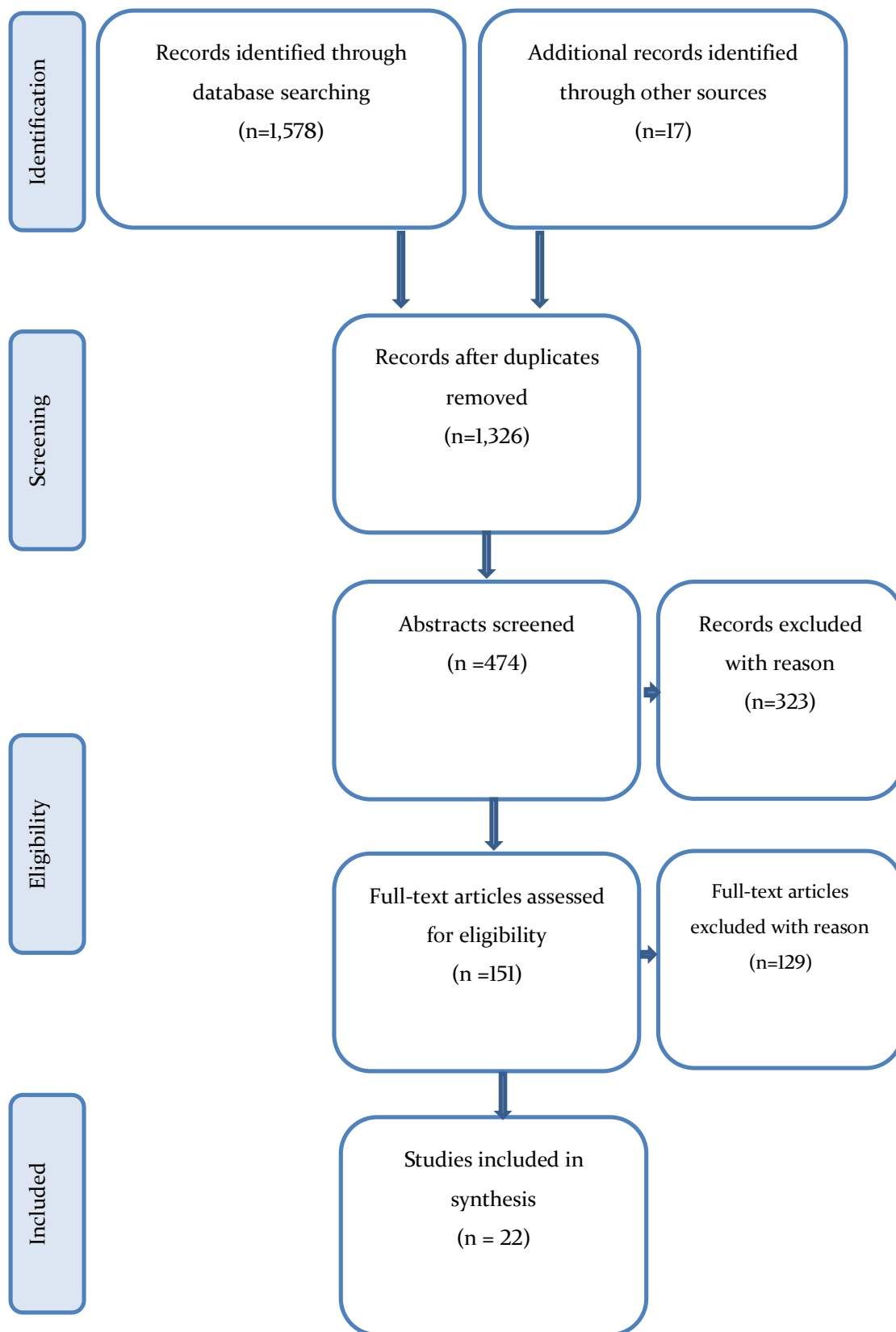


Figure 1-11 Flow of studies through systematic review 2

1.5.2.2 Description of studies included

The final 22 studies included in the synthesis comprised of one systematic review, six randomised trials, seven single group pre-post intervention studies, four evaluations and four qualitative studies. Summaries of study characteristics and key findings are included in Appendix 7 and Appendix 8.

Figure 1-12 illustrates the distribution of studies with the majority (43%) being conducted in Australia. Only three allied health professional groups had published studies on interventions specifically targeting their discipline. The majority of studies related to either multidisciplinary groups which included doctors and nurses, or larger groups of allied health professions across teams or organisations.

The studies were heterogeneous in nature with a variety of outcomes measured and study designs utilised. As a result, a meta-analysis was unable to be completed as the large range of instrumentation used made comparison and pooling of outcomes difficult.

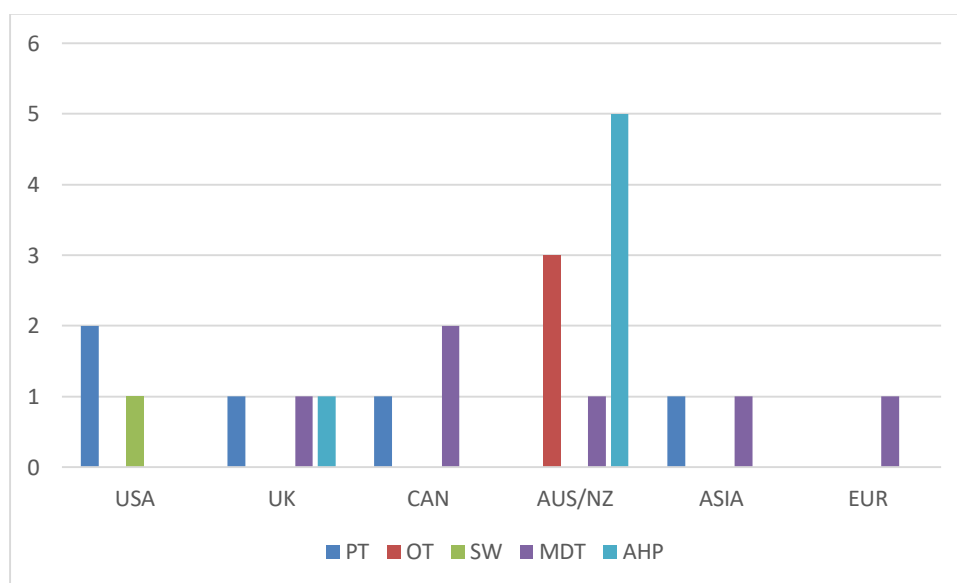


Figure 1-12 Number of publications by country of origin and professional group

1.5.2.3 Methodological quality of studies

The quality of studies included in this review varied significantly, irrespective of professional group, context or setting. Statistical analyses tended to be limited and most studies focused on one site, which weakened the representativeness and generalisability of the findings. The studies which were evaluated as strong were primarily focused on multiple disciplines and

included medical and nursing staff. Figure 1-13 and Figure 1-14 illustrate graphically the quality of studies according to professional groups and country of origin.



Figure 1-13 Quality assessment of studies according to professional group

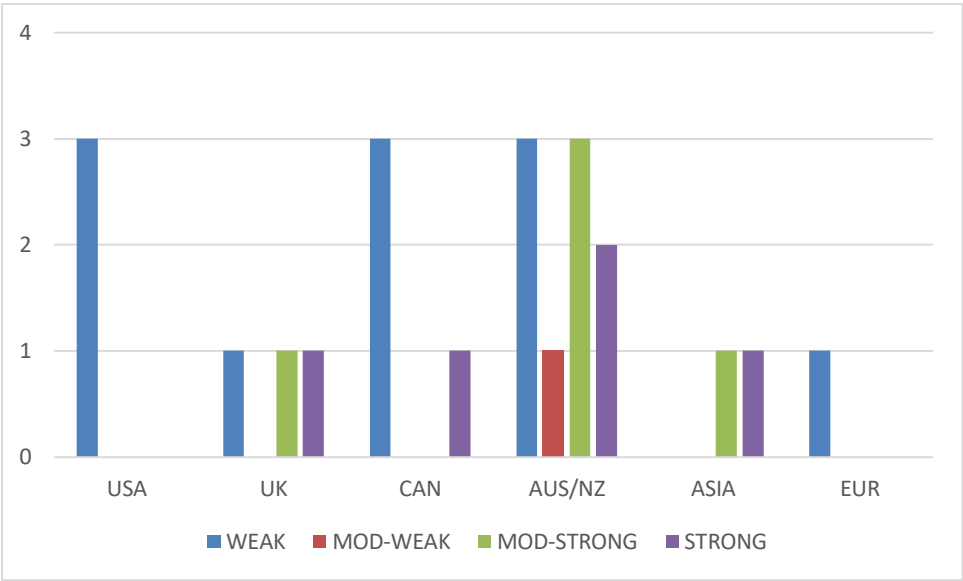


Figure 1-14 Quality assessment of studies according to country of origin

1.5.2.3.1 Systematic reviews

The Cochrane review included in this synthesis focused specifically on tailored interventions as a method of improving health professional practice (Baker, 2015). The methodological

quality was strong and included a meta-regression analysis to determine effectiveness of tailored interventions. Risk of bias and heterogeneity were both assessed. Of the 32 studies included in this Cochrane review, there was only one that focused on an allied health professional group (pharmacy) with the majority relating to prescribing practices of medical staff. Details of the assessment of quality can be found in Appendix 9.

1.5.2.3.2 Randomised trials

The six randomised trials included in this review were moderately-strong to strong in quality. The main limitations related to lack of blinding, variability in baseline data for the groups and missing data from more than 15% of respondents. Half of the studies were on a large group of health care professionals and only two focused specifically on an allied health professional group (physiotherapy). The quality of each study was evaluated using the PEDro scale and results can be found in Appendix 10.

1.5.2.3.3 Non-randomised trials

There was a total of 11 non-randomised trials, which comprised seven single group pre-post intervention studies and four evaluations. Quality was generally weak due to limited statistical analysis, poor sampling strategies and using non-validated tools to measure the outcome(s). The evaluation studies had limited or no pre-implementation data, making it impossible to determine the effectiveness of the intervention. Most of the non-randomised trials focused on allied health professional groups including occupational therapy, physiotherapy and social work. Quality was evaluated using Estabrooks' Quality Assessment tool and the results can be found in Appendix 11. Although some of the studies did not include pre-implementation data, it was determined useful to include these in order to be able to describe the types of interventions typically utilised to address EBP within allied health professional groups.

1.5.2.3.4 Qualitative studies

Four studies utilised a qualitative approach either as part of a mixed-methodology or to further explore intervention outcomes. The methodological quality for these studies was generally strong with only one study scoring weak. Most of the studies collected data utilising focus group methodology (75%) while only one study explicitly utilised a theoretical model and/or framework to explain the data. The quality of each study was evaluated using CASP and the results can be found in Appendix 12.

1.5.3 Synthesis of findings from the literature review

Data from the studies were mapped against the categories set out in the EPOC taxonomy. There were overlaps between some of the categories and subcategories which were addressed by referring to the purpose of the intervention. For example, interventions that included organisation wide changes as well as educational workshops and materials were categorised according to the purpose of the intervention i.e. if it was to enhance organisational culture, the study was placed in that category. Although there may be other ways in which to synthesise the findings from this review, this method is recommended by the Cochrane group for systematic reviews on health system interventions.

1.5.3.1 Organisational culture

This category includes any strategies implemented to change organisational culture. Three studies targeted organisational culture in an attempt to improve EBP. Bennett et al (2016) collected qualitative information on 30 occupational therapists' experience of organisational initiatives targeting EBP (Bennett, Whitehead, Eames, Fleming, Low & Caldwell, 2016). The study focused on implementation of the REP (research and evidence in practice) model which included an EBP coordinator, REP champions, team leaders, journal club, research fellow, mentoring and organisational performance plans that reflect REP activity. Data analysis found a mixture of outcomes following implementation of REP including an increased sense of alignment with the EBP movement and increased confidence in research skills. However, participants also perceived pressure related to the necessity of incorporating EBP into their already very busy workloads. They reported a lack of time and competing demands impacting on their ability to effectively engage with REP. All respondents reported that the organisational culture placed a strong emphasis on research and leadership reflected this through their support of clinicians' engagement in EBP activities. The results from this study suggest that a constructive culture is important to encourage EBP, but ongoing barriers related to large clinical workloads and lack of time continued to affect clinicians. Mortenius et al evaluated if EBP attitudes, knowledge and behaviours would change following introduction of a strategic organisation wide communication process (Mortenius, Marklun, Palm, Fridlund & Baigi, 2012). This large study (n=846) included medical staff, nursing and allied health professionals and reviewed the impact of implementing a research webpage, research bulletins and research seminars. Data were collected 7-years after implementation with no pre-implementation information. Results

suggest that 60% of respondents were interested in research and 97% had utilised the internal channels for seeking information. There were no measures of behaviour change. Wilkinson et al measured the effect of training and organisation changes on a group (n=139) of allied health professionals, over a 4-year period (Wilkinson, Hills, Street & Hinchliffe, 2016). The organisation changes included implementation of a research governance structure, active tutorial sessions and research symposia. Measures were taken at three time points and showed an increase in self-efficacy related to EBP skills for all allied health professional groups. However, EBP use did not increase across any of the measurement points.

The studies that focused on organisational culture show some promise for effecting increased confidence with EBP, but this has not translated into behavioural change for any of the allied health professional groups in this category of interventions.

1.5.3.2 Clinical practice guidelines

Guidelines that are developed to assist health care professional on health care options for patients are included in this category. Two studies investigated the effects of introducing clinical guidelines on health care professional behaviour(s). Munce et al (2017) conducted focus groups with (n=33) a multidisciplinary group of health care professionals following implementation of stroke rehabilitation guidelines. A knowledge translation approach was used to support implementation of the guidelines and included employing facilitators over a 16-month intervention period, provision of guideline booklets and pocket reminder cards and external support from a research team. This study found that numerous barriers effected the uptake of the guidelines including lack of agreement with or familiarity of the recommended interventions, lack of space to conduct the treatments, lack of resources such as equipment and time and organisational constraints. This would suggest that dissemination of guidelines with some support from facilitators does not necessarily remove barriers to the provision of evidence-based treatments. Bayley et al (2012) conducted a similar study exploring the barriers to implementation of evidence-based guidelines for stroke rehabilitation. Similar to the study conducted by Munce, implementation was supported by local facilitators who were upskilled with knowledge and change management skills to promote uptake of the guidelines. Focus groups with 79 health care professionals including medical staff, nursing and allied health professionals revealed numerous barriers

which impacted use of the guidelines. These included lack of time and training, mistrust of the evidence, lack of equipment and lack of a collaborative team approach.

Clinical practice guidelines can assist health care professionals to make evidence-based decisions regarding the treatment options for their patients. However, many barriers exist to the implementation of guidelines in practice.

1.5.3.3 Communities of practice

Communities of practice refer to groups of people who share a common interest and enhance their knowledge by regular meetings. Two studies utilised this intervention in different ways. Welch & Dawson (2006) investigated if collaborative learning groups could increase allied health professionals' (n=6) competence and confidence in consuming published research. The learning groups met monthly over a six-month period and the author of the paper provided the education whilst simultaneously collecting data. Outcomes were collected using semi-structured interviews and thematically analysed. The findings were that participants no longer perceived a divide between the role of researcher and clinician and felt more confident in both consuming and implementing EBP into practice. As this study consisted of a small sample size from a single site, it is not possible to generalise the findings. The second study that utilised communities of practice explored the impact of a journal club on the uptake of research evidence. Lizarondo et al implemented the iCAHE journal club model which included academic support, trained facilitators and a focus on using the evidence discussed in the journal club in practice (Lizarondo, Grimmer-Somers, Kumar & Crockett, 2012). A total of 93 participants were surveyed pre and post implementation of the journal club and the results indicated that only physiotherapists improved in EBP attitudes, all disciplines (physiotherapy, speech pathology, social work, occupational therapy and dietetics) improved in self-perceived knowledge but only physiotherapy, social work and dietetics reported an increase in EBP uptake.

Communities of practice show some promise in effecting behaviour change, however, there are some allied health professional groups who continued to experience ongoing barriers that were not overcome by this form of intervention.

1.5.3.4 Educational materials

This subcategory includes interventions which focus on enhancing clinical care through the provision of educational materials such as written information to assist in searching

literature. Three studies used educational materials, primarily in the form of electronic or online provision of information. Gosling & Westbrook (2004) measured the impact of an online web-based evidence retrieval system called the Clinical Information Access Program (CIAP). This large-scale study (n=790) explored allied health professionals attitudes, knowledge and behaviour related to the CIAP. Gosling found that the majority (82%) of respondents were aware of CIAP and of these, 76% had used the resource. However, utilisation of CIAP varied significantly across professional groups with social workers reporting low use (55%) and pharmacists reporting high use (98%). Barriers to uptake of CIAP related to proficiency with IT skills and access to computers. Social workers and speech pathologists reported difficulties with both of these factors. McKenna et al conducted a similar study exploring barriers and facilitators to utilisation of a recently introduced online evidence retrieval system (McKenna, Bennett, Dierselhuis, Hoffmann, Tooth & McCluskey, 2005). OTSeeker provides information on the validity and methodological rigour of published evidence related to conditions typically of interest to occupational therapists. McKenna found that 86% of 213 respondents had heard of OTseeker but only 56% had accessed it and frequency of use was low. The barriers to use were multiple and included lack of time, lack of relevant evidence and lack of computer access. Villaneuva et al conducted a randomised study to determine if simple instructions and examples on how to formulate a clinical question would increase the specificity (Villaneuva, Burrows, Fennessy, Rajendran & Anderson, 2001). The control group received no instructions. This study found a significant improvement in the experimental group with clinical questions including all four elements of PICO (patient, intervention, control and outcome). This study did not adjust their analysis for the significant (25%) number of drop-outs at follow-up.

The outcomes from the studies that utilise educational materials as the primary intervention suggest that it is not enough to simply provide the tool. Barriers to using both the CIAP and OTSeeker affected uptake, and although the provision of instructions on question formulation did improve skills, the implementation of this step into practice was not measured.

1.5.3.5 Educational meetings

Conferences and workshops are included under educational meetings. The majority of studies in this review were based on the provision of a workshop, however, the outcomes

measured varied significantly. Taylor et al evaluated the effectiveness and cost of a critical appraisal skills workshop on respondents' ability to independently critically appraise evidence for rigour and validity (Taylor, Reeves, Ewings & Taylor, 2004). This randomised trial found that although knowledge improved in the experimental group, attitude, confidence and critical appraisal skills did not change. Taylor costed the intervention at £250 per participant, suggesting that this intervention comes at a high cost for little discernible change. Schreiber et al evaluated the effectiveness of an EBP workshop, which included information on the 5-steps set out in the Sicily Statement (Schreiber, Stern, Marchetti & Provident, 2009). The program was implemented with five physiotherapists in one private practice and outcomes measured included EBP attitudes, beliefs and behaviours. The author found a modest improvement in EBP beliefs, confidence in skills and using published literature to guide decisions. The small sample size, lack of statistical analysis and single group methodology make it difficult to generalise the findings from this study. Cheng (2003) conducted a randomised trial to determine if a 3-hour workshop was more effective than no intervention on health professionals' ability to formulate a clinical question and effectively search databases. Analysis of the results indicated the experimental group improved in knowledge of databases, formulation of questions utilising the PICO (patient/intervention/control/outcome) method and skills to effectively search for literature. However, this effect degraded within 12 months, suggesting that further follow-up and/or training is required to sustain a change in skills, knowledge and behaviour. McCluskey & Lovarini (2005) measured if EBP attitudes, knowledge and behaviour changed with a group of occupational therapists, following attendance at a 2-day workshop that focused on critical appraisal skills and literature searching. Results suggest that although knowledge and skills improved, behaviours did not change, with a large number of the cohort (60%) not reading any published literature at follow-up. Parrish & Rubin (2011) evaluated the impact of a 1-day education program which focused on practicing the steps of EBP in small groups. The respondents were social workers (n=69) and the outcomes measured were EBP attitudes, beliefs, skills and behaviours. Parrish found that attitudes and skills improved immediately following intervention, but this was not sustained after 3-months. EBP behaviours did not change.

The outcomes from the studies included in this section reported improvements in attitudes and skills but did not report a behavioural change in the respondents. This would suggest

that provision of a workshop alone is not effective at changing the practice of allied health professionals in relation to EBP activities.

1.5.3.6 Educational outreach visits or academic detailing

Interventions which include a link with academic institutions, typically through an on-site programme, are included in this category. There was one study in this category (Fruth et al., 2010), which utilised physiotherapy students to deliver a presentation on a topic selected by the clinical sites involved in the study. The students summarised evidence related to the topic based on a literature review and provided suggestions on implementation of the evidence. The outcomes of interest were physiotherapists' attitudes and practices related to both the specific topic presented and more broadly about EBP. Outcomes were taken immediately post intervention and after 3-months and show that 68.5% of respondents had integrated the information into practice but 68% did not increase EBP behaviours such as consuming published research. The mixed results from this study suggest that respondents found it helpful to have EBP information summarised for them, rather than completing this task themselves.

1.5.3.7 Local opinion leaders

Local opinion leaders are health professionals with a known expertise and reputation for a specific area of practice. Two studies utilised opinion leaders within their interventions (Russell et al., 2010; Stevenson, Lewis & Hay, 2004). Russell et al's study involved situating knowledge brokers within the clinical site, for a period of 6-months. The outcome of interest was familiarity with and use of standardised assessment tools. Data were collected at baseline, following implementation and at 12 and 18 months. Analysis indicated an increase in the uptake of the standardised tools immediately following intervention and at 12-months. However, this change was not sustained for all the measures following removal of the knowledge broker roles. This would suggest that the success of the intervention was dependent on the opinion leader remaining situated within the clinical context. Stevenson et al's randomised control trial compared an evidence-based training programme that included local opinion leaders, to a conventional in-house training package. The local opinion leaders were identified by the study participants and were involved in delivering the educational component which targeted EBP skills such as critical appraisal and literature searching. The outcomes measured were changes in attitudes and sources of information for

clinical decisions. The results showed no changes in attitudes and no change in preferred sources of information to guide clinical practice. Both studies in this category failed to result in a lasting change, suggesting that opinion leaders alone are ineffective in changing allied health professionals' attitudes, beliefs, skills, confidence and/or behaviours related to EBP.

1.5.3.8 Tailored interventions

This subcategory includes any studies with interventions that are tailored to change the practice of health professionals based on prospectively identified barriers. Three studies had tailored interventions although none reported on what the barriers were, making it difficult to determine if the interventions were in fact tailored (Dizon, Grimmer-Somers & Kumar, 2014; Campbell, Novak, McIntyre & Lord, 2013; Novak & McIntyre, 2010). The methods utilised to gather pre-intervention data included surveys, observation of clinical staff and meetings. All the interventions incorporated an educational component, online material, mentoring and some form of workplace support, such as protected time during work hours to participate in EBP activities. The outcomes of the studies were measured in a variety of ways including counting the number of conference presentations, achievement of goals set by respondents and submission of activity diaries. Dizon et al's study reported an improvement in EBP behaviours, however, only 50% of respondents submitted activity diaries for analysis, and more than 50% were lost to follow-up. Campbell et al's study achieved an improvement in EBP knowledge but not behaviours. Novak & McIntyre's study employed a single group pre-post intervention design over a three-year period. The potential for a maturation effect is significant. The studies in this category show the most promise for effecting a change with allied health professionals. However, the reported changes primarily related to EBP attitudes, knowledge and skills rather than behaviours.

1.5.4 Discussion

The objectives of this literature review were to obtain a better understanding of interventions that aim to improve EBP attitudes, beliefs, skills, knowledge and/or behaviours with allied health professionals. The following questions guided the literature review.

1.5.4.1 Can allied health professionals EBP attitudes, beliefs, skills, knowledge, confidence and behaviours be changed?

A total of 22 studies were identified that included allied health professionals in interventions aimed at enhancing some aspect of EBP. Most of the studies were effective in improving respondents' attitudes, beliefs, skills and knowledge but only five were effective in changing the clinical practice of respondents. Two of these studies (Cheng, 2003; Villanueva et al., 2001) improved the ability of clinicians to pose a clinical question using the PICO format, however, neither study measured if the respondents improved in their ability to undertake the other 4-steps set out in the Sicily Statement i.e. retrieve and critically analyse the literature, implement it into practice and evaluate outcomes. Two studies utilised a tailored intervention to prospectively identify barriers to EBP before implementing a multifaceted intervention (Dizon et al., 2014; Novak & McIntyre, 2010). Both of these studies found that respondents improved in self-efficacy and EBP activities including implementing evidence into practice and presenting information at a conference. However, Dizon et al's study experienced a large number of drop-outs during follow-up which makes it difficult to determine effectiveness of the intervention. Novak & McIntyre's single group pre-post intervention study with no control group make it difficult to exclude the potential of a maturation effect. One study utilised a novel journal club structure (Lizarondo et al., 2012) and found mixed results for EBP behaviours i.e. three out of five of the allied health professional groups reported implementing the findings from journal club into practice. However, the results were promising.

One of the more interesting findings in this review, was the limited success of the two online evidence retrieval systems. The first systematic literature review identified lack of skills to locate and appraise research literature as a significant and frequently reported barrier effecting implementation of evidence into practice. It would be reasonable to assume that an online system which provides quick access to evidence-based information and/or critical appraisal of this information, would be successful. On the surface, it appears these systems should be able to overcome the previously identified barriers but two studies (McKenna et al., 2005; Gosling & Westbrook, 2004) found this was not the case. The review of OTSeeker revealed that although respondents were aware of the system, they infrequently used it due to a lack of time and lack of access to computers. The review of CIAP found similar barriers, particularly for those professional groups with high patient contact such as

social work and speech pathology. OTSeeker discontinued updating clinical information from 2016 whilst CIAP appears to only be available in New South Wales.

1.5.4.2 What is the effectiveness of different interventions to enhance the uptake of EBP with allied health professionals?

The EPOC taxonomy of implementation strategies includes 22 potential categories of interventions. This review found studies could be mapped against eight of the categories. Of these, the strategies which showed the most promise in terms of changing actual behaviour, was tailored interventions. This approach involves prospectively identifying barriers in order to develop interventions that address individual and/or context specific factors. The three studies that used this approach showed changes in allied health professional behaviours, but all had methodological limitations. The findings from this literature review support the Cochrane review on tailored interventions i.e. the approach is promising and shows some effect but is limited by lack of data.

1.5.4.3 Are different interventions effective for different allied health professional groups?

Most of the studies in this review were targeted at mixed groups of health professionals or large groups of allied health clinicians. Only nine studies targeted specific allied health professional groups including physiotherapy (n=5), occupational therapy (n=3) and social work (n=1). These studies used a variety of interventions and had a range of different outcomes. It is difficult to determine if particular interventions may be more effective for specific allied health professional groups. However, the tailored interventions which showed most promise did incorporate a number of different allied health professional groups. This would suggest that this approach may be more appropriate than the other approaches for effecting a change in behaviour related to EBP.

1.6 Summary of evidence gaps

There is a growing body of evidence exploring allied health professionals' experience of EBP. The first literature review identified that allied health professionals have a positive attitude towards EBP and believe that research can improve patient care. However, implementation of EBP appears to be affected by numerous barriers, including lack of confidence to undertake the steps necessary to translate evidence into clinical practice. The second literature review found that interventions that aimed to enhance the uptake of EBP with

allied health professionals, typically did not result in behaviour changes. This chapter has established that there remains a need for a study to determine if EBP attitudes, beliefs, skills, confidence and behaviours can be enhanced with allied health professionals.

1.7 Research aims

The overall aim of this program of research is to evaluate the effects of a tailored intervention that seeks to enhance EBP amongst allied health professionals. Five research questions were developed to address the aim.

Research question 1: What are the current EBP attitudes, beliefs, knowledge, skills and behaviours of allied health professionals in relation to EBP?

Research question 2: Do allied health professional groups differ in their attitudes, skills and behaviours related to EBP?

Research question 3: What variables influence allied health professionals' experience of EBP?

Research question 4: Does the theory of planned behaviour explain allied health professionals' EBP behaviours?

Research question 5: Can EBP be enhanced amongst a large group of allied health professionals through a tailored intervention?

1.8 Structure of the thesis

This thesis presents the findings from a quasi-experimental pre-intervention-post-intervention study that aimed to answer the above research questions. The format is as follows:

Chapter 1: Introduction. Provides a background to the central topics of this thesis i.e. evidence-based practice and allied health professionals. Also includes two systematic literature reviews on allied health professionals' experience of EBP and efforts to enhance the uptake of EBP.

Chapter 2: Methods. Describes and justifies the research design, including data collection methods and development of a tailored intervention.

Chapter 3: Paper 1. Describes the current attitudes, beliefs, skills, confidence and behaviours of allied health professionals in relation to EBP. The data from this study addresses research questions one and two.

Chapter 4: Paper 2. Describes the influence of years of clinical practice and post-graduate qualifications on confidence to undertake EBP. The data from this study addresses research question three.

Chapter 5: Paper 3. Describes allied health professionals EBP behaviours using the theory of planned behaviour. The data from this study addresses research question four.

Chapter 6: Paper 4. Describes the effects of a tailored intervention that aimed to enhance allied health professionals' skills and behaviours related to EBP. The data from this study addresses research question five.

Chapter 7: Discussion. Summarises the key findings from the study as well as the strengths and limitations. Future recommendations for EBP are made, including adapting the model to meet the needs of allied health professionals.

Chapter 2: Methods

Overview

This chapter will describe the methods used to answer the questions guiding the program of research. The theoretical framework overarching the study will be discussed as a preface to the methodology selected for the study. Strengths and weaknesses of a mixed-methods approach will be presented, and each phase of the study will be detailed, including instrumentation and data analysis techniques.

2.1 Theoretical framework

The results from the systematic literature review on interventions related to allied health professionals' experience of EBP revealed a lack of success. Most of the studies did not use a theoretical framework to guide identification of barriers and/or development of interventions. It is possible that interventions aimed at enhancing the uptake of EBP with allied health professionals have been unsuccessful due to lack of a theoretical approach. Researchers from the field of implementation science argue that a theoretical rationale is critical to understanding the nature of the problem being examined and ensuring selection of the most appropriate intervention (Francis et al., 2009; Graham & Tetroe, 2007; Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Michie et al., 2005). A theory can be described as a coherent set of ideas that aim to predict behaviour or other variables (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005). A recently published review examined which social cognitive theories best explained health care professionals' intention to undertake evidence based behaviours (Godin, Belanger-Gravel, Eccles, & Grimshaw, 2008). The authors reviewed 78 papers, of which 9 specifically included allied health professionals (primarily from pharmacy). Findings from the review suggest that the theory of planned behaviour demonstrated strong efficacy in predicting behaviour of health care professionals.

2.1.1 The theory of planned behaviour

The theory of planned behaviour is one of the most widely utilised and researched theoretical frameworks for explaining human behaviour (McEachan, Conner, Taylor, & Lawton, 2011). First proposed in 1985, the theory of planned behaviour arose from the theory of reasoned action. Although both models assume that behaviour is a consequence of a decision to act in a certain way, the theory of planned behaviour considers volitional control as a variable i.e. the individual must have the resources, opportunity and support available

to perform the specific behaviour (Ajzen, 1991). The theory of planned behaviour comprises of three independent variables that lead to behavioural intention. These will now be described in detail.

2.1.1.1 Attitudes

Attitude towards the behaviour refer to the individual's overall perception of the outcomes of the behaviour as either negative or positive. Attitudes are influenced by two salient beliefs: (1) what the individual believes the outcome(s) of the behaviour will be, and (2) evaluation of the advantages and disadvantages of the behavioural outcomes. For example, an individual may believe that researching the literature for evidence regarding a specific clinical question will result in greater knowledge, which in turn will help with treating the patient. If an individual evaluates the behavioural outcome as primarily positive, the overall attitude towards the behaviour is positive. Conversely, if the individual evaluates the behavioural outcomes as negative, the overall attitude towards the behaviour is negative.

2.1.1.2 Subjective norms

Subjective norms about the behaviour refer to whether the individual believes that key people in his/her life (called referents) think he/she should be performing the behaviour. Subjective norms are influenced by two salient beliefs: (1) the individual's beliefs regarding how important people around them will view the behaviour, and (2) motivation to comply with these important people. For example, an individual may believe that their supervisor expects them to complete outcome measures with all patients they see, and this is likely to be discussed during supervision. If an individual perceives social pressure from referents and is motivated to comply, the norms are said to be strong.

2.1.1.3 Perceived behavioural control

Perceived behavioural control relates to the individuals' perception of how difficult or easy it is to perform the behaviour. Perceived behavioural control is influenced by two salient beliefs: (1) the individual's beliefs about the factors that either support or hinder performance of the behaviour, and (2) perception of how much control or power the individual has over these factors. For example, an individual may believe that it's too difficult to implement the findings of a study into practice because of a lack of funding to purchase the necessary equipment. If an individual believes the behaviour is relatively easy

to perform and they have adequate control over contextual barriers and facilitators, they are said to have strong perceived behavioural control.

More recently, background factors related to both internal and external variables have been incorporated into a contemporary version of the model (Figure 2-1). Ajzen et al suggest that contextual factors, including institutional policies, may influence behavioural intentions due to their effect on the individual's perceived behavioural control (Ajzen, 2011). It has been suggested that perceived behavioural control may be particularly influential in explaining workplace behaviours due to the influence of factors such as policies, protocols and organisation driven key performance indicators (Freeman, Roche, Williamson, & Pidd, 2011).

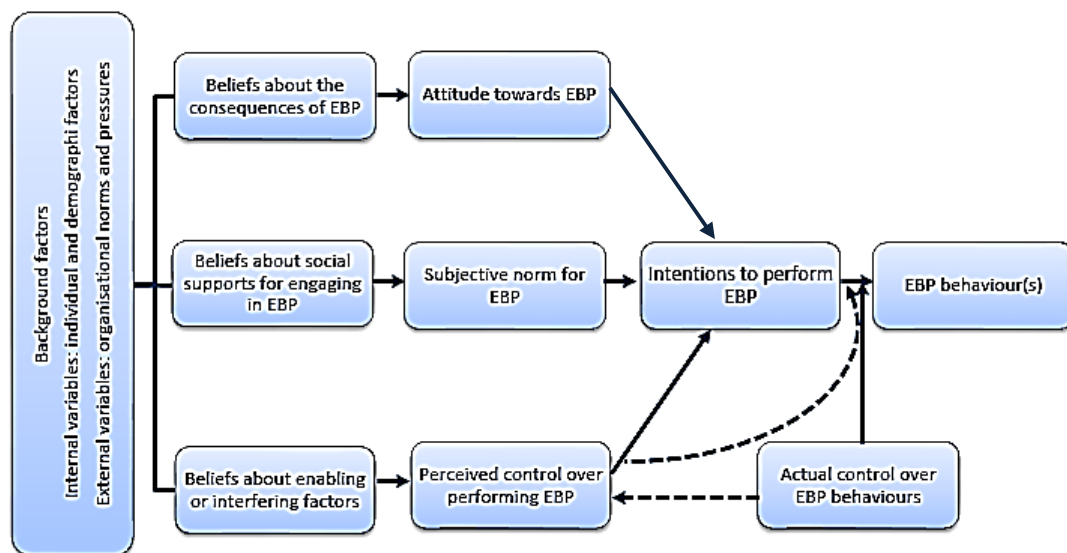


Figure 2-1 Contemporary model of the theory of planned behaviour as applied to EBP behaviours

2.1.2 Rationale for choosing the theory of planned behaviour

The theory of planned behaviour provides a framework to enable identification and consideration of the factors that should be a target of any intervention(s) (Francis et al., 2009; Glanz, Rimer, & Viswanath, 2008; Painter, Borba, Hynes, Mays, & Glanz, 2008). A recent meta-analysis included 237 studies on the theory of planned behaviour and found that this theoretical model demonstrated a strong ability to forecast intentions and subsequent behaviours (McEachan et al., 2011). To date, most studies utilising the theory of

planned behaviour to explain EBP behaviours have primarily focused on medical and nursing participants. Only two published studies have specifically explored allied health professionals' EBP behaviours utilising the theory of planned behaviour. Scholten-Peeters et al (2013) surveyed 165 physical therapy students, teachers, supervisors and therapists on their attitude, knowledge, EBP behaviours and intention to participate in research (Scholten-Peeters et al., 2013). The authors of this study analysed the data obtained from the cross-sectional survey utilising the theory of planned behaviour and not surprisingly, found that teachers had the strongest intention to utilise research. The second study also explored EBP behaviours of a group of physiotherapists (n=588), using the theory of planned behaviour (Diermayr, Schachner, Eidenberger, Lohkamp, & Salbach, 2015). Both studies were from European countries and both utilised survey methodology to measure the constructs of EBP. However, neither study elicited any information on respondents' underlying beliefs as a precursor to development of the survey. One of the major determinants of intentions are the underlying beliefs, and identifying these beliefs assist in understanding the behaviour in question (Ajzen, 2011).

The theory of planned behaviour will be used in this study to guide the focus group discussions and to provide a framework for interpreting the results from both the quantitative and qualitative data collected.

2.2 Mixed methods research design

A mixed methods approach is defined as a research procedure which includes both quantitative and qualitative methods within a single study (Creswell & Clarke, 2017). The types of studies which are thought to benefit the most from a mixed methods design tend to be complex, often with multiple facets. The study of allied health professional behaviour in relation to EBP is broad and encompasses multiple elements including the individual, his/her relationship with the evidence and the organisation in which they work. A quantitative approach alone would likely not have provided an understanding of the experiential component of EBP. A qualitative approach alone would not provide an adequate sample size to understand the breadth of the issues. A mixed methods approach to this study supports multiple data collection techniques and limits the potential of missing important information.

2.2.1 Strengths and weaknesses of mixed-methods designs

A mixed methods research design is argued to be more comprehensive as it includes a broad range of data, such as statistics and narrative information. The strength of this approach is that it can assist in finding an answer for complex questions that may not easily be explained by the data obtained from singular methods of data collection. It is also possible that the strengths of one method can assist in overcoming the limitations of the other. For example, a survey with close-ended questions cannot provide information on why the respondent has answered in a particular way. By contrast, a focus group discussion with one single group of individuals cannot provide information on the opinions of a sector of an organisation. A mixed method approach can also increase the rigour of the study by providing a form of triangulation. However, there are also some inherent weaknesses in this design, including the additional time and expertise required by the researchers undertaking this approach. This was overcome by ensuring the research team consisted of two individuals with a long history of research in quantitative and qualitative research.

2.2.2 Applying mixed methods to this research

There are four major types of mixed methods design (Creswell & Clark, 2017), and selection of one depends on a number of factors, including: (1) level of interaction. For example, the two forms of data collection may be completely independent or the process of one may influence the other; (2) priority. For example, the quantitative data may be considered more important than the qualitative data or equal; (3) timing. For example, the qualitative data collection may occur first or concurrently or later, and; (4) mixing. For example, the data is mixed before analysing or each different form of data is analysed separately and then interpreted together.

A convergent parallel design was selected for the approach as the quantitative and qualitative data would be collected concurrently and both methods were of equal priority. This type of mixed method approach consists of strands i.e. each strand is conceived of as either qualitative or quantitative. Strand 1 refers to data collected using quantitative methodology throughout Phase 1 and 2, whilst Strand 2 refers to data collected using qualitative methodology during Phase 1 only (Figure 2-2).

To evaluate the effect of the intervention, a quasi-experimental pre-intervention-post-intervention design with two parallel control groups was used. Also known as non-equivalent group design, this method involves using intact groups, one of whom receive the intervention whilst the other(s) acts as a control arm.

Although this method does not use randomisation for allocation of subjects, the inclusion of pre-intervention data for both the experimental and control groups provides a measure of the initial equivalence of the dependent variable i.e. EBP constructs. The data from the pre-intervention phase indicate how alike or different the groups are (Portney & Watkins, 2000).

2.3 Ethics

Ethics approval for this research was obtained from the Human Research and Ethics Committee Tasmania Network (Approval No. H0010827) and the Human Research and Ethics Committee Monash Health (Approval No. 08206A). A copy of the approvals are included in Appendix 18.

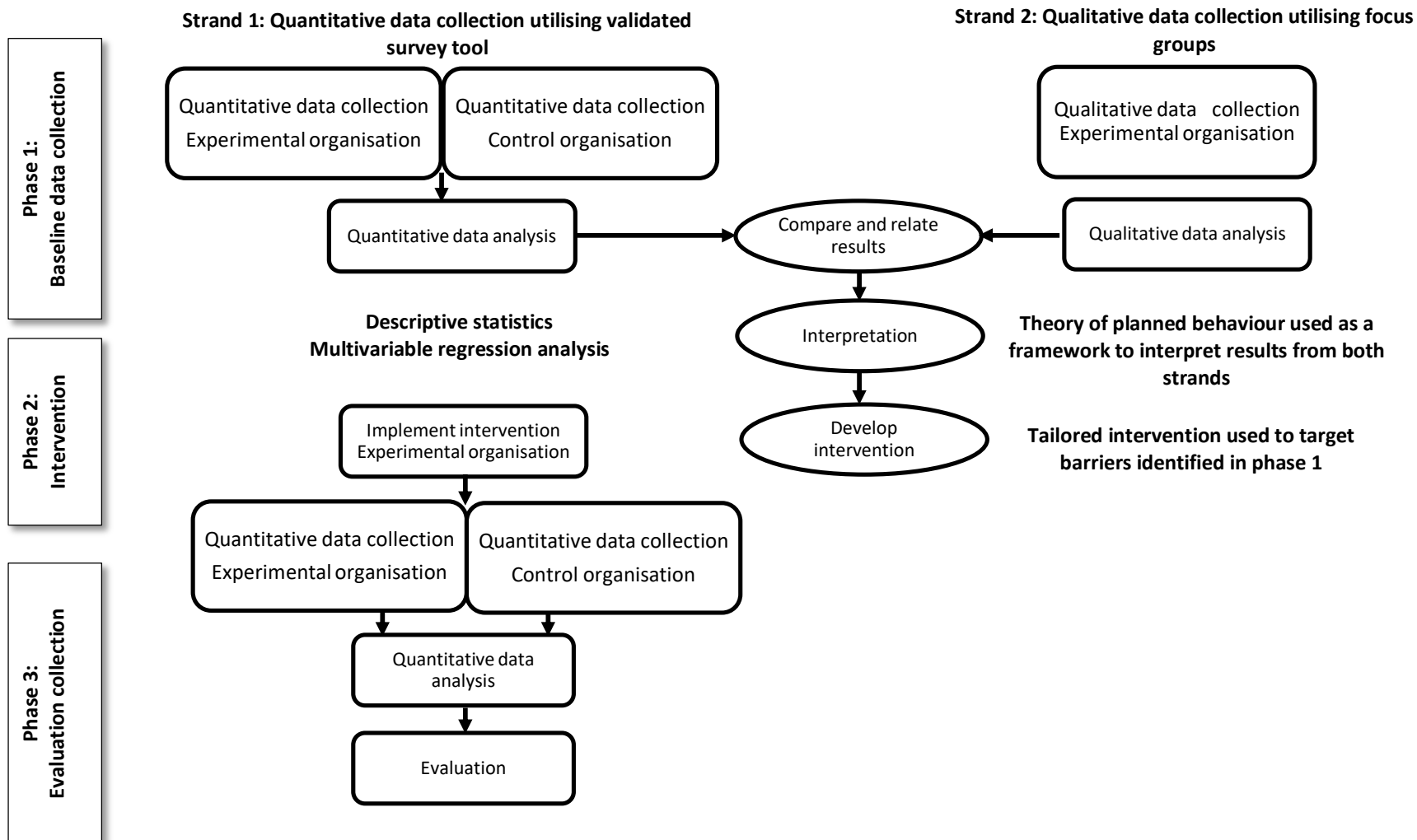


Figure 2-2 Mixed methods approach applied to the study

2.4 Phase 1: Baseline data collection

Phase 1 included data collection using both quantitative and qualitative methodology. Both will be described in the following sections. The purpose of this phase of the study was to understand allied health professionals current attitudes, beliefs, skills, confidence, behaviours, barriers to and facilitators for EBP. As described earlier, the theory of planned behaviour was used as a framework to explore and explain the data collected during this phase.

2.4.1 Strand 1: Quantitative data collection

The objective of this stage of the study was to identify and quantify the attitudes, beliefs, skills, knowledge and behaviours of the allied health professionals involved in this study. This was the pre-intervention component of the quantitative data collection strand.

2.4.1.1 Study sites

Two organisations were invited to participate in this study: the intervention organisation and the control organisation. The co-investigators for the study had existing relationships with the intervention organisation as research leaders within allied health departments. The leader of allied health research at the control organisation was approached to participate in the study but had no prior relationship with any investigators from this study.

2.4.1.1.1 Intervention organisation

This organisation is a major metropolitan health service located in Victoria, Australia. The health service provides 260,000 episodes of hospital care and employs 16,000 staff across 40 sites and services.

2.4.1.1.2 Control organisation

This organisation is a major metropolitan health service located in Tasmania, Australia. The health service provides more than 50,000 episodes of hospital care and employs 3,000 people across its acute, sub-acute and ambulatory services and sites. Although this organisation is classified as a metropolitan health service, it should be noted it is significantly smaller in size than the intervention organisation.

2.4.1.2 Study population

All allied health professionals from both organisations M and H were eligible to participate in Phase 1 of this study. The allied health professional groups included audiology, exercise physiology, nutrition / dietetics, occupational therapy, podiatry, physiotherapy, psychology (clinical and neuropsychology), speech pathology, social work and radiation therapy.

2.4.1.3 Data collection tool

Allied health professionals' beliefs, attitudes, confidence, sources of information to guide clinical decisions and behaviour relating to EBP were evaluated using a survey. The survey comprised of a demographics page and a total of 56 questions grouped into five sections to measure the specific components of EBP. The survey was available online via a web-link to a Survey Monkey page. Each respondent was allocated a unique identifier in order to maintain confidentiality. A hard-copy of the survey was also available for those respondents who were unable to or chose not to complete the online version of the survey. Prepaid envelopes were provided with all hardcopies of surveys to enhance likelihood of return. A copy of the survey can be found in Appendix B.

2.4.1.3.1 Demographic data

It was important to collect information in the demographic section to allow exploration of associations between independent variables, such as year of graduation, and the dependent variable of EBP. The demographics page included questions on the following variables:

- Age
- Gender
- Professional group
- Employment area
- Employment status
- Year of graduation
- Years worked clinically
- Highest level of qualification achieved

2.4.1.3.2 Measure of attitude, skills and knowledge & behaviours

Four sections of the survey related to beliefs, attitudes, sources of information to guide clinical decisions and participation in EBP activities. This tool had previously been developed and used amongst allied health professionals groups (Jette et al., 2003; Salbach et

al., 2007) and is both valid and reliable. Respondents were asked to rate their attitudes and beliefs using a six-point Likert Scale from strongly agree to strongly disagree. Sources of information for clinical decision making was measured using a five-point Likert Scale from always to never whilst participation in EBP activities was measured using a yes/no response.

2.4.1.3.3 Measure of confidence (self-efficacy)

The fifth section of the survey measured respondents' confidence to conduct evidence-based activities, such as formulating a research question. This tool has high internal consistency and construct validity and has been used in both its preliminary and final version in a number of studies (Salbach et al., 2007; Salbach & Jaglal, 2011). It is comprised of 12 questions related to the 5-steps set out in the Sicily statement. Respondents are asked to rate their confidence on an 11-point Likert scale from 0% "cannot do at all" to 100% "certain can do".

2.4.1.4 Data collection procedure

Email contact was made with the managers of each allied health professional group across both organisations to explain the study and invite participation from all of their qualified staff members. The survey was available online via a web-link to a Survey Monkey page for an initial period of four weeks. A reminder email was sent at the end of the first week and included the web link for online completion of the survey. Each respondent was allocated a unique identifier to maintain confidentiality. A hard-copy of the survey was also available for those respondents who preferred this method. Prepaid addressed envelopes were provided with all hardcopies of surveys in order to enhance likelihood of return. Surveys that were returned as a hardcopy were manually entered into Survey Monkey by a research assistant. All respondents who completed the survey, either online or hardcopy, were eligible to go into a draw to win a \$100 gift voucher. Implied consent was assumed for all respondents who submitted a completed survey.

2.4.1.5 Data management and analysis

Data from Survey Monkey was exported via excel and copied into STATA 13.0, a statistical package. Descriptive data analysis was completed for each organisation separately, to ensure the groups were matched at baseline. Data from both organisations were also merged and analysed to provide a larger sample size for regression analyses.

Ordered logistic regression (Portney & Watkins, 2000) was used to identify relationships between respondents' demographic information such as professional group, workplace setting, age, gender, highest qualification, years practicing and prior exposure to research (independent variables) and EBP beliefs, attitudes, confidence, sources of information guiding clinical decisions and behaviour (dependent variables). The ordered logit model is appropriate for analysis of outcome variables that are ordinal in nature, such as the Likert scale responses used in the instrument in this study. Statistically significant results were set at p value of $<.05$ with 95% confidence intervals. The results of this analysis are contained in Chapter 3.

Data were also visually analysed using box plots that illustrated the relationship between confidence to conduct EBP activities and years worked clinically, using only respondents whose highest academic degree was at Bachelor level. A Bachelor level of degree was selected as this qualification is the minimum requirement to practice as an allied health professional, in Australia, for most of the disciplines. The results of this analysis can be found in Chapter 4.

A multivariable regression analysis was performed to examine if there was a relationship between level of qualification achieved and years worked clinically with confidence to undertake EBP activities. A separate multivariable regression analysis for each item on the EBP self-efficacy scale was undertaken using highest level of qualification treated as categorical covariate with the Bachelor's degree serving as the reference value. Years of clinical experience was also entered into these models as a categorical variable with 1 year of experience serving as the reference value. Dummy variables were created due to the categorical nature of the data. Statistically significant results were set at p value of $<.05$ with 95% confidence intervals. The results of this analysis are also included in Chapter 4.

2.4.2 Strand 2: Qualitative data collection

The objective of the qualitative strand of data collection was to explore allied health professionals' beliefs in relation to the constructs of the theory of planned behaviour as applied to EBP. Focus groups were selected as the method of data collection for the following reasons (Liamputtong, 2011).

2.4.2.1.1 Group dynamics

Group interviews can help participants to clarify their views through the process of hearing other opinions, being challenged / questioned and participating in a moderated discussion. This is one of the advantages of focus groups over other qualitative methods of data collection, such as individual interviews. It should be noted however, that the disadvantage is that members of the focus group are sharing their views with more than just the researcher. Consequently, it is important to establish 'ground rules' including respectful communication and protecting group member's confidentiality.

2.4.2.1.2 Eliciting salient beliefs

Identifying the beliefs that contribute to the predictor constructs in the theory of planned behaviour (attitudes, norms & perceived behavioural control) was the goal of this strand of data collection. It is important to identify the various beliefs and their collective impact on EBP, as a precursor to developing an intervention. For example, if respondents believe that EBP is important and valuable, then it can be assumed that they have a positive attitude towards EBP and this may not need to be a focus of the intervention.

Focus groups are considered to be one of the strongest methods of data collection for exploring attitudes, beliefs and needs within the social network of a group of respondents (Liamputtong, 2011).

2.4.2.2 Study site

The focus groups were conducted at the intervention organisation, previously described in this chapter. Additional qualitative data from the control site was not sought as they were not the target of any interventions and were acting as a parallel control group.

2.4.2.3 Study population

Allied health professionals from all the major professional groups at the intervention organisation were targeted for participation in the study. Multidisciplinary teams from the community and acute sectors were also invited to participate. Both discipline specific and multidisciplinary groups were included in order to explore if there were differences in participants' experience of EBP related to sites and settings. Purposive sampling was used to ensure adequate numbers of discipline specific participants and to be representative of the workplace settings, levels of experience, gender and age. The procedure for recruitment involved contacting the managers from each allied health professional group and team

leaders from multidisciplinary groups, by email and informing of the study details. Participation from allied health professionals from a variety of settings, gender, level of experience and age were requested in order for the sample to be representative. A maximum number of 8 participants for each group was deemed to be adequate, given the complexity of the topic being examined and the aim being to obtain a deeper understanding of the participants' experience of EBP (Krueger & Casey, 2014).

2.4.2.4 Data collection tool

Questions guiding the focus group discussion (Appendix 14) were developed according to the manual for "Constructing questions based on the theory of planned behaviour" (Francis et al., 2004). This manual provides instructions for either direct measurements of the constructs using close-ended questions or indirect measurements of the salient beliefs influencing the constructs. As the purpose of the focus group discussion was to better understand the beliefs and experiences of the respondents, the questions focused on eliciting information about beliefs.

Each focus group commenced with introductions and an opening question asking participants "what does EBP mean to you?" Questions to elicit behavioural beliefs and outcome evaluations which influence attitudes towards EBP, included asking about the advantages and disadvantages related to EBP. Participants were asked what they thought was good about EBP and what wasn't good or was bad about EBP. Questions to elicit normative beliefs and motivation to comply included asking participants whether they considered EBP as important and the reasons why they should or should not be engaging in EBP. This was further examined by asking whether participants could identify important people or groups of people who either approved or disapproved of EBP. Questions eliciting control beliefs and participants' perception of the power of these beliefs to influence their behaviour included a discussion on barriers and facilitators that either help or hinder engagement in EBP. Each focus group were also asked if there were any other issues, concerns or topics related to EBP that they wished to discuss. This was to ensure that any other influencing factors could be identified, particularly background factors related to individual variables and the organisation specific variables.

All focus group discussions were audiotaped, and two researchers attended each group. One researcher who was experienced in focus group methodology facilitated the discussion

whilst the other took additional notes related to body language, gestures and any other non-verbal information important to later analysis of the data. Neither researcher worked directly with any of the participants.

2.4.2.5 Data management and analysis

The audiotaped data collected from each focus group were transcribed verbatim and the additional notes were added as supplementary material. NVivo II Software was used to assist in the analysis process as it enables the researcher to sort the data in numerous ways including frequency counts and matrices for relationships between identified themes. Following verbatim transcription, two researchers analysed the transcripts for frequency of words and/or statements. This data was then coded according to the constructs of the theory of planned behaviour. For example, if a participant described EBP as important for their career progression, this statement would be categorised under behavioural beliefs. Statements or discussion or words relating to who expected or approved of EBP was categorised under normative beliefs. Emotive words describing the value or impact of normative beliefs were also recorded and considered as an influence on participants' motivation to comply. Descriptions about factors that made it difficult or hindered EBP were categorised under control beliefs. Once again, any information regarding participants' perceptions of the power of these factors to influence their engagement in EBP was also captured under perceived behavioural control.

Following the initial coding using the theory of planned behaviour, the transcripts were reviewed again to further refine the code structure, particularly in relation to identifying salient beliefs. The most frequently mentioned beliefs underlying each construct were considered to be significant contributors to behavioural intentions and likelihood to engage in the behaviour. As per recommendations in the manual on utilising the theory of planned behaviour in health services research (Francis et al., 2004), another researcher involved in the study but not in the focus group facilitation or discussions, reviewed the transcripts and analysis in order to increase validity.

Any additional themes related to the topic of EBP but not specifically to the constructs measured in the theory of planned behaviour, were analysed by the two initial coders. This could relate to specific background factors that may influence perceived behavioural control but not necessarily captured as a barrier or facilitator. For example, if a participant

mentioned that there were organisational demands to prioritise patients and this influenced their capacity to engage in EBP, this could be coded as an extra variable that influenced control beliefs.

2.4.3 Interpretation of results from Strand 1 and 2

Data from both the quantitative strand and qualitative strand were compared and related as a final step to interpreting the full breadth of respondents' experience of EBP. The theory of planned behaviour provided the framework for this phase of the study. Findings from the quantitative data collected were considered under the constructs of attitudes/beliefs, subjective norms, perceived behavioural control and actual behaviour. Findings from the qualitative data provided important information on the salient beliefs which act as antecedents to the three constructs contributing to the behavioural intentions. This process was an important step prior to developing an intervention which would intentionally target the barriers and build further on the facilitators that were identified in this phase.1 of this study.

2.5 Phase 2: Intervention

This section will describe development of the intervention, objectives of the strategies selected, and the procedure followed for implementation of the intervention. The implementation strategy is based on a knowledge exchange framework which will be described in detail below. As mentioned, phase 1 provided critical data on respondents' experience of EBP and this was quantified using both survey data and qualitative data to understand the beliefs influencing the behaviour(s) in question.

2.5.1 A tailored intervention

A tailored approach to the intervention was selected as the previous literature reviews had determined that this method has the strongest evidence related to effecting a change in behaviour. Although the literature review revealed that relatively few studies resulted in a sustainable improvement in EBP behaviours, it was determined this was due to several critical factors. Most importantly, there was typically a lack of theoretical framework guiding either the identification of barriers and facilitators and/or guiding the development of an intervention. Many of the intervention studies were based on the authors' perception of EBP barriers and facilitators, resulting in the possibility that the intervention did not target the

areas of concern for the respondents. Second, some of the studies utilised strategies such as knowledge brokers but then removed these at completion of the study, resulting in respondents' reverting to their baseline performance of EBP.

The tailored intervention developed for this study was supported by a knowledge exchange framework (Graham & Tetroe, 2007). Fundamental to successful implementation of EBP, is the capacity of the user to bridge the gap between research and decision making. Knowledge exchange, also known as knowledge translation or knowledge synthesis or knowledge brokering, is 'a dynamic and iterative process that includes the synthesis, dissemination, exchange, and ethically sound application of knowledge to improve health... provide more effective health services and products, and strengthen the healthcare system.' (Graham & Tetroe, 2007 p.936). Historically, there have been numerous models of knowledge exchange including the producer-push or user-pull models. Producer push-models are based on the premise that end users will automatically implement information/knowledge that is produced by the research community, provided it is of good quality. By contrast, user-pull models are based on end users directing the parameters of the research they require to inform their practice. Both of these models assume that the flow of research knowledge into action settings occurs in one direction. More recently, knowledge exchange processes have further developed into multidirectional models where both end users and producers of research work together to produce research knowledge. Such models are informed by an understanding that the users and producers of research are distinct communities and as such, underpinned by different and competing values. Furthermore, the environment in which knowledge exchange is applied is complex and subject to change, so that any knowledge exchange interventions should be adaptable and frequently evaluated. Graham et al (2006) developed the following model as a framework for translating knowledge into action.

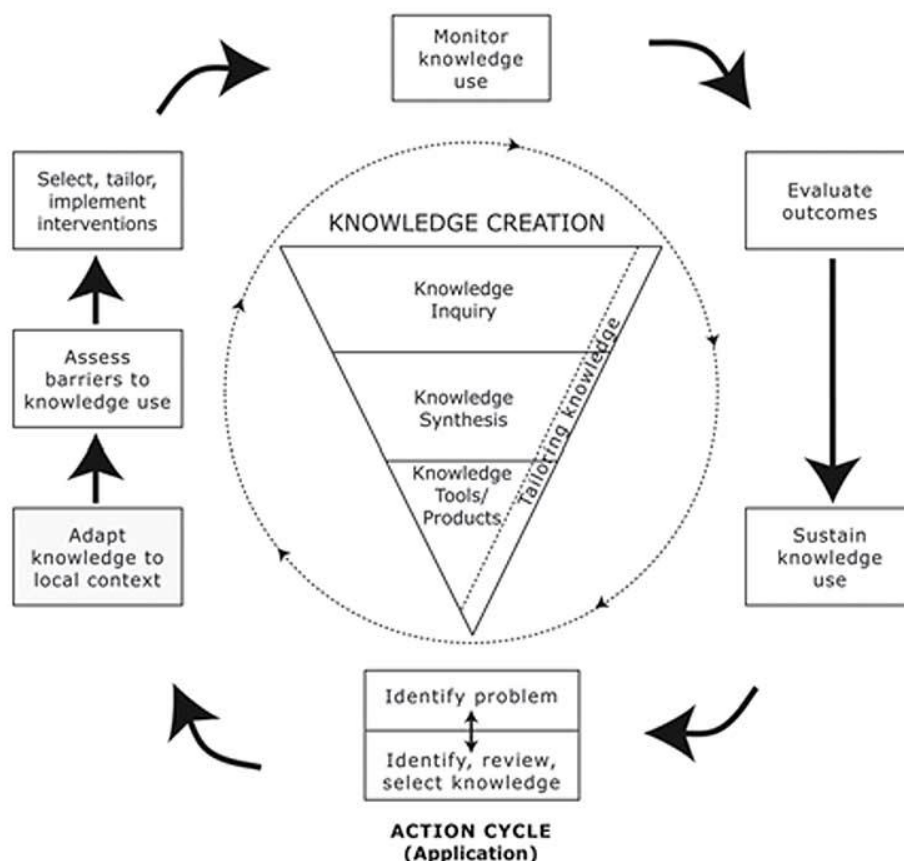


Figure 2-3 The knowledge-to-action framework

In this model, the knowledge exchange process is multidimensional and assumes that end users are included in the entire process to ensure that the knowledge creation and subsequent implementation are relevant to their needs. The central aspect of the diagram symbolizes the process required to create knowledge while the outer cycle articulates the variety of activities and processes apparent in the use and/or implementation of the knowledge. The different aspects of this conceptual model were incorporated in the following steps.

2.5.1.1 Step 1: Stakeholder engagement

The areas targeted for intervention were inpatient and outpatient physical rehabilitation services, for adults and the aged population. To evaluate the effectiveness of the tailored intervention, implementation of a relevant project within clinically similar areas was necessary. Adult and aged rehabilitation services were selected as the clinical area of interest whilst acute wards, outpatient departments in a hospital and community health acted as parallel control groups. Clinical reference groups (CRGs) for each allied health professional

group and multidisciplinary team from the targeted intervention areas were established. The purpose of the clinical reference groups was to engage the broader team in identifying an area of clinical practice that they wished to address through an evidence-based project. For example, the group may select the need to implement a standardised screening process but require assistance to identify an appropriate tool and/or methodology to implement a process. Managers from each allied health professional group and team leaders from multidisciplinary groups were emailed a description of the project and the role of the clinical reference group. Managers were asked to identify staff from their professional group or team who could attend the required number of meetings over a 12 month period. The identified clinicians were then contacted by email and invited to participate in the clinical reference groups. A total of eight clinical reference groups were established including community rehabilitation, dietetics, occupational therapy, physiotherapy, podiatry, social work, speech pathology and rehabilitation in the home. The number of participants, level of experience and primary role varied significantly across the different clinical reference groups. For example, the community rehabilitation group included nine participants all predominantly working in a clinical role. By contrast, the dietetics group consisted of six participants with two predominantly working in management roles.

Participants' written consent was obtained prior to commencing each focus group discussion. A copy of the participant information and consent form is included in Appendix 15.

2.5.1.2 Step 2: Mentorship group

This phase of the intervention built on the concept of knowledge brokerage embedded within the organisation. Each clinical reference group nominated an individual allied health professional to attend a mentorship program. Nominations involved a group discussion and identification of an individual who was motivated to participate in the program and able to leave their clinical caseload for a fixed period. Successful nominees will from hereon be referred to as mentees.

The role of the mentees was to become EBP champions for their specific professional group and/or team where they worked. It was conceived that this would happen in several ways. First, each mentee would need to deliver an evidence-based project that was selected by the clinical reference group. This would also involve educating their colleagues on the methods

they used to complete the project and ideas on implementation. Second, the mentees would become a reference point for their colleagues in relation to EBP skills and knowledge, including how to critically appraise literature.

Each mentee was seconded to the allied health research unit for a period of two weeks as part of the mentorship program. The program involved a combination of learning and support strategies, detailed below, whilst also providing protected non-clinical time for each mentee to complete their project.

2.5.1.2.1 Skills-based workshop

The content of the workshops was based on the data collected in Phase 1 of the study. The survey revealed low skills and confidence to complete the 5-steps necessary to translate evidence into practice. Mentees participated in three days of lectures and practice-based workshops on the following topics:

1. How to formulate a question using PICO
2. How to effectively and efficiently search for literature
3. How to critically appraise literature

Mentees were able to directly apply the skills from these workshops to their evidence-based projects. Full details of the skills-based workshop are contained in Appendix 16.

2.5.1.2.2 Academic support

Each mentee was matched with an academic mentor from the local university. This strategy is defined as academic detailing according to the EPOC taxonomy. There is evidence to suggest that EBP skills, knowledge and behaviours can be enhanced when organisations are affiliated with academic institutions. The goal of this strategy was to create a longer-term link between the intervention organisation and the academic institution. The academic mentors would provide guidance to the mentees on completing the evidence-based project, including later implementation if/as appropriate.

2.5.1.2.3 Delivery of an evidence-based project

The delivery of an evidence-based project was based on the EPOC taxonomy of continuous quality improvement. The clinical reference groups identified an area of clinical practice they were concerned with and/or wished to improve upon. However, they perceived they either didn't have the skills or time to be able to address the issue. The mentees' goal was to

deliver a report based on a critical analysis of the published research on the construct identified and selected by the relevant clinical reference group. Citing the earlier example, the mentee would search the literature for screening tools and then critically appraise literature related to the psychometric properties of the tool. This would then be presented to the clinical reference group and a discussion regarding implementation would follow. The initial time-frame for the mentees to complete the evidence-based project was six weeks following the conclusion of the secondment to the allied health research unit. However, a number of mentees required additional time of up to a total of three months. It should also be noted that one mentee did not complete their project but did not formally withdraw from the study.

2.5.1.3 Organisational culture

Results from the literature reviews revealed that the organisational culture has a significant influence on health professionals' experience of EBP. A constructive culture was associated with more positive attitudes towards EBP and conversely, a negative and unsupportive culture was perceived to create significant barriers to all EBP related constructs. The theory of planned behaviour determined that the respondents did not feel that their engagement in EBP activities were valued by the organisation. Other contextual factors, such as KPIs to discharge patients within a certain time-frame, also contributed to overall low perceived behavioural control related to EBP. Consequently, the tailored intervention targeted several elements of the organisation in order to build a more constructive culture related to allied health professionals' engagement in EBP activities. The elements which were addressed in this study included:

1. Executive and managerial support for the research study. The organisation agreed to release staff to attend clinical reference groups and for the mentees to attend a 2-week mentorship program. However, it must be noted there was funded provided to backfill the clinical work of the mentees for the 2-week secondment.
2. Development of a research hub with a drop-in design for all allied health professionals to use. Lack of computer resources was a frequently cited barrier in both strands of data collection and in published literature. The research hub had dedicated computers in a quiet space for allied health professionals to use as they needed.

3. Launch of an organisation specific research web page with EBP resources. Cheat-sheets were developed for each of the 5-steps of the Sicily statement including information on how to use search engines and tools for critical analysis. Research on the effectiveness of education resources have found that this approach can improve the skills of health professionals. One of the benefits of having such resources available on-line is that individuals can access them when they need it i.e. at a time when they are undertaking a project.

2.6 Phase 3: Evaluation

Phase 3 occurred over a period of approximately 12 months. Although the intervention targeted a small group of allied health professionals, evaluation of the impact of the intervention was measured across the broader organisation. As mentioned previously, the role of the EBP champions was to act as knowledge brokers and a source of EBP skills and knowledge for their colleagues. It was anticipated that the intervention would have a more far-reaching effect than the individuals who attended the mentorship group. The next section will describe data collection and analysis for the evaluation of the intervention.

2.6.1 Strand 1: Quantitative data collection

The post-intervention component of the study involved repeating the quantitative survey from Phase 1 with both the intervention and control organisations.

Email contact was made with the managers of each allied health professional group, across both sites, to explain the study and invite participation from all their qualified staff members. A web-based link was included in the email along with a PDF of the survey to ensure that computer access was not a barrier to participation. Pre-paid return envelopes were provided to both sites and all disciplines for those clinicians who completed a hard copy of the survey. These were then manually entered by a research assistant. All respondents who completed the survey, either online or hardcopy, were eligible to go into a draw to win a \$100 gift voucher. Implied consent was assumed for all respondents who submitted a completed survey.

2.6.1.1 Study sites

The same two sites from Phase 1 of the study participated in Phase 3 of the study.

2.6.1.2 Study population

The same study population from Phase 1 were invited to participate in Phase 3 of the study.

2.6.1.3 Data collection tool

The same survey that was used in Phase 1 was repeated for both sites. The only alteration was the addition of a question regarding earlier completion of the survey during phase 1. This was to identify the number of staff changes during the time of the study.

The control organisation was also asked to report on any additional projects or activities that may have influenced allied health professionals' EBP experiences over the prior 12-months. It was not expected that the control site would cease any activities they had typically engaged in that targeted EBP constructs. For example, many organisations offer skills-based workshops for their staff on various aspects of research.

The questionnaire related to EBP activities in the prior 12 months was completed by the lead contact at the control site and can be found in Appendix 17.

2.6.1.4 Data management and analysis

The online survey for Phase 3 was open for a total of four weeks. The same process used in Phase 1 was followed for this phase. After the deadline, the survey was closed, and any hardcopies received were manually entered so that all respondents had unique identifier numbers.

Data from Survey Monkey was exported via excel and copied into STATA 13.0, a statistical package. Descriptive data analysis was completed for each organisation separately, to ensure the groups were matched at baseline.

The primary focus of the analysis at this stage was to determine if the intervention had any impact on EBP attitudes, beliefs, skills, knowledge and behaviour. To determine this, regression analyses both within the organisation and between the intervention and control organisations were completed.

2.6.1.4.1 Control group 1: Within intervention organisation regression analysis

As mentioned in the above paragraph, the intervention targeted a small group of EBP champions based in different clinical areas across the intervention organisation. This aspect of the data analysis involved comparing the intervention target areas with the non-intervention target areas within the intervention organisation. The purpose of this analysis

was to determine the effect of the intervention on the clinical areas that were most likely to benefit from the intervention i.e. the allied health groups and multidisciplinary teams that were captured in the clinical reference groups. This included the sub-acute rehabilitation care ward, sub-acute aged care ward, community rehabilitation and community health centre.

The regression analysis measured the effect of the intervention on the dependent variable i.e. EBP attitudes, beliefs, skills, knowledge and behaviour. Statistically significant results were set at p value of $<.05$ with 95% confidence intervals. The results of this analysis are included in Chapter 6.

2.6.1.4.2 Control group 2: Within target areas between organisations regression analysis

The second parallel control group consisted of allied health professionals from the same target areas but from the non-intervention organisation. To measure the effect of the intervention, the target areas were matched and compared. Data from the Phase 3 survey pertaining to allied health professional who worked in subacute rehabilitation, subacute aged care, community rehabilitation and domiciliary care were included in a regression analysis.

The results of this analysis can also be found in Chapter 6.

Chapter 3: Paper 1

Preface

This chapter presents the findings of the first study from the quantitative component of Phase 1. The aim of this study was to explore allied health professionals' experience of and engagement with evidence-based practice.

The research questions guiding the study were:

Research question 1: What are the current attitudes, beliefs, knowledge, skills and behaviours of allied health professionals in relation to EBP?

Research question 2: Do allied health professional groups differ in their attitudes, skills and behaviours related to EBP?

Research question 3: What variables influence allied health professionals' experience of EBP?

It is important to identify if there are differences between the professional groups and/or workplace settings in relation to EBP attitudes, beliefs, knowledge, skills and behaviours. The tailoring of an intervention to address contextual barriers is reliant on prospective identification and understanding of the variables that may influence allied health professionals' experience of EBP.

There are no published studies comparing the experiences and perceptions of EBP across different allied health professional groups and workplace settings in an Australian context.

A PDF of the manuscript submitted to the International Journal of Therapy and Rehabilitation can be found in Appendix 19.

This chapter is an adaptation of the submitted manuscript as it does not include the abstract.

Evidence-based practice and allied health professionals: Differences in perspectives across disciplines and settings

3.1 Introduction

The concept of EBP is not new to allied health with studies on this topic appearing in the literature more than 30 years ago (Jette et al. 2003). A scan of published literature would suggest that most allied health professional groups think that EBP is a 'good idea' and that research evidence can improve patient care (Kamwendo 2002, Bennett et al. 2003, Jette et al. 2003, McCluskey 2003, Powell and Case-Smith 2003, Iles and Davidson 2006, Salbach et al. 2007, Salbach et al. 2009, Powell and Case-Smith 2010). However, much of this literature has failed to account for the potential influence of factors such as where the clinician works, age, gender and characteristics of the specific discipline.

One of the earliest studies exploring physiotherapists' attitudes towards, knowledge of and engagement in EBP activities found that more than 90% of the respondents (n=488) held positive beliefs about EBP (Jette et al., 2003). However, more than 60% of the sample had higher qualifications and almost 60% worked in an outpatient setting. The authors of this study did not analyse if there were differences between clinicians working in different settings or those with entry level degrees. In a similar study conducted with occupational therapists, Bennett et al found that 96% of respondents (n=649) held positive attitudes and beliefs regarding EBP (Bennett et al., 2003). Although the authors found an association between metropolitan settings and higher qualifications and EBP training, they did not analyse workplace setting or years since initial qualification. Similar studies can be found across most of the allied health professional groups (Zipoli & Kennedy, 2005; Byham-Gray et al., 2005; Wilkinson et al., 2012), however, the samples often include high numbers of respondents with post-graduate qualifications and/or do not explore if there are associations between other demographic characteristics and EBP attitudes, beliefs, confidence and behaviours. The studies to date appear to assume that allied health professionals are homogenous in their experience of EBP i.e. that respondents working in the acute setting will have similar views to respondents working in community setting, or that respondents who work part-time will experience similar barriers to those who work full-time.

Understanding if allied health professionals are different in their experience of EBP is critical in developing appropriate interventions to enhance the uptake of EBP. There have been a

number of international studies comparing EBP attitudes, beliefs, skills, knowledge and confidence across a variety of allied health professional groups. Heiwe et al surveyed 227 Swedish allied health professionals and found that all of the disciplines held a positive attitude towards EBP, but some disciplines were more interested in increasing the use of evidence in daily practice (Heiwe et al., 2011). However, the sample was drawn from a university hospital and previous research has shown a correlation between affiliation with a tertiary institution and EBP attitudes, beliefs, skills and behaviours (Kamwendo, 2007; Salbach et al., 2007; Barnard & Wiles, 2001). Furthermore, this study did not account for the influence of higher qualifications. More than 56% of the sample were physiotherapists and nearly 50% of these respondents had higher qualifications. It is possible that this influenced the results of the study as previous research has also shown a correlation between post-graduate qualifications and propensity to engage in EBP behaviours (Zipoli & Kennedy, 2005; Byham-Gray et al., 2005; Bernhardsson & Larsson, 2013; Brown et al., 2010; Upton et al., 2014; Scurlock-Evans et al., 2014; Hadley et al., 2008). A similar study in the United Kingdom found differences between dietitians, occupational therapists, physiotherapists and speech / language therapists (n=572) in relation to perceived importance of research and barriers (Metcalf et al., 2001). However, the authors did not explore if these differences may have been influenced by workplace setting, higher level qualifications or any other demographic information.

To date, the published studies comparing the experiences and perceptions of EBP across different allied health professional groups provide limited information regarding the impact of factors such as workplace setting, professional group and demographic characteristics on EBP. Only one published study (Pain et al., 2004) tested for differences in clinician's experience of EBP against the size (small, medium and large) and location (urban or small urban/rural) of the work setting and found no statistically significant differences related to those variables. However, there was no information on whether the clinician was primarily based in an acute setting, rehabilitation ward or community facility.

The primary aim of this study was to compare EBP beliefs, attitudes, confidence, sources of information guiding clinical decisions and behaviour across a range of Australian allied health disciplines and across a range of workplace settings. The second aim was to examine if there were any associations between independent variables such as professional group,

workplace setting, age, gender and years practicing and the dependent variables of EBP beliefs, attitudes, confidence, skills and behaviours.

3.2 Methods

3.2.1 Study design

Analytical cross-sectional survey

3.2.2 Participants and setting

All allied health professionals from two major metropolitan health services in Victoria and Tasmania were considered eligible to participate in the study. The allied health disciplines included audiology, exercise physiology, nutrition / dietetics, occupational therapy, podiatry, physiotherapy, psychology (clinical and neuropsychology), speech pathology, social work and radiation therapy. All settings were of interest and include acute care wards, inpatient and outpatient rehabilitation and community settings. The total sample size was 496 allied health professionals.

3.2.3 Instrument

Allied health professionals' beliefs, attitudes, confidence, sources of information to guide clinical decisions and behaviour relating to EBP were evaluated using a composite instrument developed for this study. The instrument consisted of a total of 56 questions grouped into five sections to measure the specific components of EBP. The four sections related to beliefs, attitudes, sources of information to guide clinical decisions and participation in EBP activities were based on a survey developed and validated by Jette et al for use with allied health professionals (2003). Respondents were asked to rate their attitudes and beliefs using a six-point Likert Scale from strongly agree to strongly disagree. Sources of information for clinical decision making was measured using a five-point Likert Scale from always to never whilst participation in EBP activities was measured using a yes/no response. The fifth section of the survey measured respondents' confidence to conduct evidence-based activities, such as formulating a research question. This tool has high internal consistency and construct validity and has been used in both its preliminary and final version in a number of studies (Salbach et al., 2007; Salbach & Jaglal, 2011; DeCleene Huber et al. 2015, Clyde et al. 2016). It comprises 12 questions related to the 5-

steps set out in the Sicily statement. Respondents are asked to rate their confidence on a Likert scale from 0% “cannot do at all” to 100% “certain can do”.

Information regarding respondents’ age, gender, years practicing, level of qualification(s) and work setting were all collected on the first page of the instrument.

3.2.4 Procedure

Email contact was made with the managers of each allied health professional group explaining the study and inviting participation from all their qualified staff members. A web-based link was included in the email along with a PDF of the survey to ensure that computer access was not a barrier to participation. Pre-paid return envelopes were provided to both sites and all disciplines for those clinicians who completed a hard copy of the survey. These were then manually entered by a research assistant. All respondents who completed the survey, either online or hardcopy, were eligible to go into a draw to win a \$100 gift voucher. Implied consent was assumed for all respondents who submitted a completed survey.

3.2.5 Ethics

The study was approved by the Human Research Ethics Committee (HREC) at each site.

3.2.6 Data analysis

All data analysis was undertaken using STATA Version 13.0. Ordered logistic regression was used to identify relationships between independent variables such as professional group, workplace setting, age, gender, highest qualification, years practicing and prior exposure to research and the dependent variables measured in the survey tool including EBP beliefs, attitudes, confidence, sources of information guiding clinical decisions and behaviour. The ordered logit model is appropriate for analysis of outcome variables that are ordinal in nature, such as the Likert scale responses used in the instrument in this study.

Unstandardised beta coefficients were used and statistically significant results were set at p value of $<.05$ with 95% confidence intervals.

3.3 Results

The survey was completed by 288 clinicians, indicating a response rate of 58%.

Demographics of the sample are presented in Table 3-1. Respondents were primarily female

(88.2%), under the age of 30 (43.7 %) and working full-time (53.8%). Half (49.3%) of the respondents had a bachelor's degree as their highest qualification and nearly 60% had been working for less than 10 years. Table 3-2 presents the associations between the specific allied health professional groups and EBP constructs measured, whilst Table 3-3 presents the associations between the workplace settings and EBP. Table 3-4 explores the influence of a number of demographic variables on EBP skills, confidence and sources of information for clinical decision making. All data were analysed using ordered logistic regression but for ease of interpretability, the data is displayed as n% agree or median and IQR for self-efficacy ratings. Comparison of responses for questions revealed significant differences between specific professional groups, workplace setting and demographics.

3.3.1 Association between professional group and EBP

There were differences between professional groups related to all of the EBP constructs measured. Social workers were less likely than all the other allied health professional groups to agree that EBP principles were necessary for their clinical practice ($p=0.02$), or that they should be responsible for interpreting whether research findings apply to their individual patients ($p<0.01$). Surprisingly, they did not report a lack of confidence with EBP skills such as interpreting statistical data, despite the fact that they did not agree that patient care should be based on scientific studies ($p<0.01$). By contrast, the majority of occupational therapists felt that EBP principles were important in clinical practice, but they consistently identified a lack of confidence with EBP skills including critically appraising literature ($p<0.01$), interpreting statistical procedures ($p=0.01$), applying evidence ($p<0.01$) and evaluating practice ($p<0.01$). This was also reflected in the sources of information this group used for clinical decision making, as they were less likely to use clinical practice guidelines ($p=0.01$) or research studies ($p<0.01$) in comparison to all other allied health professional groups.

Dietitians consistently reported high levels of self-efficacy related to EBP and were the least likely to identify a divide between research and practice ($p<0.01$) and the most likely to use clinical practice guidelines ($p<0.01$). This professional group were also more likely to report recent engagement in EBP activities such as collecting data/information for protocols and/or guidelines ($p<0.01$).

3.3.2 Association between workplace setting and EBP

There were also differences found across the variety of workplace settings in relation to all the EBP constructs. Clinicians from sub-acute outpatient settings were more likely to believe they should conduct their own literature reviews ($p=0.03$) and critically evaluate the evidence ($p=0.05$). Community based allied health professionals had lower self-efficacy in relation to identifying the strengths and weaknesses of study designs ($p=0.02$) and interpreting statistical data ($p=0.04$). This was also reflected in the sources of information for clinical decision making with community-based clinicians being the least likely to use research studies ($p<0.01$) in comparison to all other settings. By contrast, clinicians from the acute setting were more likely to use clinical practice guidelines ($p<0.01$), case studies ($p<0.01$) and internet resources ($p<0.01$).

3.3.3 Association between demographics and EBP

Several demographic variables were associated with the constructs measured. Age was strongly associated with sources used for clinical decision making with younger respondents more likely to use the results from a randomized controlled trial ($p=0.04$) while older respondents were more likely to rely on their own clinical experience ($p=0.02$). The greatest differences were seen for years worked, grade of the clinician, year of graduation and highest qualification across all EBP constructs measured. Respondents with less clinical experience were less likely to perceive a divide between research and clinical practice ($p<0.01$) and more confident in their ability to interpret the strengths and weaknesses of study designs ($p=0.02$). Respondents with higher qualifications were more confident in their ability to interpret statistical data ($p<0.01$) and more likely to use the results of a meta-analysis of randomized controlled trials ($p<0.01$) to inform their clinical decisions.

3.4 Discussion

The findings from this study have highlighted significant differences in attitudes, skills, confidence and behaviours related to EBP, both across allied health professional groups and workplace settings. Although all allied health professionals had positive attitudes and beliefs towards EBP, social workers were statistically less likely to believe that EBP principles were important in their practice, or that patient care should be based on research rather than opinions of colleagues. There are a number of reasons that may account for this finding,

including the reported tension between the philosophy of EBP and the epistemological perspectives of social workers i.e. the nature of knowledge and truth (Simmons, 2012). It has been suggested that “... many interpretations of EBP do not adequately account for the needs of the individual within the context of his or her environment and the socially structured aspects of problems.” (Simmons, 2012, p.14). There is also a body of literature within social work arguing for evidence-informed practice as a more appropriate title for the model of care delivered by health professionals (Shlonsky et al., 2011). The results from this study may reflect a move away from the term evidence-based practice and towards evidence-informed practice. A recent study with social workers found that 82% of respondents (n=364) agreed research could be useful in their daily activities (Gray et al., 2013), however, more than 50% of the respondents were in non-clinical positions i.e. management, coordination and service development. Less than 16% of the respondents in this study were in positions with a substantial non-clinical component i.e. Gd.4 and above. It is possible that social workers in a “front-line” position may have different attitudes towards evidence-based practice or evidence-informed practice in comparison to those working in non-clinical roles. This may be influenced by the well-documented barriers that clinical allied health professionals report in relation to EBP i.e. lack of time and competing priorities.

Previous research has found that allied health clinicians in general experience low levels of self-efficacy with EBP skills such as critically appraising literature and then applying in practice (Upton 1999; Delany & Bailocerkowski, 2011; Bakar et al., 2016; Verloo et al., 2017). However, this study found that occupational therapists in particular were less confident in their ability to undertake EBP activities, and they were also more likely to perceive that EBP activities placed an unreasonable demand on their time. Lack of time is one of the most frequently cited barriers to implementing EBP in clinical practice, and it is possible that occupational therapists perceive this to be a greater barrier than the other allied health professional groups (Upton 1999; Kamwendo 2002; Jette et al. 2003; Thomas et al. 2003; Gosling & Westbrook 200; Byham-Gray et al. 2005; McKenna et al. 2005; Zipoli & Kennedy 2005; Upton & Upton 2006; Grimmer-Somers et al. 2007; Salbach et al. 2007; Schreiber et al. 2008; O'Connor & Pettigrew 2009; Salls et al. 2009; Fruth et al. 2010; Lai et al. 2010; Delany & Bialocerkowski 2011; Heiwe et al. 2011; Döpp et al. 2012; McCurtin & Roddam 2012; Swedlove & Etcheverry 2012; Valdes & von der Heyde 2012; Vogt et al. 2012; McCluskey et

al. 2013; Pighills et al. 2013; Robertson et al. 2013; Mota da Silva et al. 2014; Scurlock-Evans et al. 2014). By contrast, dietitians had the highest levels of self-efficacy related to EBP skills. This may be related to the level of education dietitians receive and potential exposure to research as a component of a higher research degree. In Australia, there are currently 15 education programs accredited with the Dietitians Association of Australia (Dietitians Association of Australia, 2018). Of these 15 programs, 11 are provided at a post-graduate level i.e. Master's courses. Previous research has shown there is a positive correlation between higher qualifications and EBP attitudes, skills, confidence and behaviours (Bennett et al., 2003; Jette et al., 2003; Salbach et al., 2007; Perraton et al., 2017).

There were also differences found in relation to the workplace setting with subacute inpatient and community-based clinicians reporting significantly lower levels of confidence in appropriately applying evidence from the literature to their individual patient(s). The organisations in which clinicians work play a critical role in supporting EBP. Organisational features which have been identified in the literature as facilitators or barriers to EBP include site location / type / size / affiliations, availability of EBP resources and culture (Salbach et al., 2007). Acute health services typically have a higher FTE than community and subacute services at a single location, and research has found a positive correlation between the number of colleagues in the workplace and the clinician's perception of ability to implement research evidence in practice (Pain et al., 2007; Dopp et al., 2012). This may in part explain the differences we observed between work settings.

A systematic literature review completed by Dizon & Grimmer-Somers (2011) on training allied health professionals in EBP indicated that there is currently no strong evidence for any particular training approach to support allied health clinicians in EBP and research utilisation. It is possible this is due to the variability in perceptions and experiences of EBP across allied health professional groups. Consequently, a "one-size fits all" approach to EBP training may not be successful.

3.5 Limitations

Participation in the study was voluntary and although all clinicians were eligible to win a gift voucher, it is possible that respondents were already interested in EBP. As such, this may skew the results more towards a positive attitude and interest in EBP than is actually present within the broader allied health population. Both study sites are located in metropolitan

regions, albeit different size cities. It is therefore difficult to generalise the results from this study to rural or regional areas. Prior research on this topic suggests that allied health clinicians in smaller and/or rural worksites experience additional challenges related to EBP including limited access to resources such as journals, EBP workshops, libraries and the internet (Barnard & Wiles, 2001; Salbach et al., 2007).

3.6 Future research directions

This study has identified associations between professional allied health groups, workplace settings and EBP attitudes, behaviours and self-efficacy. It is unclear why specific groups, such as occupational therapy, have lower self-efficacy. It is also unclear why certain workplaces, such as the acute setting, are more likely to use evidence-based resources within their clinical practice. Any interventions to enhance the uptake of EBP should not assume that allied health professionals are a homogenous group.

Table 3-1 Respondent demographic information

	PT (n=85)		OT (n=61)		SP (n=26)		SW (n=32)		DIET (n=47)		OTHER (n=37)		Total (n=288)	
Age	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Under 30	37	43.5	30	49.18	13	50.00	6	18.75	23	48.94	17	45.95	126	43.7
31-40	27	31.8	16	26.23	8	30.77	8	25.00	13	27.66	8	21.62	80	27.8
41-50	14	16.5	9	14.75	4	15.38	10	31.25	6	12.77	7	18.92	50	17.4
51-60	7	8.2	6	9.84	1	3.85	7	21.88	5	10.64	5	13.51	31	10.8
61 and over	0	0	0	0	0	0	1	3.13	0	0	0	0	1	0.3
Gender														
Male	16	18.82	5	8.20	0	0	1	3.13	2	4.26	10	27.03	34	11.8
Female	69	81.18	56	91.80	26	100.00	31	96.87	45	95.74	27	72.97	254	88.2
Main work area														
Acute care ward	27	31.76	21	34.43	9	34.62	14	43.75	27	57.45	4	10.81	102	35.4
Sub-acute inpatient	10	11.77	16	26.23	5	19.23	6	18.75	7	14.89	7	18.92	51	17.7
Hospital outpatient dept.	16	18.82	3	4.92	2	7.69	0	0	4	8.51	15	40.54	40	13.9
Community e.g. CRC, RITH	23	27.06	16	26.23	8	30.77	6	18.75	3	6.39	6	16.22	62	21.5
Other	9	10.59	5	8.20	2	7.69	6	18.75	6	12.77	5	13.51	33	11.5
Employment status														
Permanent full-time	51	60.00	39	63.93	12	46.15	21	65.63	15	31.91	17	45.95	155	53.8
Permanent part-time	21	24.71	14	22.95	9	34.62	11	34.38	18	38.3	13	35.14	86	29.9
Temporary or casual FT	9	10.59	4	6.56	4	15.38	0	0	9	19.15	6	16.22	32	11.1
Temporary or casual PT	4	4.71	4	6.56	1	3.85	0	0	5	10.64	1	2.70	15	5.2
Years worked clinically since graduation														

Less than 5 years	23	27.06	21	34.43	10	38.46	9	28.13	19	40.43	13	35.14	95	33.0
5-10 years	24	28.24	17	27.87	8	30.77	8	25.00	10	21.28	9	24.32	76	26.4
10-15 years	15	17.65	10	16.39	6	23.08	8	25.00	9	19.15	5	13.51	53	18.4
15-20 years	8	9.41	5	8.20	0	0	3	9.38	1	2.13	6	16.22	23	8.0
More than 20 years	15	17.65	8	13.11	2	7.69	4	12.50	8	17.02	4	10.81	41	14.2
Highest grade currently working in														
1	11	12.94	18	29.51	6	23.08	7	21.88	12	25.53	8	21.62	62	21.5
2	28	32.94	18	29.51	6	23.08	13	40.63	21	44.68	6	16.22	92	31.9
3	35	41.18	21	34.43	11	42.31	7	21.88	10	21.28	11	29.73	95	33.0
4 or above	11	12.94	4	6.55	3	11.52	5	15.64	4	8.52	12	32.44	39	13.5
Year graduated from entry level health degree														
2009	1	1.18	0	0	2	7.69	3	9.38	4	8.51	1	2.70	11	3.8
2008	5	5.88	7	11.48	1	3.85	3	9.38	5	10.64	3	8.11	24	8.3
2007	5	5.88	3	4.92	2	7.69	0	0	3	6.38	2	5.41	15	5.2
2006	3	3.53	4	6.56	0	0	0	0	1	2.13	6	16.22	14	4.9
2005	8	9.41	3	4.92	5	19.23	3	9.38	5	10.64	0	0	24	8.3
2000-2004	24	28.24	19	31.15	6	23.08	6	18.75	11	23.20	9	24.32	75	26.0
1995-1999	14	16.47	7	11.48	6	23.08	6	18.75	6	12.77	5	13.51	44	15.3
1990-1994	8	9.41	3	4.92	2	7.69	2	6.25	5	10.64	6	16.22	26	9.0
Before 1990	17	20.00	15	24.59	2	7.69	9	28.13	7	14.89	5	13.51	55	19.1
Highest level of qualification obtained														
Bachelor's degree	36	42.35	38	62.30	18	69.23	22	68.75	16	34.04	12	32.43	142	49.3
Bachelor's degree Hons.	16	18.82	10	16.39	1	3.85	2	6.25	6	12.77	2	5.41	37	12.8
Graduate certificate	9	10.59	1	1.64	1	3.85	2	6.25	2	4.26	2	5.41	17	5.9

Graduate diploma	2	2.35	2	3.28	0	0	0	0	4	8.51	1	2.70	9	3.1
Post-graduate diploma	10	11.76	2	3.28	0	0	3	9.38	2	4.26	3	8.11	20	6.9
Master's Degree	11	12.94	8	13.11	6	23.08	3	9.38	17	36.17	9	24.32	54	18.8
PhD	1	1.18	0	0	0	0	0	0	0	0	8	21.62	9	3.1
Currently enrolled in higher qualification course														
Yes	6	7.06	5	8.20	2	7.69	4	12.50	2	4.26	5	13.51	24	8.3
No	79	92.94	56	91.80	24	92.31	28	87.50	45	95.74	32	86.49	264	91.7
Year graduated from most recent qualification														
2009	4	4.71	0	0	3	11.54	4	12.50	6	12.77	6	16.2	23	8.0
2008	9	10.59	11	18.03	1	3.85	3	9.38	6	12.77	6	16.2	36	12.5
2007	8	9.41	4	6.56	2	7.69	0	0	3	6.38	4	10.8	21	7.3
2006	4	4.71	4	6.56	0	0	1	3.13	1	2.13	7	18.9	17	5.9
2005	8	9.41	2	3.28	5	19.23	3	9.38	6	12.77	1	2.7	25	8.7
2000-2004	29	34.12	24	39.34	6	23.08	11	34.38	12	25.53	3	8.1	85	29.5
1995-1999	11	12.94	6	9.84	7	26.92	2	6.25	6	12.77	6	16.2	38	13.2
1990-1994	3	3.53	5	8.20	1	3.85	3	9.38	4	8.51	4	10.8	20	6.9
Before 1990	9	10.59	5	8.20	1	3.85	5	15.63	3	6.39	0	0	23	8

Table 3-2 Relationship between professional group and EBP

EBP BELIEFS & ATTITUDES. 6-POINT RESPONSE SCALE FROM STRONGLY AGREE TO STRONGLY DISAGREE. DATA PRESENTED AS N (%) AGREE												
Question	PT (n=82)		OT (n=60)		SP (n=26)		SW (n=31)		DIET (n=47)		OTHER (n=37)	
	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=
In making clinical decisions, clinical experience is more important than scientific studies.	56 (68.3)	0.33	48 (80.0)	0.055	12 (46.2)	0.02*	18 (58.1)	0.76	28 (59.6)	0.15	21 (61.8)	0.92
In making clinical decisions, seeking evidence from scientific studies is important.	81 (98.8)	0.50	54 (90.0)	<0.01*	26 (100)	<0.01*	27 (87.1)	<0.01*	44 (93.6)	<0.01*	33 (97.1)	0.12
In making clinical decisions, assessing the quality of the research evidence is important.	80 (97.6)	0.36	56 (93.3)	0.06	26 (100)	0.34	26 (83.9)	<0.01*	44 (93.6)	0.03*	33 (97.1)	0.52
Clinical experience is the most reliable way to know what is effective.	47 (57.3)	0.84	36 (60.0)	0.18	10 (38.5)	<0.01*	22 (71.0)	0.01*	24 (51.1)	0.76	15 (44.1)	0.08
Patient care should be based, where possible, on scientific studies rather than the opinions of respected practitioners.	46 (56.1)	0.88	37 (61.7)	0.65	13 (50.0)	0.55	11 (35.5)	<0.01*	29 (61.7)	0.14	23 (67.7)	0.23
Critical appraisal of the literature is not very practical in real-life day-to-day patient care.	43 (52.4)	0.93	32 (53.3)	0.26	16 (61.5)	0.37	12 (38.7)	0.22	29 (61.7)	0.52	15 (44.1)	0.07
Application of EBP principles are necessary for the practice of my profession today.	79 (97.5)	0.59	52 (86.7)	0.12	26 (100.0)	0.05	25 (83.3)	0.02*	46 (97.9)	0.02*	32 (100.0)	0.65
Literature and research findings are useful in my day-to-day practice.	74 (91.4)	0.50	46 (76.7)	<0.01*	26 (100.0)	0.04*	22 (73.3)	0.03*	46 (97.9)	0.07	31 (93.8)	0.27
I need to increase the use of evidence in my daily practice.	66 (81.5)	0.14	58 (96.7)	<0.01*	25 (96.2)	<0.01*	23 (76.7)	0.25	34 (72.3)	0.40	22 (68.8)	0.04*

Incorporating EBP activities into day-to-day practice places an unreasonable demand on people working in my profession.	16 (19.8)	0.37	19 (31.7)	0.02*	7 (26.9)	0.59	9 (30)	0.60	7 (14.9)	0.24	6 (18.8)	0.32
I am interested in learning or improving the skills necessary so that I can incorporate research evidence into my clinical decision making.	71 (87.7)	0.64	49 (81.7)	0.92	21 (80.8)	0.32	23 (76.7)	0.10	42 (89.4)	0.98	27 (84.4)	1.00
Adoption of EBP activities into day-to-day practice improves the quality of patient care.	73 (90.1)	0.13	56 (93.3)	0.74	25 (96.2)	0.02*	26 (86.7)	0.06	46 (97.9)	0.48	32 (100)	0.60
There is a definite divide between research and practice in my profession.	21 (25.9)	0.48	29 (48.3)	<0.01*	14 (53.9)	0.04*	14 (46.7)	0.14	6 (12.8)	<0.01*	6 (18.8)	0.15
Allied health professionals should conduct their own literature reviews to answer their clinical questions.	45 (55.6)	0.12	38 (63.3)	0.88	17 (65.4)	0.19	17 (56.7)	0.61	30 (63.8)	0.80	21 (65.6)	0.05
Allied health professionals should be responsible for critically evaluating the quality of the literature to address their clinical questions.	57 (70.4)	0.33	43 (71.7)	0.67	18 (69.2)	0.98	23 (73.3)	0.45	35 (74.5)	0.27	26 (81.3)	0.06
Allied health professionals should be responsible for interpreting whether research findings apply to their individual patients.	73 (90.1)	0.07	48 (80.0)	0.29	23 (88.5)	0.13	18 (60.0)	<0.01*	38 (80.9)	0.43	22 (68.8)	0.69
EBP CONFIDENCE. 10-POINT RESPONSE SCALE FROM 0% CANNOT DO AT ALL TO 100% CERTAIN CAN DO. DATA PRESENTED AS MEDIAN (IQR).												
Question	PT (n=82)		OT (n=60)		SP (n=26)		SW (n=31)		DIET (n=47)		OTHER (n=37)	
	n (IQR)	P=	n (IQR)	P=	n (IQR)	P=	n (IQR)	P=	n (IQR)	P=	n (IQR)	P=
Identify clinical problems following a patient assessment.	90 (80,100)	0.01*	85 (80,90)	0.04*	90 (70,90)	0.29	80 (80,100)	<0.01*	80 (70,90)	0.04*	85 (60,80)	0.13

Formulate a question based on the clinical problem to guide a literature search.	70 (60,80)	0.79	70 (50,80)	<0.01*	80 (68,93)	0.02*	65 (50,80)	0.08	80 (60,90)	0.06	80 (63,90)	0.19
Effectively search the relevant literature to address the question.	60 (50,80)	0.09	50 (40,68)	<0.01*	80 (60,90)	0.04*	60 (50,80)	0.95	80 (60,80)	0.05	75 (60,90)	0.04*
Critically appraise the literature for reliability and relevance.	60 (50,70)	0.32	50 (30,70)	<0.01*	60 (50,80)	0.38	55 (43, 80)	0.62	70 (60,80)	<0.01*	80 (60,90)	<0.01*
Critically appraise the reliability and validity of outcome measures.	50 (40,70)	0.28	40 (30,60)	<0.01*	60 (40,80)	0.51	50 (40,70)	0.53	70 (50,80)	0.01*	80 (60,90)	<0.01*
Identify the strengths and weaknesses of different study designs.	60 (40,70)	0.44	50 (30,60)	<0.01*	60 (50,80)	0.22	30 (33,68)	0.19	70 (50,80)	0.02*	75 (60,90)	<0.01*
Interpret results of statistical procedures such as t tests, correlations and chi-square tests.	20 (10,50)	<0.01*	20 (10,50)	0.01*	30 (20,70)	0.27	25 (10,48)	0.06	50 (30,70)	<0.01*	50 (50,88)	<0.01*
Interpret results of statistical procedures such as linear or logistic regression.	20 (10,40)	<0.01*	20 (0,48)	0.02*	30 (10,63)	0.41	20 (0,30)	0.03*	45 (20,60)	<0.01*	50 (40,78)	<0.01*
Appropriately apply evidence from the literature to the individual patient.	70 (50,80)	0.52	50 (50,70)	<0.01*	75 (70,83)	0.04*	60 (50,78)	0.09	80 (70,90)	<0.01*	70 (60,88)	0.35
Understand your patient's needs and treatment preferences.	90 (80,100)	<0.01*	80 (70,90)	<0.01*	90 (88,100)	0.03*	80 (70,90)	0.05	90 (80,100)	0.30	85 (73,90)	0.10
Decide on an appropriate course of action in collaboration with the patient.	90 (80,100)	0.01*	80 (80,90)	0.01*	90 (80,100)	0.41	80 (73,98)	0.11	90 (80,100)	0.19	90 (80,90)	0.30
Continually evaluate the effect of your practice.	80 (70,90)	0.04*	70 (60,88)	<0.01*	90 (80,90)	0.03*	80 (60,90)	0.35	80 (70,90)	0.64	80 (70,90)	0.54
SOURCES OF INFORMATION CLINICAL DECISION MAKING. 5-POINT RESPONSE SCALE FROM ALWAYS TO NEVER. DATA PRESENTED AS N (%) RESPONDED OFTEN- ALWAYS.												
Question	PT (n=82)		OT (n=60)		SP (n=26)		SW (n=31)		DIET (n=47)		OTHER (n=37)	
	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=

My own clinical experience.	80 (100.0)	0.02*	58 (98.3)	0.18	25 (96.2)	0.84	28 (100.0)	0.20	41 (95.4)	0.80	30 (96.8)	0.92
Opinions of colleagues.	62 (77.5)	0.20	52 (88.1)	0.35	21 (80.8)	0.64	25 (89.3)	0.20	31 (72.1)	0.45	26 (83.9)	0.81
Expert consultation.	38 (47.5)	0.11	32 (54.2)	0.89	14 (53.9)	0.43	18 (64.3)	0.14	23 (53.5)	0.42	19 (61.3)	0.68
Employer sponsored continuing education seminars or in-services.	31 (38.8)	0.53	14 (23.7)	0.15	10 (38.5)	0.63	11 (39.3)	0.87	21 (48.8)	0.05*	12 (38.7)	0.52
Clinical practice guidelines.	39 (48.8)	0.13	25 (42.4)	0.01*	14 (53.9)	0.96	16 (57.1)	0.76	37 (86.1)	<0.01*	18 (58.1)	0.83
Continuing education outside my place of employment.	34 (42.5)	0.02*	14 (23.7)	<0.01*	10 (38.5)	0.70	6 (21.4)	0.10	13 (30.2)	0.84	13 (41.9)	0.15
Textbooks.	22 (27.5)	0.50	17 (28.8)	0.13	15 (57.7)	<0.01*	7 (25.0)	0.13	14 (32.6)	0.33	10 (32.3)	0.51
Videos, DVD, audiotapes, CD, podcasts.	5 (6.3)	0.47	6 (10.2)	0.38	6 (23.1)	<0.01*	2 (7.1)	0.74	2 (4.7)	0.14	3 (9.7)	0.37
Case studies.	8 (10.0)	<0.01*	10 (17.0)	0.23	8 (30.8)	0.02*	12 (42.9)	<0.01*	6 (14.0)	0.21	5 (16.1)	0.54
Internet resources (excluding previously mentioned sources of information or journal articles found via the internet).	42 (52.5)	0.75	30 (50.9)	0.73	16 (61.5)	0.16	13 (46.4)	0.78	24 (55.8)	0.91	13 (41.9)	0.46
Research studies (in general).	31 (38.8)	0.83	14 (23.7)	<0.01*	15 (57.7)	0.03*	7 (25.0)	0.16	21 (48.8)	0.01*	15 (48.4)	0.06
Meta-analysis of randomized controlled trials.	22 (27.5)	<0.01*	6 (10.2)	<0.01*	3 (11.5)	0.26	0 (0.0)	<0.01*	8 (18.6)	<0.01*	8 (25.8)	0.16

Results from a randomized controlled trial.	24 (30.0)	<0.01*	7 (11.9)	<0.01*	3 (11.5)	0.49	0 (0.0)	<0.01*	10 (23.3)	0.02*	6 (19.4)	0.98
Results of a controlled study without randomization.	7 (8.8)	0.12	5 (8.5)	0.21	4 (15.4)	0.60	0 (0.0)	<0.01*	3 (7.0)	0.54	2 (6.5)	0.41
Results of a quasi-experimental study.	5 (6.3)	0.19	2 (3.4)	0.98	1 (3.9)	0.83	0 (0.0)	0.39	2 (4.7)	0.60	1 (3.2)	0.65
Results from a single-subject design study.	1 (1.3)	0.72	3 (5.1)	0.52	3 (11.5)	<0.01*	1 (3.6)	0.19	1 (2.3)	0.02*	1 (3.2)	0.29
Results from studies investigating reliability or validity of a measurement instrument / approach.	11 (13.8)	0.25	5 (8.5)	0.07	5 (19.2)	0.11	1 (3.6)	<0.01*	4 (9.3)	0.49	3 (9.7)	0.08
Results from an economic evaluation (e.g. cost-effectiveness study).	1 (1.3)	0.96	2 (3.4)	0.78	0 (0.0)	0.47	0 (0.0)	0.42	0 (0.0)	0.55	1 (3.2)	0.27
EBP PARTICIPATION OVER LAST 6 MONTHS. YES / NO RESPONSE SCALE. DATA PRESENTED AS N (%) RESPONDED YES.												
Question	PT (n=82)		OT (n=60)		SP (n=26)		SW (n=31)		DIET (n=47)		OTHER (n=37)	
	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=
Reviewing literature individually for my own clinical practice.	63 (79.8)	0.7461	39 (67.2)	0.02*	25 (96.2)	0.02*	18 (64.3)	0.05	37 (86.1)	0.19	26 (83.9)	0.28
Reviewing literature as a part of a group for practice as a group/department.	49 (62.0)	0.9584	31 (53.5)	0.12	20 (76.9)	0.11	18 (64.3)	0.82	27 (62.8)	0.94	20 (64.5)	0.70
Collecting information for a quality assurance project.	59 (74.7)	0.03*	33 (56.9)	0.15	15 (57.7)	0.42	13 (46.4)	0.03*	33 (76.7)	0.08	19 (61.3)	0.45
Collecting information for a clinical practice protocol/guideline.	50 (63.3)	0.58	26 (44.8)	<0.01*	18 (69.2)	0.35	15 (53.6)	0.41	33 (76.7)	0.02*	19 (61.3)	0.80

Collecting information for a research project.	23 (29.1)	0.32	21 (36.2)	0.63	5 (19.2)	0.10	5 (17.9)	0.06	17 (39.5)	0.37	18 (58.1)	<0.01*
Leading a quality assurance project.	31 (39.2)	0.81	16 (27.6)	0.06	13 (50.0)	0.19	6 (21.4)	0.06	20 (46.5)	0.22	15 (48.4)	0.43
Leading a clinical practice protocol/guideline project.	34 (43.0)	0.05	13 (22.4)	0.03*	11 (42.3)	0.37	5 (17.9)	0.05*	16 (37.2)	0.67	12 (38.7)	0.99
Leading a research project.	6 (7.6)	0.08	7 (12.1)	0.77	3 (11.5)	0.79	0 (0.0)	0.03*	6 (14.0)	0.87	13 (41.9)	<0.01*
Preparing a conference presentation (poster or podium).	17 (21.5)	0.21	13 (22.4)	0.39	10 (38.5)	0.16	3 (10.7)	0.04*	14 (32.6)	0.35	14 (45.2)	0.02*
Writing a manuscript for a journal.	6 (7.6)	0.31	9 (15.5)	0.17	3 (11.5)	0.87	1 (3.6)	0.20	3 (7.0)	0.40	6 (19.4)	0.06

Table 3-3 Relationship between workplace setting and EBP

EBP BELIEFS & ATTITUDES. 6-POINT RESPONSE SCALE FROM STRONGLY AGREE TO STRONGLY DISAGREE. DATA PRESENTED AS N (%) AGREE.										
Question	Acute (n=102)		Sub-Acute In patient (n=51)		Sub-Acute Out Patient (n=40)		Community (n=62)		Other (n=33)	
	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=
In making clinical decisions, clinical experience is more important than scientific studies.	67 (66.3)	0.90	34 (69.4)	0.39	25 (64.1)	0.86	40 (67.8)	0.56	17 (53.1)	0.08
In making clinical decisions, seeking evidence from scientific studies is important.	92 (91.1)	0.96	48 (98.0)	0.81	37 (94.9)	0.26	58 (98.3)	0.12	30 (93.8)	0.56
In making clinical decisions, assessing the quality of the research evidence is important.	93 (92.1)	0.60	48 (98.0)	0.61	37 (94.9)	0.55	56 (94.9)	0.13	31 (96.9)	0.15
Clinical experience is the most reliable way to know what is effective.	56 (55.5)	0.64	29 (59.2)	0.13	17 (43.6)	0.050	33 (55.9)	0.65	19 (59.4)	0.86
Patient care should be based, where possible, on scientific studies rather than the opinions of respected practitioners.	64 (63.4)	0.16	25 (51.0)	0.35	24 (61.5)	0.20	29 (61.5)	0.07	17 (53.1)	0.91
Critical appraisal of the literature is not very practical in real-life day-to-day patient care.	53 (52.5)	0.81	24 (49.0)	0.75	20 (51.3)	0.40	30 (50.9)	0.75	20 (62.5)	0.60
Application of EBP principles are necessary for the practice of my profession today.	95 (94.1)	0.30	46 (93.9)	0.25	36 (97.3)	0.86	55 (94.8)	0.26	28 (90.3)	0.14
Literature and research findings are useful in my day-to-day practice.	92 (91.1)	0.64	39 (79.6)	0.10	34 (91.9)	0.03*	51 (87.9)	0.06	28 (90.3)	0.17
I need to increase the use of evidence in my daily practice.	83 (82.2)	0.69	45 (91.8)	0.01*	28 (75.7)	0.14	48 (82.8)	0.61	24 (77.4)	0.83

Incorporating EBP activities into day-to-day practice places an unreasonable demand on people working in my profession.	20 (19.8)	0.20	16 (32.7)	0.02*	5 (13.5)	0.14	14 (24.1)	0.59	9 (29.0)	0.98
I am interested in learning or improving the skills necessary so that I can incorporate research evidence into my clinical decision making.	86 (85.2)	0.89	42 (85.7)	0.30	32 (86.5)	0.53	48 (82.8)	0.35	25 (80.7)	0.61
Adoption of EBP activities into day-to-day practice improves the quality of patient care.	99 (98.0)	0.13	43 (87.8)	0.63	35 (94.6)	0.72	52 (89.7)	0.33	29 (93.6)	0.94
There is a definite divide between research and practice in my profession.	23 (22.8)	0.03*	18 (36.7)	0.28	8 (21.6)	0.12	30 (51.7)	<0.01*	11 (35.5)	0.88
Allied health professionals should conduct their own literature reviews to answer their clinical questions.	64 (63.4)	0.71	26 (53.1)	0.19	29 (78.4)	0.03*	32 (55.2)	0.54	17 (54.8)	0.54
Allied health professionals should be responsible for critically evaluating quality of the literature to address clinical questions.	74 (73.3)	0.86	36 (73.5)	0.54	31 (83.8)	0.05*	35 (60.3)	0.03*	25 (80.7)	0.22
Allied health professionals should be responsible for interpreting whether research findings apply to their individual patients.	85 (84.2)	0.77	37 (75.5)	0.99	33 (89.2)	0.03*	42 (72.4)	0.07	25 (80.7)	0.70
EBP CONFIDENCE. 10-POINT RESPONSE SCALE FROM 0% CANNOT DO AT ALL UP TO 100% CERTAIN CAN DO. DATA PRESENTED AS MEDIAN (IQR).										
Question	Acute (n=102)		Sub-Acute In patient (n=51)		Sub-Acute Out Patient (n=40)		Community (n=62)		Other (n=33)	
	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=
Identify clinical problems following a patient assessment.	90 (80,90)	0.49	80 (80,100)	0.34	90 (80,100)	0.79	90 (80,90)	0.47	90 (80,100)	0.44

Formulate a question based on the clinical problem to guide a literature search.	70 (60,80)	0.76	60 (50,80)	0.07	80 (60,90)	0.23	70 (50,80)	0.39	80 (70,90)	0.01*
Effectively search the relevant literature to address the question.	70 (50,80)	0.44	60 (50,80)	0.24	70 (50,80)	0.30	60 (80,48)	0.07	70 (60,90)	0.13
Critically appraise the literature for reliability and relevance.	60 (80,50)	0.53	50 (40,80)	0.03*	70 (50,80)	0.12	60 (38,80)	0.30	70 (48,80)	0.17
Critically appraise the reliability and validity of outcome measures.	60 (45,70)	0.54	50 (30,70)	0.07	60 (50,80)	0.04*	50 (30,73)	0.23	60 (40,80)	0.58
Identify the strengths and weaknesses of different study designs.	60 (40,80)	0.58	50 (35,70)	0.25	60 (50,80)	0.09	50 (30,70)	0.02*	70 (50,80)	0.07
Interpret results of statistical procedures such as t tests, correlations and chi-square tests.	30 (10,55)	0.74	30 (10,55)	0.34	50 (20,55)	0.09	20 (10,40)	0.04*	45 (18,70)	0.12
Interpret results of statistical procedures such as linear or logistic regression.	30 (10,50)	0.60	20 (0,50)	0.43	40 (20,50)	0.16	20 (0,43)	0.07	35 (10,60)	0.34
Appropriately apply evidence from the literature to the individual patient.	70 (60,80)	0.12	60 (50,75)	0.02*	70 (65,85)	0.27	60 (50,80)	0.03*	80 (58,90)	0.03*
Understand your patient's needs and treatment preferences.	90 (80,95)	0.71	80 (80,95)	0.14	90 (80,90)	0.60	90 (80,100)	0.68	90 (80,100)	0.02*
Decide on an appropriate course of action in collaboration with the patient.	90 (80,100)	0.96	90 (80,100)	0.10	90 (80,100)	0.67	90 (80,90)	0.72	90 (88,100)	0.04*
Continually evaluate the effect of your practice.	80 (70,90)	0.78	80 (60,90)	0.34	80 (70,90)	0.16	80 (60,90)	0.29	80 (70,90)	0.54
SOURCES OF INFORMATION CLINICAL DECISION MAKING. 5-POINT RESPONSE SCALE FROM ALWAYS TO NEVER. DATA PRESENTED AS N (%) RESPONDED OFTEN- ALWAYS.										
Question	Acute (n=102)		Sub-Acute In patient (n=51)		Sub-Acute Out Patient (n=40)		Community (n=62)		Other (n=33)	

	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=
My own clinical experience.	94 (99.0)	0.52	47 (95.9)	0.69	36 (97.3)	0.70	56 (100.0)	0.88	29 (96.7)	0.40
Opinions of colleagues.	81 (85.3)	0.40	44 (89.8)	0.05	25 (67.6)	0.02*	43 (76.8)	0.47	24 (80.0)	0.88
Expert consultation.	59 (62.1)	0.05*	27 (55.1)	0.94	17 (46.0)	0.41	27 (48.2)	0.09	14 (46.7)	0.99
Employer sponsored continuing education seminars or in-services.	38 (40.0)	0.22	21 (42.9)	0.69	11 (29.7)	0.26	16 (28.6)	0.17	13 (43.3)	0.54
Clinical practice guidelines.	64 (67.4)	<0.01*	24 (49.0)	0.31	22 (59.5)	0.43	23 (41.1)	0.01*	16 (53.3)	0.45
Continuing education outside my place of employment.	36 (37.9)	0.08	36 (73.5)	0.03*	18 (48.7)	0.08	17 (30.4)	0.19	9 (30.0)	0.77
Textbooks.	30 (31.6)	0.46	15 (30.6)	0.52	12 (32.4)	0.53	16 (28.6)	0.64	12 (40)	0.67
Videos, dvds, audiotapes, cds, podcasts.	11 (11.6)	0.16	3 (6.1)	0.30	1 (2.7)	0.68	7 (12.5)	0.72	2 (6.7)	0.40
Case studies.	24 (25.3)	<0.01*	9 (18.4)	0.14	5 (13.5)	0.49	9 (16.1)	0.17	2 (6.7)	0.42
Internet resources (excluding previously mentioned sources of info. Or journal articles found on internet).	60 (63.1)	<0.01*	20 (40.8)	0.06	14 (37.8)	0.05	28 (50)	0.78	16 (53.3)	0.98
Research studies (in general).	42 (44.2)	0.09	16 (32.7)	0.46	16 (43.2)	0.25	13 (23.2)	<0.01*	16 (53.3)	0.10

Meta-analysis of randomized controlled trials.	21 (22.1)	0.09	6 (12.2)	0.24	6 (16.2)	0.18	6 (10.7)	<0.01*	8 (26.7)	0.07
Results from a randomized controlled trial.	24 (25.3)	0.04*	5 (10.2)	0.05*	9 (24.3)	0.03*	6 (10.7)	0.02*	6 (20)	0.86
Results of a controlled study without randomization.	13 (13.7)	0.07	2 (4.1)	0.52	2 (5.4)	0.12	2 (3.6)	<0.01*	2 (6.7)	0.50
Results of a quasi-experimental study.	8 (8.4)	0.04*	0 (0)	0.55	2 (5.4)	0.22	0 (0)	<0.01*	1 (3.3)	0.54
Results from a single-subject design study.	7 (7.4)	0.02*	2 (4.1)	0.40	0 (0)	0.52	0 (0)	0.03*	1 (3.3)	0.59
Results from studies investigating reliability or validity of a measurement instrument / approach.	11 (11.6)	0.55	4 (8.2)	0.24	8 (21.6)	0.04*	4 (7.1)	0.11	2 (6.7)	0.71
Results from an economic evaluation (e.g. Cost-effectiveness study).	2 (2.1)	0.15	1 (2.0)	0.27	1 (2.7)	0.04*	0 (0)	0.01*	0 (0)	0.93
EBP PARTICIPATION OVER LAST 6 MONTHS. YES / NO RESPONSE SCALE. DATA PRESENTED AS N (%) RESPONDED YES.										
Questions	Acute (n=102)		Sub-Acute In patient (n=51)		Sub-Acute Out Patient (n=40)		Community (n=62)		Other (n=33)	
	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=	n (%)	P=
Reviewing literature individually for my own clinical practice.	77 (81.1)	0.45	32 (66.7)	0.03*	33 (91.7)	0.04*	38 (67.9)	0.03*	28 (93.3)	0.04*
Reviewing literature as a part of a group for practice as a group/department.	69 (72.6)	<0.01*	24 (50)	0.05	23 (63.9)	0.83	30 (53.6)	0.13	19 (63.3)	0.90
Collecting information for a quality assurance project.	67 (70.5)	0.15	27 (56.3)	0.17	25 (69.4)	0.54	28 (50)	<0.01*	25 (83.3)	0.03*

Collecting information for a clinical practice protocol/guideline.	60 (63.2)	0.55	25 (52.1)	0.18	25 (69.4)	0.25	31 (55.4)	0.35	20 (66.7)	0.48
Collecting information for a research project.	34 (35.8)	0.57	15 (31.3)	0.71	14 (38.9)	0.47	14 (25)	0.13	12 (40)	0.43
Leading a quality assurance project.	44 (46.3)	0.04*	15 (31.3)	0.28	15 (41.7)	0.64	12 (21.4)	<0.01*	15 (50)	0.16
Leading a clinical practice protocol/guideline project.	39 (41.1)	0.09	13 (27.1)	0.24	15 (41.7)	0.32	13 (23.2)	0.05*	11 (36.7)	0.78
Leading a research project.	13 (13.7)	0.86	4 (8.3)	0.27	10 (27.8)	0.006*	4 (7.1)	0.13	4 (13.3)	0.98
Preparing a conference presentation (poster or podium).	31 (32.6)	0.1093	10 (20.8)	0.3038	9 (25)	0.79	9 (16.1)	0.04*	12 (40)	0.08
Writing a manuscript for a journal.	11 (11.6)	0.69	4 (8.33)	0.58	6 (16.7)	0.20	4 (7.14)	0.35	3 (10)	0.92

Table 3-4 Relationship between demographic variables and EBP. Data presented as regression coefficient (95% CI), P

Question	Age	Gender	Years worked	Grade	Year of graduation	Highest qualification
In making clinical decisions, assessing the quality of the research evidence is important.			-0.12 (-0.23 to -0.01), p=0.03	-0.33 (-0.55 to -0.34), p<0.01	-0.11 (-0.21 to -0.01), p=0.02	-0.19 (-0.29 to -0.08), p<0.01
Clinical experience is the most reliable way to know what is effective.			0.16 (0.06 to .26), p<0.01	0.39 (0.18 to 0.59), p<0.01	0.14 (.01 to 0.23), p<0.01	0.11 (0.13 to 0.21), p=0.03
There is a definite divide between research and practice in my profession.		0.698 (0.02 to 1.38), p=0.05	-0.15 (-0.25 to -0.04), p<0.01		-0.12 (-0.21 to -0.02), p=0.02	
Identify clinical problems following a patient assessment.			0.23 (0.12 to 0.33), p<0.01	0.35 (0.13 to 0.57), p<0.01	0.21 (0.11 to 0.30), p<0.01	0.14 (0.04 to 0.24), p<0.01
Identify the strengths and weaknesses of different study designs			-.11 (-0.21 to -0.01), p=0.02		-0.11 (-0.20 to -0.02), p=.02	0.26 (0.16 to 0.36), p<0.01
Interpret results of statistical procedures such as linear or logistic regression			-0.12 (-0.22 to -0.19), p=0.02		-0.12 (-0.21 to -0.02), p=0.01	0.23 (0.13 to 0.33), p<0.01
Understand your patient's needs and treatment preferences.			0.11 (0.00 to 0.21), p=0.04	0.23 (0.03 to 0.44), p=0.03	0.10 (0.00 to 0.19), p=0.05	0.13 (0.03 to 0.23), p=0.01
Decide on an appropriate course of action in collaboration with the patient.			0.15 (0.48 to 0.256), p<0.01	0.28 (0.07 to 0.49), p=0.01	0.14 (0.04 to 0.23), p<0.01	0.17 (0.06 to 0.27), p<0.01
My own clinical experience.	-0.29 (-0.53 to -0.04), p=0.02		-0.31 (-0.43 to -0.18), p<0.01	-0.42 (-.67 to -0.17), p<0.01	-0.26 (-0.37 to -0.15), p<0.01	
Opinions of colleagues.			0.14 (.02 to 0.26), p=0.03	0.26 (0.02 to 0.50), p=0.04	0.14 (0.03 to 0.25), p=0.02	
Textbooks.	0.22 (0.00 to 0.44), p=0.05				0.11 (0.01 to 0.1), p=0.03	
Videos, DVDs, audiotapes, CDs, podcasts.	-0.24(-0.45 to -0.03), p=0.03					
Meta-analysis of randomized controlled trials.				-0.31 (-0.52 to -0.10), p<0.01		-0.26 (-0.36 to -0.15), p<0.01

Results from a randomized controlled trial.	0.22 (0.1 to 0.43), p=0.04					-0.14 (-0.24 to -0.03), p<0.01
Collecting information for a quality assurance project.	-0.28 (-0.54 to -0.02), p=0.04		-0.20 (-0.32 to -0.0), p<0.01	-0.59 (-0.87 to -0.32), p<0.01	-0.8 (-0.29 to -0.06), p<0.01	-0.16 (-0.29 to -0.03), p=0.01
Collecting information for a clinical practice protocol/guideline.			-0.21 (-0.33 to -0.09), p<0.01	-0.43 (-0.68 to -0.17), p<0.01	-0.18 (-0.9 to -0.07), p<0.01	
Leading a quality assurance project.			-0.15 (-0.28 to -0.03), p=0.02	-0.49 (-0.75 to -0.3), p<0.01	-0.15 (-0.26 to -0.03), p=0.01	-0.15 (-0.27 to -0.0), p<0.01
Leading a clinical practice protocol/guideline project.			-0.23 (-0.36 to -0.10), p<0.01	-0.55 (-0.82 to -0.28), p<0.01	-0.21 (-0.34 to -0.09), p<0.01	
Leading a research project.		1.08 (0.17 to 1.989), p=0.02		-0.46 (-0.80 to -0.11), p=0.01		-0.27 (-0.43 to -0.11), p<0.01

Summary points

- This study sought to explore and compare the beliefs, attitudes, confidence and behaviour related to EBP, across allied health professional groups and workplace settings.
- Allied health professional groups have different attitudes and beliefs regarding EBP. For example, social workers are the least likely to believe that research evidence should guide their clinical practice.
- Allied health professional groups have different levels of confidence regarding EBP skills. For example, occupational therapists have the lowest self-efficacy for all 5-steps related to EBP and set out in the Sicily Statement.
- Allied health professional groups from different workplace settings had different levels of EBP behaviours. For example, community-based clinicians were the least likely to collect information for quality assurance or research projects.
- The findings from this study suggest that allied health professionals are not homogenous in their experience of EBP. These results were used to inform the development of a tailored intervention to enhance the uptake of EBP.
- The next chapter reports on the variables that had a significant influence on allied health professionals' engagement with EBP.

Conclusion

- This study identified differences across allied health professional groups and workplace settings in relation to EBP attitudes, beliefs, confidence and behaviours. This has implications for training in EBP and should be considered during the development of interventions aimed at enhancing the uptake of EBP.

Chapter 4: Paper 2

Preface

This chapter presents the findings of the second study from the quantitative component of Phase 1. The aim of this study was to explore if there was a relationship between allied health professionals' confidence to perform EBP activities, and the time since they graduated from their entry level degree. Findings from initial analysis revealed a negative correlation between years worked and confidence to undertake EBP activities, such as critically appraising research studies. Conversely, there was a positive correlation between the presence of post-graduate qualifications and confidence to undertake EBP activities. These findings suggested there might be a confounding effect between the presence of further formal training and confidence to undertake EBP activities, such as critically appraising literature.

The research question guiding the study was:

Research question 3: What variables influence allied health professionals' experience of and engagement with EBP?

There are no published studies exploring the correlation between Australian allied health professionals' confidence to perform EBP activities and the time since they graduated.

A PDF of the manuscript was submitted to the Journal of Evaluation in Clinical Practice and can be found in Appendix 20.

This chapter is an adaptation of the submitted manuscript as it does not include the abstract.

How soon do allied health professionals lose confidence to perform EBP activities? A cross-sectional study

4.1 Introduction

Contemporary definitions of evidence-based practice (EBP) include a synthesis of current best evidence and clinical expertise with consideration to the patient's values and preferences (Guyatt, Meade, Jaeschke, Cook, & Haynes, 2000). EBP is both a philosophical approach to healthcare and a set of behaviours when applied in practice. These behaviours include: 1) Formulation of a research question; 2) Retrieval of best available evidence; 3) Critical appraisal of evidence; 4) Application of evidence to practice and; 5) Evaluation of practice (Dawes et al., 2005). EBP has the potential to meet numerous healthcare aims including improved patient outcomes, decreased variation in care and reduction in per capita healthcare costs.

EBP needs to be implemented and supported by a range of activities, policies and procedures within health service organisations. A parallel cohort comparison study published in 2015 compared two models of care over a period of 7 years; one model included EBP skill building activities (such as training for staff in critical appraisal of literature) and accompanying policies (such as protected staff time to engage in these activities). The comparison model was standard practice and as such, did not include structured EBP activities or related policies (Emparanza, Cabello, & Burls, 2015). The results from this longitudinal study found that patients treated under the EBP model experienced significantly reduced rates of mortality and decreased length of stay. This is one of numerous studies that have demonstrated strong associations between EBP and improvements in the quality and safety of healthcare delivery (Morris et al., 2011; Peiris, Taylor, & Shields, 2011; Tinetti et al., 2008).

Allied health professionals make up almost 25% of the health workforce in Australia (Allied Health Professions Australia, 2017) and should justifiably be the subject of training and support to implement EBP. Published literature on EBP within allied health spans more than 20 years and includes topics such as barriers and facilitators to the provision of EBP, tension between the concept of client centred practice and the use of research studies and strategies to enhance the uptake of EBP. There appears to be broad agreement across most allied health professional groups that EBP is a 'good idea' and that research evidence can improve

patient care (Bennett et al., 2003; Connolly, Lupinnaci, & Bush, 2001; Iles & Davidson, 2006; Jette et al., 2003; Kamwendo, 2002; McCluskey, 2003; McKenna et al., 2005; Powell & Case-Smith, 2003, 2010; Salbach, Guilcher, Jaglal, & Davis, 2009; Salbach, Jaglal, Korner-Bitensky, Rappolt, & Davis, 2007). However, there is a large body of evidence suggesting that implementation of EBP behaviours in every day clinical decision making remains low. There are numerous reasons cited for this including lack of time and lack of skills in understanding and applying research (Byham-Gray, Gilbride, Dixon, & Stage, 2005; Delany & Bialocerkowski, 2011; Döpp, Steultjens, & Radel, 2012; Fruth et al., 2010; Gosling & Westbrook, 2004; Grimmer-Somers, Lekkas, Nyland, Young, & Kumar, 2007; Heiwe et al., 2011; Jette et al., 2003; Kamwendo, 2002; Lai, Teng, & Lee, 2010; McCluskey, Vratsistas-Curto, & Schurr, 2013; McCurtin & Roddam, 2012; McKenna et al., 2005; Mota da Silva, da Cunha Menezes Costa, Garcia, & Costa, 2014; O'Connor & Pettigrew, 2009; Pighills, Plummer, Harvey, & Pain, 2013; Robertson, Graham, & Anderson, 2013; Salbach et al., 2007; Salls, Dolhi, Silverman, & Hansen, 2009; Schreiber, Stern, Marchetti, Provident, & Turocy, 2008; Scurlock-Evans, Upton, & Upton, 2014; Swedlove & Etcheverry, 2012; Thomas et al., 2003; Upton, 1999; Upton & Upton, 2006; Valdes & von der Heyde, 2012; Vogt, Byham-Gray, Parrott, & Touger-Decker, 2012; Zipoli & Kennedy, 2005). In an attempt to address cited barriers, a number of studies have reported on strategies to enhance the uptake of EBP including changing curricular content within academic institutions. Ensuring that education providers include EBP skills as a core component of their training was the first recommendation made by the Sicily Statement - an internationally accepted consensus statement that describes the minimum requirements for EBP educational training programs (Dawes et al., 2005). From an Australian perspective, this recommendation appears to have been addressed for many allied health professional groups through the process of accreditation. For example, a new graduate Australian occupational therapist (OT) must first complete their training program with an educational provider that has been accredited by the Occupational Therapy Council (Australia & New Zealand) Ltd. The OT must then maintain registration with the Australian Health Practitioner Regulation Agency (AHPRA). This body is responsible for ensuring registered health professionals are competent and ethical, and that education and training is high quality. To fulfil this objective, a number of professions regulated by AHPRA have guidelines for accreditation of entry level clinicians that mandate training in EBP skills. These include physiotherapy, medicine, nursing and

midwifery, podiatry, occupational therapy and radiography. Other allied health professional groups that are not included under AHPRA may still have a focus on EBP. For example, Speech Pathology Australia require that practicing clinicians are aware of current research and participate in research activities as part of their competency based standards (Speech Pathology Australia, 2016).

It is likely that recent Australian graduates from the allied health professions will have been exposed to education and training aimed at enhancing skills in EBP. It is therefore surprising that previous research has found that clinicians report a lack of skills as a significant barrier to EBP, despite the commitment of education providers, registration bodies and peak consensus groups to facilitate this. If we assume that the university-based training has assisted allied health professionals to become competent and confident in using EBP, then somewhere between graduation and participation in the earlier research just mentioned, allied health professionals have lost the confidence in their skills.

There have so far only been two studies that have explored this potential loss of confidence. Jette et al surveyed 488 physiotherapists and found that search skills and confidence to perform critical appraisal of research was lower in respondents who had graduated more than 15 years ago from their entry level degree, compared to those who graduated less than 5 years ago (Jette et al., 2003). Similarly, Salbach et al reported that physiotherapists' working in stroke services (n=270) confidence to perform EBP activities was lower in respondents more than 15 years since graduation compared to those who were less than 5 years, between 5-10 years and 11-15 years. These findings would give the impression that there is potentially a problem amongst physiotherapy practitioners who have worked clinically for more than 15 years, however, the collapsing of data into 5-year intervals may have actually obscured a loss of confidence that takes place much earlier. Further, these papers both reported that higher levels of formal training created greater levels of confidence yet did not adjust for this potential confounder in their analyses.

This study aims to examine the relationship between allied health professionals' confidence to perform a range of EBP activities and the number of years worked clinically, and highest level of qualification received.

4.2 Methods

4.2.1 Study design

Analytical cross-sectional survey

4.2.2 Participants and setting

All allied health professionals from two major metropolitan health services in Victoria and Tasmania were considered eligible to participate in the study. The allied health disciplines included audiology, exercise physiology, nutrition / dietetics, occupational therapy, podiatry, physiotherapy, psychology (clinical and neuropsychology), speech pathology, social work and radiation therapy. The size of the potential target population in these organisations was 496 allied health professionals.

4.2.3 Instrument

Allied health professionals' beliefs, attitudes, interest and behaviour relating to EBP, were evaluated using a composite instrument developed for this study. The instrument consisted of a total of 56 questions grouped into four sections to measure specific components of EBP. The 12 items measuring respondents' confidence to conduct EBP activities was based on the evidence-based practice confidence scale (Salbach & Jaglal, 2011). This scale consists of questions related to the steps considered necessary for EBP, such as critically appraising the literature for reliability and relevance. Respondents are asked to rate their level of confidence on an 11-point scale from 0% (cannot do at all) to 100% (certain can do). This scale has excellent reliability and has been used in a number of studies exploring allied health clinicians' self-efficacy to conduct EBP activities (Clyde, Brooks, Cameron, & Salbach, 2016; DeCleene Huber et al., 2015; Salbach & Jaglal, 2011; Salbach, Jaglal, & Williams, 2013).

Information regarding respondents' age, gender, years worked clinically post-graduation, level of qualification and work setting were all collected on the first page of the instrument. We used the response scaling of 1 year, 2 years, 3 years, 4 years, 5-10 years, 10-15 years, 15-20 years, and >20 years for the years worked clinically post-graduation item rather than a numeric response scaling approach due to the risk of the survey becoming identifiable. The employment profile in the participating organisations indicated that there were far fewer potential respondents in the higher years of experience categories, thus if the exact number

of years was cross-referenced against their professional background, the identity of the respondent could have become known.

4.2.4 Procedure

Email contact was made with the managers of each allied health discipline explaining the study and inviting participation from all their qualified staff members. A web-based link was included in the email along with a PDF of the survey to ensure that computer access was not a barrier to participation. Pre-paid return envelopes were provided to both sites and all disciplines for those clinicians who completed a hard copy of the survey. These were then manually entered by a research assistant. All respondents who completed the survey, either online or hardcopy, were eligible to go into a draw to win a \$100 gift voucher. Implied consent was assumed for all respondents who submitted a completed survey.

4.2.5 Ethics

The study was approved by the Human Research Ethics Committee (HREC) at each site.

4.2.6 Data analysis

Analysis commenced by visually examining box plots illustrating the relationship between confidence to conduct EBP activities and years worked clinically, using only respondents whose highest academic degree was at Bachelor level. This qualification was chosen as Bachelor level of degrees typically have less emphasis on research training than honours, masters and PhD level degrees. A box plot panel was constructed to illustrate these results for each of the 12-items included in the self-efficacy scale measuring confidence to undertake EBP activities.

A multivariable regression was then performed on the whole dataset with adjustment for the highest level of qualification attained by the respondent to account for the potentially confounding affect that higher levels of training may have. A separate multivariable regression analyses for each of the 12-items on the self-efficacy scale was undertaken using highest level of qualification treated as categorical covariate with the Bachelor degree serving as the reference value. Years of clinical experience was also entered into these models as a categorical variable with 1 year of experience serving as the reference value. Data displayed as regression coefficients which should be interpreted according to the size and

direction of the effect e.g. a large positive coefficient indicates the predictor variable has a significant increasing effect on the dependent variable. Statistically significant results were set at p value of $<.05$ with 95% confidence intervals and all analyses were undertaken using STATA SE Version 13.0.

4.3 Results

A total of 288 ($n=288$) surveys were completed, representing a 58% response rate. Participant demographics are displayed in Table 4-1 and show that the majority of respondents were female (88.2%) and below the age of 40 (71.5%). More than half were employed in permanent full-time positions (53.8%) at a Grade 2 level or below (53.4%) and had graduated from their entry level health degree (56.5%) within 10 years prior to participating in the study. The highest level of qualification obtained was primarily a Bachelor's degree (49.3%) with relatively few respondents currently enrolled in post-graduate studies (8%). Figure 4.1 illustrates the relationship between confidence to conduct EBP activities and years worked clinically, using only respondents whose highest academic degree was at Bachelor level ($n=142$). The boxplots illustrate that the mean item level self-efficacy scores decreased from between 2 and 4 years of clinical practice for questions related to critical appraisal and interpretation of published studies i.e. questions 4-8.

The results of the multivariable regression analysis are displayed in Table 4-2. The two independent variables, level of qualification and years worked clinically, were significant predictors of confidence to undertake a variety of EBP activities. Allied health professionals with post-graduate qualifications, particularly at Master's and PhD levels, maintained levels of confidence related to EBP activities with number of years held constant. The data from the multivariable regression analysis supports the findings from the boxplots i.e. allied health professionals gradually lose confidence with EBP activities over time. This appears to begin in the fourth year of practice for tasks such as interpreting results of statistical procedures, and from the fifth year of practice for searching and critically appraising the literature.

4.4 Discussion

This study has found that allied health professionals lose confidence in some EBP skills, particularly those related to accessing and interpreting research studies, in under 5 years of

clinical work, after controlling for highest level of qualification attained. It is possible that a meaningful loss of confidence begins sooner than this, but that our study was insufficiently powered to detect these changes across the smaller year categories. Despite this, our finding of a loss of confidence in under 5 years is important as previous research has not identified that EBP confidence degrades so quickly following graduation. Only two previous studies had identified when EBP skills and confidence begin to deteriorate. Jette et al and Salbach et al both found that EBP confidence was lower in respondents who had graduated more than 15 years ago, in comparison to those who graduated less than 5 years ago. However, both studies analysed age as a predictor variable in 5-year intervals which makes it difficult to determine at what point following graduation allied health professionals begin to lose confidence in EBP skills. Furthermore, these studies did not adjust their analyses for higher levels of qualifications, despite reporting that there was a correlation between EBP confidence and higher degrees.

Visual analysis of the box plots suggests that there is a negative correlation between EBP confidence and years of clinical practice, particularly for steps two and three described in the Sicily statement. It would appear that new graduates initially report a moderate to high level of confidence with EBP activities, but this begins to deteriorate between the second and fourth years of clinical practice. The data from the boxplots indicates that allied health professionals with no post-graduate qualifications lose confidence to conduct some EBP activities over time.

It is important to consider why EBP confidence may degrade so quickly in allied health professionals. It is possible that this may be due to early career allied health professionals being predominantly focused on clinical work. The demographics of the respondents support this theory with more than half of the allied health professionals (59.4%) having worked clinically for less than 10 years and employed at a level of Grade 2 or below (53.4%). In the Australian context, the grading system typically reflects the amount of clinical work expected of the allied health professional. Position descriptions for Grade 1 roles are strongly focused on clinical work whilst Grade 3 roles include a minimum of 35% of non-clinical activities such as quality, research and supervision (Alfred Health, 2018). It is plausible that recently graduated allied health professionals lose their confidence to conduct EBP activities due to a lack of opportunity to practice these skills. Exposure to higher qualifications is a

protective factor against the degradation of these skills most likely due to a greater level of training in EBP activities such as critical appraisals.

4.5 Limitations

Limitations to this study include the nature of a cross-section study design. It cannot be assumed that the relationship between the independent variables i.e. years worked clinically and qualification received and the dependent variable i.e. confidence to conduct EBP is cause-and-effect. The scale used to measure changes in confidence related to undertaking EBP activities had excellent reliability in relation to the total score but was only adequate for some of the individual scale items. This has implications when analysing EBP self-efficacy item scores. The respondents who participated were drawn from two metropolitan hospitals, indicating that the perspectives and experiences of allied health professionals from regional areas may not be represented.

4.6 Future research directions

Recently graduated allied health professionals are typically equipped with the knowledge and skills to confidently participate in EBP activities. However, these skills degrade quickly, particularly for the professionals with no post-graduate qualifications. If allied health professionals are to provide a practice that is evidence based, there must be investment in strategies which ensure maintenance of EBP skills, confidence and behaviours. Further research determining the timing, frequency and format of these strategies is important.

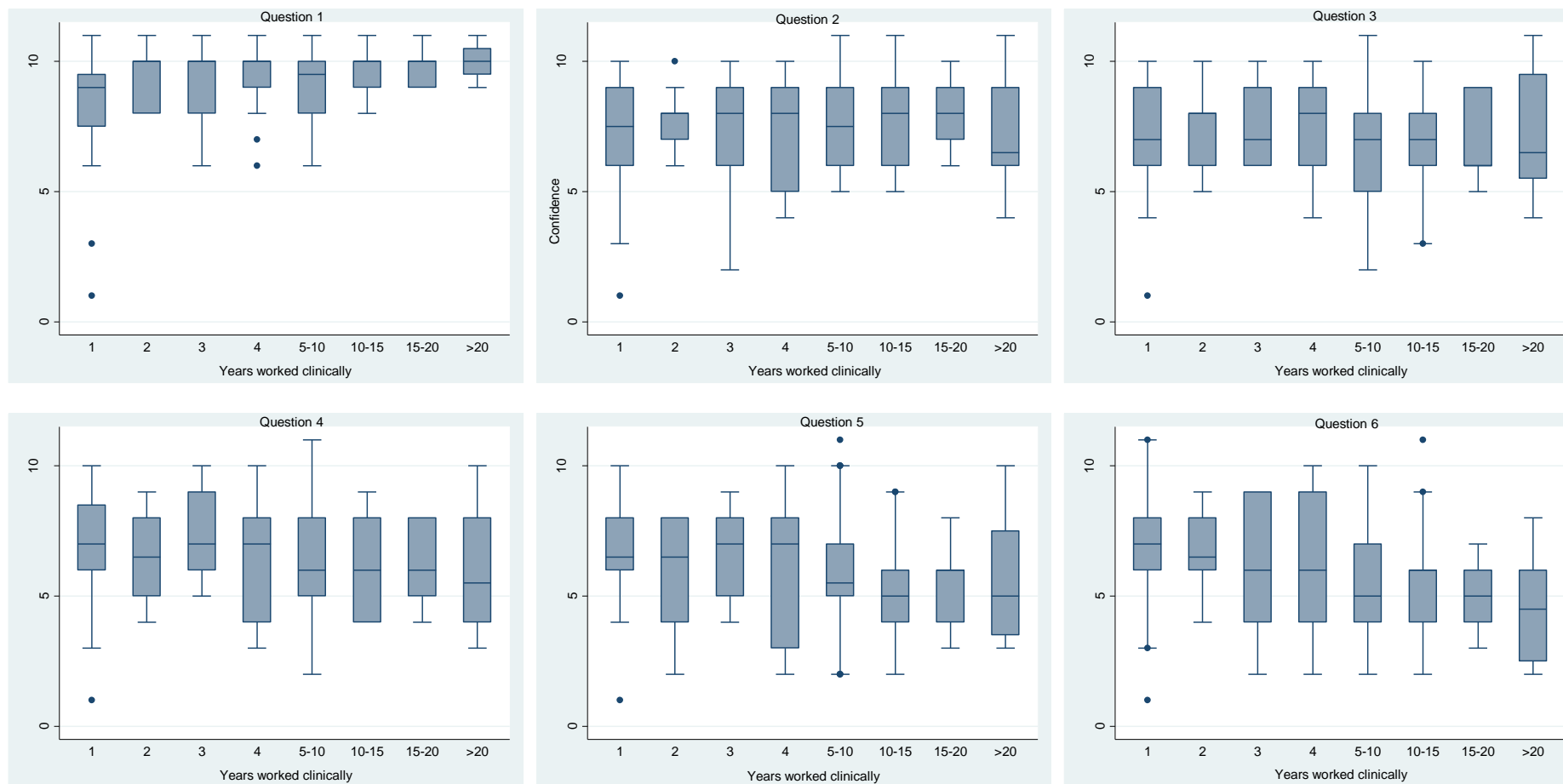
Table 4-1 Respondent demographic information

	PT (n=85)		OT (n=61)		SP (n=26)		SW (n=32)		DIET (n=47)		OTHER (n=37)		Total (n=288)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Age														
< 30	37	43.5	30	49.2	13	50.0	6	18.8	23	48.9	17	46.0	126	43.7
31-40	27	31.8	16	26.2	8	30.8	8	25.0	13	27.7	8	21.6	80	27.8
41-50	14	16.5	9	14.8	4	15.4	10	31.3	6	12.8	7	18.9	50	17.4
51-60	7	8.2	6	9.8	1	3.9	7	21.9	5	10.6	5	13.5	31	10.8
> 61	0	0	0	0	0	0	1	3.13	0	0	0	0	1	0.3
Gender														
Male	16	18.8	5	8.2	0	0	1	3.1	2	4.3	10	27.0	34	11.8
Female	69	81.2	56	91.8	26	100.0	31	96.9	45	95.7	27	73.0	254	88.2
Main work area														
Acute ward	27	31.8	21	34.4	9	34.6	14	43.8	27	57.5	4	10.8	102	35.4
Sub-acute inpatient	10	11.8	16	26.2	5	19.2	6	18.8	7	14.9	7	18.9	51	17.7
Hospital outpatient	16	18.8	3	4.9	2	7.7	0	0	4	8.5	15	40.5	40	13.9
Community	23	27.1	16	26.2	8	30.8	6	18.8	3	6.4	6	16.2	62	21.5
Other	9	10.6	5	8.2	2	7.7	6	18.8	6	12.8	5	13.5	33	11.5
Employment status														
Permanent FT	51	60.0	39	63.9	12	46.2	21	65.6	15	31.9	17	46.0	155	53.8
Permanent PT	21	24.7	14	23.0	9	34.6	11	34.4	18	38.3	13	35.1	86	29.9
Temp or casual FT	9	10.6	4	6.6	4	15.4	0	0	9	19.2	6	16.2	32	11.1
Temp or casual PT	4	4.7	4	6.6	1	3.9	0	0	5	10.6	1	2.7	15	5.2
Years worked clinically since graduation														
<5 years	23	27.1	21	34.4	10	38.5	9	28.1	19	40.4	13	35.1	95	33.0
5-10 years	24	28.2	17	27.9	8	30.8	8	25.0	10	21.3	9	24.3	76	26.4
10-15 years	15	17.7	10	16.4	6	23.1	8	25.0	9	19.2	5	13.5	53	18.4
15-20 years	8	9.4	5	8.2	0	0	3	9.4	1	2.1	6	16.2	23	8.0
>20 years	15	17.7	8	13.1	2	7.7	4	12.5	8	17.0	4	10.8	41	14.2
Highest grade currently working in														

1	11	12.9	18	29.5	6	23.1	7	21.9	12	25.5	8	21.6	62	21.5
2	28	32.9	18	29.5	6	23.1	13	40.6	21	44.7	6	16.2	92	31.9
3	35	41.2	21	34.4	11	42.3	7	21.9	10	21.3	11	29.7	95	33.0
4 or above	11	12.9	4	6.6	3	11.5	5	15.6	4	8.5	12	32.4	39	13.5
Year graduated from entry level health degree														
2009	1	1.2	0	0	2	7.7	3	9.4	4	8.5	1	2.7	11	3.8
2008	5	5.9	7	11.5	1	3.9	3	9.4	5	10.6	3	8.1	24	8.3
2007	5	5.9	3	4.9	2	7.7	0	0	3	6.4	2	5.4	15	5.2
2006	3	3.5	4	6.6	0	0	0	0	1	2.1	6	16.2	14	4.9
2005	8	9.4	3	4.9	5	19.2	3	9.4	5	10.6	0	0	24	8.3
2000-2004	24	28.2	19	31.2	6	23.1	6	18.8	11	23.2	9	24.3	75	26.0
1995-1999	14	16.5	7	11.5	6	23.1	6	18.8	6	12.8	5	13.5	44	15.3
1990-1994	8	9.4	3	4.9	2	7.7	2	6.3	5	10.6	6	16.2	26	9.0
Before 1990	17	20.0	15	24.6	2	7.7	9	28.1	7	14.9	5	13.5	55	19.1
Highest level of qualification obtained														
Bachelor's degree	36	42.4	38	62.3	18	69.2	22	68.8	16	34.0	12	32.4	142	49.3
Bachelor's degree Hons	16	18.8	10	16.4	1	3.9	2	6.3	6	12.8	2	5.4	37	12.8
Graduate certificate	9	10.6	1	1.6	1	3.9	2	6.3	2	4.3	2	5.4	17	5.9
Graduate diploma	2	2.4	2	3.3	0	0	0	0	4	8.5	1	2.7	9	3.1
Post-grad diploma	10	11.8	2	3.3	0	0	3	9.4	2	4.3	3	8.1	20	6.9
Master's Degree	11	12.9	8	13.1	6	23.1	3	9.4	17	36.2	9	24.3	54	18.8
PhD	1	1.2	0	0	0	0	0	0	0	0	8	21.6	9	3.1
Currently enrolled in higher qualification course														
Yes	6	7.1	5	8.2	2	7.7	4	12.5	2	4.3	5	13.5	24	8.3
No	79	92.9	56	91.8	24	92.3	28	87.5	45	95.7	32	86.5	264	91.7
Year graduated from most recent qualification														
2009	4	4.7	0	0	3	11.5	4	12.5	6	12.8	6	16.2	23	8.0
2008	9	10.6	11	18.0	1	3.9	3	9.4	6	12.8	6	16.2	36	12.5
2007	8	9.4	4	6.6	2	7.7	0	0	3	6.4	4	10.8	21	7.3
2006	4	4.7	4	6.6	0	0	1	3.1	1	2.1	7	18.9	17	5.9
2005	8	9.4	2	3.3	5	19.23	3	9.4	6	12.8	1	2.7	25	8.7
2000-2004	29	34.1	24	39.3	6	23.08	11	34.4	12	25.5	3	8.1	85	29.5

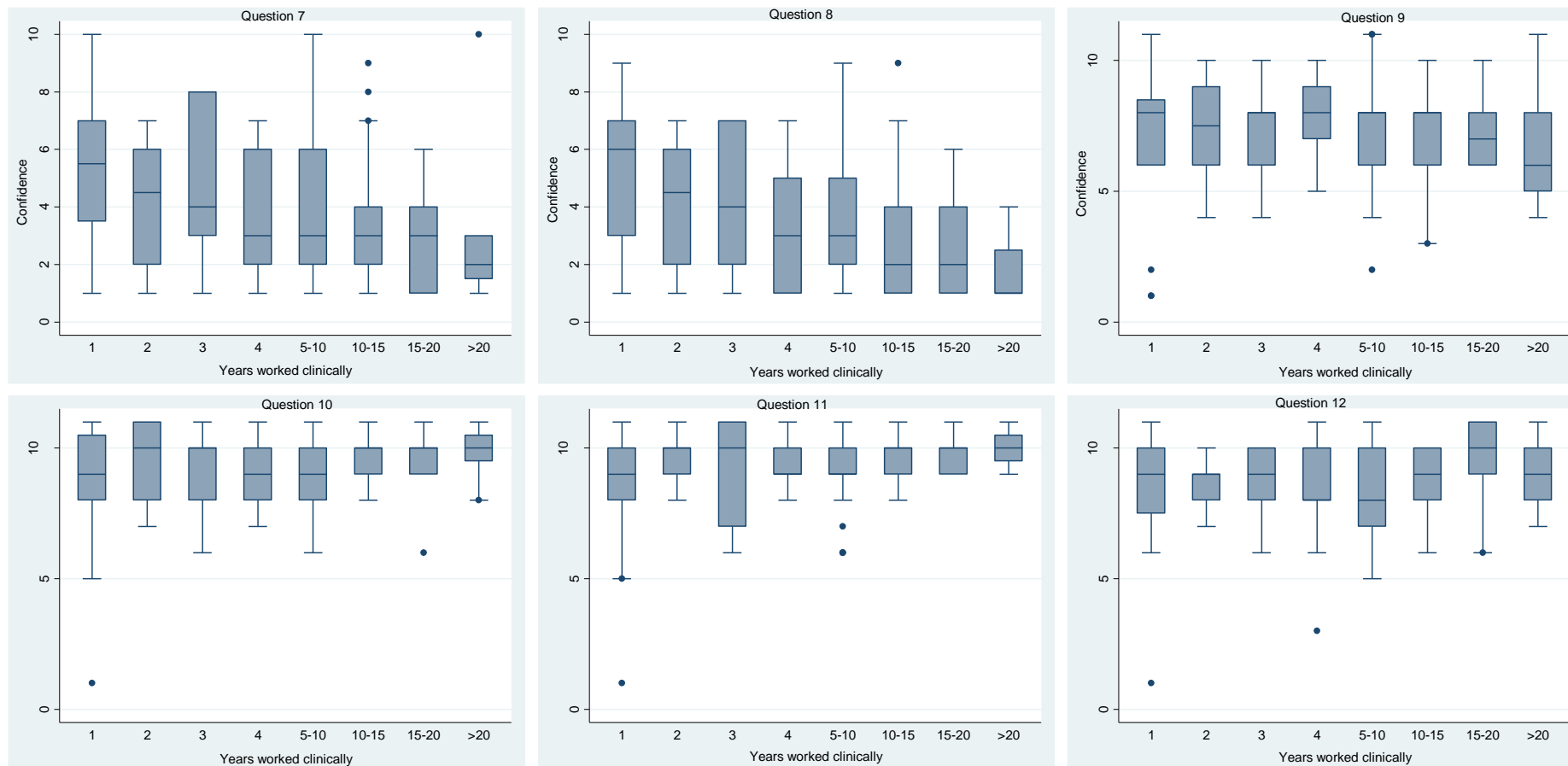
1995-1999	11	12.9	6	9.8	7	26.92	2	6.3	6	12.8	6	16.2	38	13.2
1990-1994	3	3.5	5	8.2	1	3.85	3	9.4	4	8.5	4	10.8	20	6.9
Before 1990	9	10.6	5	8.2	1	3.85	5	15.6	3	6.4	0	0	23	8

Figure 4-1 Box plot panel for EBP confidence and years worked clinically



Participants with highest academic qualification at Bachelor level (n=142). Respondents asked to rate confidence on 11-point Likert scale from 0% “cannot do at all” to 100% “certain can do” for the following questions:

1. Identify clinical problems following a patient assessment.
2. Formulate a question based on the clinical problem to guide a literature search
3. Effectively search the relevant literature to address the question.
4. Critically appraise the literature for reliability and relevance.
5. Critically appraise the reliability and validity of outcome measures.
6. Identify the strengths and weaknesses of different study design.



Participants with highest academic qualification at Bachelor level (n=142). Respondents asked to rate confidence on 11-point Likert scale from 0% “cannot do at all” to 100% “certain can do” for the following questions:

7. Interpret results of statistical procedures such as t tests, correlations and chi-square tests.
8. Interpret results of statistical procedures such as linear or logistic regression.
9. Appropriately apply evidence from the literature to the individual patient.
10. Understand your patient’s needs and treatment preferences.
11. Decide on an appropriate course of action in collaboration with the patient.
12. Continually evaluate the effect of your practice.

Table 4-2 Multivariable regression analysis for EBP confidence, years of clinical experience and qualifications. Data presented as regression coefficient (95% CI), p

Question	Years worked 2	Years worked 3	Years worked 4	Years worked 5-10	Years worked 10-15	Years worked 15-20	Years worked > 20	Bach. Degree Honours	Grad. Cert.	Grad. Dip.	Post- grad. Dip.	Master Degree	PhD
Identify clinical problems following patient assessment	0.94 (0.09 to 1.78), p=0.03*	0.59 (-0.19 to 1.37), p=0.14	1.07 (0.40 to 1.75), p<0.01*	0.95 (0.41 to 1.50), p<0.01*	1.14 (0.55 to 1.74), p<0.01*	1.37 (0.63 to 2.12), p<0.01*	1.28 (0.62 to 1.94), p<0.01*	0.50 (0.00 to 1.00), p=0.05*	0.53 (-0.18 to 1.24), p=0.14	0.29 (-0.65 to 1.22), p=0.55	0.10 (-0.59 to .0), p=0.77	0.60 (0.16 to 1.04), p<0.01*	-0.26 (-1.21 to 0.69), p=0.60
Formulate a question based on the clinical problem to guide a literature search	0.52 (-0.73 to 1.78), p=0.41	0.21 (-0.95 to 1.38), p=0.72	0.35 (-0.66 to 1.36), p=0.49	0.32 (-0.50 to 1.14), p=0.44	0.43 (-0.46 to 1.32), p=0.34	0.71 (-0.40 to 1.82), p=0.21	0.11 (-0.88 to 1.09), p=0.83	0.76 (0.02 to 1.57), p=0.04*	1.27 (0.22 to 2.33), p=0.02*	-0.08 (-1.46 to 1.31), p=0.91	0.55 (-0.48 to 1.59), p=0.30	1.40 (0.75 to 2.06), p<0.01*	1.59 (0.18 to 3.01), p=0.03*
Effectively search the relevant literature to address the question	-0.15 (-1.49 to 1.19), p=0.83	0.21 (-1.03 to 1.45), p=0.74	0.06 (-1.01 to 1.1), p=0.91	-0.82 (-1.69 to 0.05), p=0.06	-0.67 (-1.62 to 0.27), p=0.16	-0.54 (-1.72 to 0.64), p=0.36	-0.82 (-1.87 to 0.24), p= 0.13	0.85 (0.05 to 1.64), p=0.04*	1.31 (0.19 to 2.43), p=0.02*	0.04 (-1.43 to 1.52), p=0.96	0.06 (-1.04 to 1.17), p=0.91	1.46 (0.77 to 2.15), p<0.01*	2.74 (1.23 to 4.25), p<0.01*
Critically appraise the literature for reliability and relevance	-0.3 (-1.87 to 0.81), p=0.44	0.10 (-1.14 to 1.35), p=0.87	-0.30 (-1.38 to 0.77), p=0.58	-1.05 (-1.92 to -0.17), p=0.02*	-0.69 (-1.63 to 0.26), p=0.15	-0.72 (-1.90 to 0.46), p=0.23	-0.94 (-2.03 to 0.08), p=0.07	1.03 (0.24 to 1.82), p=0.01*	1.19 (0.07 to 2.32), p=0.04*	0.84 (-0.64 to 2.32), p=0.27	0.64 (-0.47 to 1.75), p=0.26	1.71 (1.014 to 2.40), p<0.01*	3.60 (2.09 to 5.11), p<0.01*

Critically appraise reliability validity of outcome measures	-0.96 (-2.37 to 0.45), $p=0.18$	-0.43 (-1.74 to 0.88), $p=0.52$	-0.72 (-1.85 to 0.41), $p=0.212$	-1.14 (-2.05 to -0.22), $p=0.02^*$	-1.17 (-2.16 to -0.17), $p=0.02^*$	-1.09 (-2.34 to 0.15), $p=0.08$	-1.31 (-2.42 to -0.20), $p=0.02^*$	1.12 (0.29 to 1.96), $p<0.01^*$	1.38 (0.20 to 2.57), $p=0.02^*$	0.99 (-0.57 to 2.55), $p=0.21$	0.80 (-0.36 to 1.96), $p=0.18$	1.57 (0.84 to 2.30), $p<0.01^*$	3.98 (2.39 to 5.56), $p<0.01^*$
Identify strengths and weaknesses of different study designs	-0.07 (-1.45 to 1.31), $p=0.92$	-0.67 (-1.95 to 0.61), $p=0.30$	-0.39 (-1.49 to 0.72), $p=0.49$	-1.58 (-2.47 to -0.68), $p<0.01^*$	-1.41 (-2.38 to -0.44), $p<0.01^*$	-1.62 (-2.83 to -0.40), $p<0.01^*$	-1.92 (-3.01 to -0.84), $p<0.01^*$	1.49 (0.68 to 2.31), $p<0.01^*$	1.30 (0.14 to 2.46), $p=0.03^*$	1.18 (-3.4 to 2.70), $p=0.13$	1.11 (-0.03 to 2.24), $p=0.06$	2.00 (1.29 to 2.72), $p<0.01^*$	4.35 (2.80 to 5.91), $p<0.01^*$
Interpret results of statistical procedures e.g. t tests, correlations	-1.04 (-2.66 to 0.59), $p=0.21$	-1.13 (-2.64 to 0.37), $p=0.14$	-1.52 (-2.83 to -0.22), $p=0.02^*$	-1.68 (-2.73 to -0.62), $p<0.01^*$	-1.45 (-2.60 to -0.31), $p=0.01^*$	-1.95 (-3.38 to -0.51), $p<0.01^*$	-1.80 (-3.08 to -0.53), $p<0.01^*$	1.0 (0.04 to 1.6), $p=0.04^*$	0.43 (-0.93 to 1.80), $p=0.53$	0.65 (-1.14 to 2.44), $p=0.48$	0.91 (-0.43 to 2.25), $p=0.18$	2.25 (1.41 to 3.09), $p<0.01^*$	5.81 (3.98 to 7.63), $p<0.01^*$
Interpret results of statistical procedures e.g. linear regression	-0.38 (-1.97 to 1.22), $p=0.64$	-1.14 (-2.62 to 0.34), $p=0.13$	-1.45 (-2.73 to -0.17), $p=0.03$	-1.80 (-2.84 to -0.76), $p<0.01^*$	-1.79 (-2.2 to -0.67), $p<0.01^*$	-2.06 (-3.47 to -0.65), $p<0.01^*$	-2.01 (-3.26 to -0.75), $p<0.01^*$	0.61 (-0.34 to 1.55), $p=0.21$	0.68 (-0.66 to 2.02), $p=0.32$	0.54 (-1.22 to 2.30), $p=0.55$	1.25 (-0.07 to 2.56), $p=0.06$	1.92 (1.09 to 2.75), $p<0.01^*$	5.19 (3.39 to 6.98), $p<0.01^*$
Appropriately apply evidence from literature to the individual patient	0.24 (-0.10 to 1.47), $p=0.71$	-0.11 (-1.25 to 1.04), $p=0.86$	0.48 (-0.50 to 1.47), $p=0.34$	-0.23 (-1.04 to 0.57), $p=0.57$	-0.15 (-1.02 to 0.72), $p=0.73$	-0.29 (-1.38 to 0.79), $p=0.60$	-0.47 (-1.44 to 0.49), $p=0.34$	0.85 (0.12 to 1.57), $p=0.02^*$	1.43 (0.39 to 2.46), $p<0.01^*$	-0.04 (-1.40 to 1.32), $p=0.96$	0.68 (-0.34 to 1.69), $p=0.19$	1.54 (0.90 to 2.18), $p<0.01^*$	1.98 (0.60 to 3.37), $p<0.01^*$
Understand your patient's needs and treatment preferences	0.63 (-0.25 to 1.51), $p=0.16$	0.25 (-0.57 to 1.06), $p=0.56$	0.47 (-0.24 to 1.18), $p=0.19$	0.26 (-0.31 to 0.83), $p=0.37$	0.66 (0.04 to 1.28), $p=0.04^*$	0.54 (-0.24 to 1.32), $p=0.17$	0.56 (0.14 to 1.25), $p=0.11$	0.51 (-0.01 to 1.03), $p=0.06$	0.88 (0.14 to 1.62), $p=0.02^*$	-0.48 (-1.45 to 0.50), $p=0.34$	0.26 (-0.47 to 0.99), $p=0.48$	0.63 (0.17 to 1.08), $p<0.01^*$	0.15 (-0.85 to 1.14), $p=0.77$

Decide on an appropriate action in collaboration with the patient	0.77 (-0.07 to 1.61), <i>p</i> =0.07	0.24 (-0.53 to 1.02), <i>p</i> =0.54	0.76 (0.09 to 1.43), <i>p</i>=0.03*	0.57 (0.03 to 1.11), <i>p</i>=0.04*	0.82 (0.23 to 1.41), <i>p</i><0.01*	0.89 (0.15 to 1.62), <i>p</i>=0.02*	0.9 (0.04 to 1.35), <i>p</i>=0.04*	0.55 (0.06 to .05), <i>p</i>=0.03*	0.69 (-0.01 to 1.39), <i>p</i>=0.05*	-0.23 (-1.16 to 0.69), <i>p</i> =0.62	0.35 (-0.33 to 1.04), <i>p</i> =0.31	0.69 (0.25 to 1.12), <i>p</i><0.01*	0.09 (-0.85 to 1.03), <i>p</i> =0.86
Continually evaluate the effect of your practice	0.20 (-0.89 to 1.29), <i>p</i> =0.71	0.22 (-0.79 to 1.23), <i>p</i> =0.67	0.12 (-0.76 to .99), <i>p</i> =0.79	0.03 (-0.68 to 0.74), <i>p</i> =0.93	0.49 (-0.28 to 1.25), <i>p</i> =0.21	0.49 (-0.47 to 1.45), <i>p</i> =0.32	-0.07 (-0.92 to 0.79), <i>p</i> =0.88	0.51 (-0.13 to 1.15), <i>p</i> =0.12	0.80 (-0.12 to 1.71), <i>p</i> =0.09	-0.18 (-1.38 to 1.03), <i>p</i> =0.77	0.601 (-0.30 to 1.50), <i>p</i> =0.19	0.47 (-0.10 to 1.03), <i>p</i> =0.10	0.19 (-1.04 to 1.41), <i>p</i> =0.77

Qualification reference value: bachelor degree; Years of clinical experience reference value: 1 year; Statistically significant results: *p* value set at <0.05 with 95% confidence intervals

Summary points

- This study sought to explore if there was a relationship between allied health professionals' confidence to perform a range of EBP activities and the time since they graduated from their entry level degree whilst controlling for the influence of post-graduate qualifications.
- Allied health professionals with no formal higher degree qualifications experience a loss of confidence to undertake EBP activities, such as critically appraising research studies. This degradation of confidence begins after the second year of clinical practice.
- Allied health professionals with formal higher degree qualifications, particularly at Master and PhD levels, do not experience this degradation in confidence to undertake EBP activities, such as looking for, appraising and applying evidence in clinical practice.
- The next chapter reports on the qualitative component of Phase I which sought to explore allied health professionals' EBP behaviours using the theory of planned behaviour.

Conclusion

- This study identified that allied health professionals graduate from their entry level degree with confidence to undertake the prescribed steps to locate, appraise and apply evidence in practice. However, this confidence begins to degrade far earlier than previous studies had suggested. This has implications for professional and regulatory bodies involved in accreditation of allied health professionals.

Chapter 5: Paper 3

Preface

This chapter presents the findings from the qualitative component of Phase 1. The aim of this study was to explore if the theory of planned behaviour could explain allied health professionals' engagement with EBP.

The research question guiding the study was:

Research question 4: Does the theory of planned behaviour explain allied health professionals' EBP behaviours?

There are no published Australian studies that have utilised the theory of planned behaviour to explore and explain allied health professionals' experience of EBP.

A PDF of the manuscript was submitted to the Journal of Allied Health Journal and can be found in Appendix 21.

This chapter is an adaptation of the submitted manuscript as it does not include the abstract.

Does the theory of planned behaviour explain allied health professionals' EBP behaviours? A focus group study

5.1 Introduction

Evidence based practice (EBP) is a term used to describe the judicious use of the best available evidence when making clinical decisions (Guyatt et al., 2000). It is both a philosophical approach to health care and a set of behaviours when applied in practice. The process of EBP involves integrating individual clinical expertise with the best available external clinical evidence derived from systematic research, whilst also incorporating client preferences and values (Satterfield et al., 2009). There appears to be broad agreement across most allied health professional groups that EBP is a 'good idea' and that research evidence can improve patient care (Bennett et al., 2003; Connolly, Lupinnaci, & Bush, 2001; Iles & Davidson, 2006; Jette et al., 2003; Kamwendo, 2002; Annie McCluskey, 2003; McKenna et al., 2005; Powell & Case-Smith, 2003, 2010; Salbach, Guilcher, Jaglal, & Davis, 2009; Salbach, Jaglal, Korner-Bitensky, Rappolt, & Davis, 2007). However, there is a large body of evidence suggesting that implementation of EBP behaviours in every day clinical decision making remains low. There are numerous reasons cited for this including lack of time and lack of skills in understanding and applying research (Byham-Gray et al., 2005; Delany & Bialocerkowski, 2011; Döpp, Steultjens, & Radel, 2012; Fruth et al., 2010; Gosling & Westbrook, 2004; Grimmer-Somers, Lekkas, Nyland, Young, & Kumar, 2007; Heiwe et al., 2011; Jette et al., 2003; Kamwendo, 2002; Lai, Teng, & Lee, 2010; McCluskey, Vratsistas-Curto, & Schurr, 2013; McCurtin & Roddam, 2012; McKenna et al., 2005; Mota da Silva, da Cunha Menezes Costa, Garcia, & Costa, 2014; O'Connor & Pettigrew, 2009; Pighills, Plummer, Harvey, & Pain, 2013; Robertson, Graham, & Anderson, 2013; Salbach et al., 2007; Salls, Dolhi, Silverman, & Hansen, 2009; Schreiber, Stern, Marchetti, Provident, & Turocy, 2008; Scurlock-Evans, Upton, & Upton, 2014; Swedlove & Etcheverry, 2012; Thomas et al., 2003; Upton, 1999; Upton & Upton, 2006; Valdes & von der Heyde, 2012; Vogt, Byham-Gray, Parrott, & Touger-Decker, 2012; Zipoli & Kennedy, 2005). In an attempt to address cited barriers, a number of studies have reported on interventions which may enhance the uptake of EBP with allied health professionals (Buchanan, Siegfried, Jelsma, & Lombard, 2014; Campbell, Novak, McIntyre, & Lord, 2013; Cheng, 2003; Dizon, Grimmer-Somers, & Kumar, 2014; A. McCluskey & Lovarini, 2005; Moore et al., 2018; Novak & McIntyre, 2010; Russell et al., 2010; Schreiber, Stern, Marchetti, & Provident, 2009; Wilkinson, Hills, Street,

& Hinchliffe, 2016; Young, Rohwer, Volmink, & Clarke, 2014). Most of these studies have resulted in an improvement in knowledge and skills but only two have succeeded in changing the behaviours of the participants (Dizon, Dizon, Regino, & Gabriel, 2014; Russell et al., 2010). It is possible that interventions aimed at changing allied health professionals' EBP behaviours have been largely unsuccessful due to a lack of an explicit theoretical framework guiding the implementation. Researchers from the field of implementation science argue that a theoretical rationale is critical to understanding the nature of the problem being examined and ensuring selection of the most appropriate intervention (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012).

A theory can be described as a coherent set of ideas that aim to predict behaviour or other variables (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005). A recently published review examined which social cognitive theories best explained healthcare professionals' intention to undertake evidence based behaviours (Godin, Belanger-Gravel, Eccles, & Grimshaw, 2008). The authors reviewed 78 papers, of which 9 specifically included allied health professionals primarily from pharmacy. Findings from the review suggest that the theory of planned behaviour demonstrated strong efficacy in predicting behaviour of healthcare professionals.

The theory of planned behaviour is one of the most widely utilised and researched theoretical frameworks for explaining human behaviour (McEachan, Conner, Taylor, & Lawton, 2011). First proposed in 1985, the theory of planned behaviour suggests that an individual's behaviour is determined by his/her intention to perform that behaviour. The strength of the intention is directly influenced by three variables: i) Attitude towards the behaviour i.e. an individual's beliefs about the consequences of the behaviour and how much they value those consequences e.g. "I think implementing research findings in my clinical work is important because my patients will benefit"; ii) Subjective norm about the behaviour i.e. an individual's beliefs about how their peers or important people (known as referents) will view the behaviour in question and how much the individual wishes to gain approval from these people e.g. "My supervisor expects me to critique that journal article and present it at the multidisciplinary team meeting"; and iii) Perceived behavioural control regarding the behaviour i.e. an individual's perception of his/her ability to perform a given behaviour and how much control they have over the change e.g. "I know how to critique that article and I'm sure I can apply the findings to my practice." More recently, background

factors related to both internal and external variables have been incorporated into a revised version of the model (Figure 5-1). Ajzen et al suggest that contextual factors, including institutional policies, may influence intentions due to their effect on the individual's perceived behavioural control (Ajzen, 2011). It has been suggested that perceived behavioural control may be particularly important in explaining workplace behaviours due to the influence of factors such as policies, protocols and organisation driven key performance indicators (Freeman, Roche, Williamson, & Pidd, 2011).

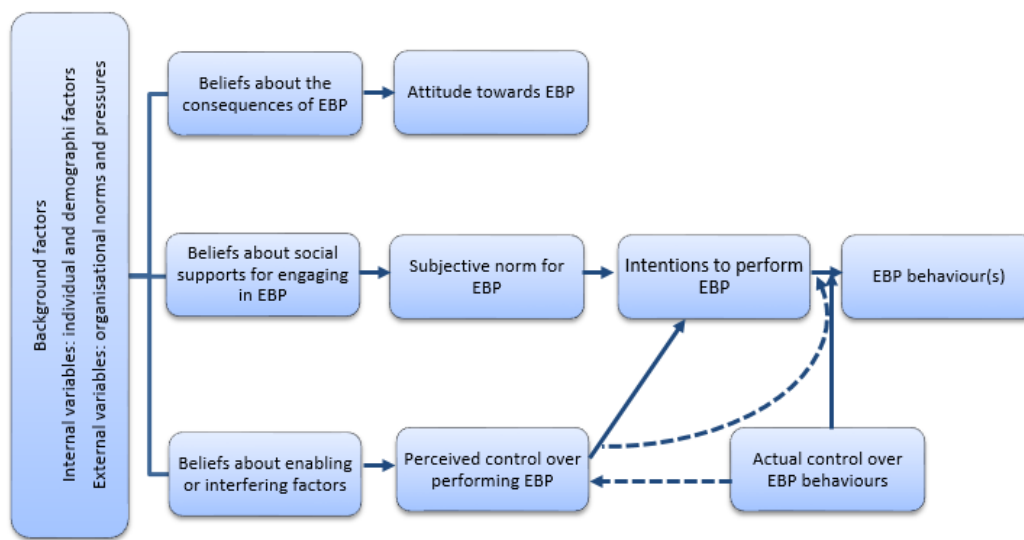


Figure 5-1 The theory of planned behaviour applied to EBP

A recent meta-analysis on the theory of planned behaviour included 237 studies and found that this theoretical model demonstrated a strong ability to forecast intentions and subsequent behaviours (McEachan et al., 2011).

To date, most studies utilising the theory of planned behaviour to explain EBP behaviours have primarily focused on medical and nursing participants. Only three published studies have specifically explored allied health professionals' EBP behaviours utilising the theory of planned behaviour. Diermayr et al utilised the theory of planned behaviour to interpret the findings from a survey of 588 physical therapists in Austria (Diermayr, Schachner, Eidenberger, Lohkamp & Salbach, 2015). This study found low levels of behavioural control and low subjective norms related to implementation of EBP in clinical practice.

Scholten-Peeters et al (2013) surveyed 165 physical therapy students, teachers, supervisors and therapists on their attitude, knowledge, EBP behaviours and intention to participate in research (Scholten-Peeters et al., 2013). The authors of this study analysed the data obtained

from the cross-sectional survey utilising the theory of planned behaviour and not surprisingly, found that teachers had the strongest intention to utilise research. However, the authors failed to account for the impact of the workplace setting on the individuals' intention to participate in EBP behaviours. One could argue that a significant component of a university teacher's role is to participate in research, certainly more so than a clinician. A second significant limitation in this study was the tool used to measure the constructs of the theory of planned behaviour. The DOERAK is not a validated questionnaire but furthermore, it does not provide any information on participants' underlying beliefs. One of the major determinants of intentions are the underlying beliefs, and identifying these beliefs assists in understanding the behaviour in question (Ajzen, 2011).

The third study utilised the theory of planned behaviour to explore which factors predicted health professionals' intention to use clinical guidelines (Kortteisto, Kaila, Komulainen, Mäntyranta, & Rissanen, 2010). The authors surveyed a large (n=2252) group of health professionals including doctors, nurses and 'others' such as physiotherapists and occupational therapists. They found there was a correlation between the individual's professional group and the most influential construct affecting intention to use clinical guidelines. Doctors were more affected by perceived behavioural control while nurses and allied health were more affected by subjective norms. As in the previous study, the survey instrument was not validated, and nor did it provide any information on participants' underlying beliefs. Furthermore, this study had a low response rate from the 'other' category of health professionals, thus limiting generalisability of the findings.

All three studies were conducted in Europe and none elicited any data related to the salient beliefs informing attitudes, behaviours and normative influences. To date, there have been no published Australian studies that have utilised the theory of planned behaviour to explain allied health professionals' experience of EBP.

This study aims to use the theory of planned behaviour to understand and explain allied health professionals' behaviours related to EBP.

5.2 Methods

5.2.1 Study design

Focus group design was selected as the methodology so that we could better understand the participants' experience of EBP in their specific context(s). We anticipated that a group discussion may assist in revealing subjective norms related to professional groups and/or the workplace setting. Focus groups are considered to be one of the strongest methods of data collection for exploring attitudes, beliefs and needs within the social network of a group context (Liamputtong, 2011).

5.2.2 Participants and setting

This study was conducted at a large metropolitan health service located in Australia, which employs nearly 1,000 allied health professionals in a range of settings including acute hospitals, sub-acute rehabilitation hospital and community health centres.

Allied health professionals from all of the major professional groups were targeted for participation in the study. This included dietetics / nutrition, occupational, physiotherapy, podiatry, psychology, social work and speech pathology. Multidisciplinary teams from the community and acute sectors were also invited to participate and included the acute stroke unit, community rehabilitation services and rehabilitation in the home. Purposive sampling was used to ensure adequate numbers of discipline specific participants and also representative of all of the workplace settings, levels of experience, gender and age. A maximum number of 8 participants for each group was deemed to be adequate given the complexity of the topic being examined and the aim being to obtain a deeper understanding of the participants' experience of EBP (Krueger & Casey, 2014).

5.2.3 Instrument

Questions guiding the focus group discussion (Table 5-1) were developed according to the manual for "Constructing questions based on the theory of planned behaviour" (Francis et al., 2004). Each focus group commenced with introductions and an opening question asking participants "what does EBP mean to you?" Attitudes towards EBP were elicited by further asking how the participants felt about EBP and their perception of what was good/bad about it. Subjective norms were explored by asking whether they considered EBP important and

the reasons why they should or should not be engaging in EBP. Behavioural control involved identifying barriers and facilitators to EBP.

5.2.4 Procedure

Managers from each allied health professional group and multidisciplinary teams were contacted by email and informed of the study details. Participation from allied health professionals from a variety of settings, gender, level of experience and age were requested in order for the sample to be representative.

Each focus group was scheduled to last for 60 minutes and was facilitated by a researcher experienced in focus group methodology. All groups were audio taped and observations of facial expressions, gestures or other non-verbal forms of communication were noted in a research journal. The audio recordings were transcribed by the first author of this paper and the notes from the research journal supplemented findings.

5.2.5 Data analysis

Trustworthiness of the data obtained was supported through a process of multiple coding undertaken by the three authors of this paper and a separate researcher (Shenton, 2004). The initial transcripts were compared to the audio recordings by a researcher not included in the study and drafts were sent to participants to verify content. The data obtained from the focus groups were coded and thematically analysed using NVivo 11 Software. Two researchers initially analysed the transcripts for frequency of words and/or statements. The data were then coded according to the constructs of the theory of planned behaviour i.e. attitudinal beliefs towards about EBP, normative beliefs for EBP and control beliefs regarding EBP. The transcripts were reviewed again to further refine the code structure developed from the initial analysis. The most frequently mentioned beliefs underlying each construct were considered to be significant contributors to behavioural intentions and eventual behaviour. As per recommendations in the manual on utilising the theory of planned behaviour in health services research (Francis et al., 2004), a second researcher involved in the study but not in the focus groups, reviewed the transcripts and analysis in order to increase validity. Any additional themes related to the topic of EBP but not specifically the constructs related to the theory of planned behaviour were identified and analysed by two of the authors of this paper.

5.2.6 Ethics

The study was approved by the Human Research Ethics Committee (HREC) at each site.

5.3 Results

Ten focus group with a total of 49 participants were conducted and included both discipline specific and multidisciplinary teams. The following allied health professional groups were represented: dietetics / nutrition, occupational therapy, physiotherapy, podiatry, psychology (clinical and neuropsychology), social work and speech pathology. Three multidisciplinary groups from community health, the acute stroke unit and a mentorship program also participated. The mentorship program comprised a targeted multidisciplinary group of clinicians who would also be participating in the intervention phase of this study.

Most of the participants were women (94%) and equally distributed across the workplace settings with 29% from the acute sector, 35% from the sub-acute campus and 36% from community health/rehabilitation centres (Table 5-2). The majority of participants had substantive clinical loads with only two managers present in the dietetics group. Less than 27% had post-graduate qualifications.

A total of four major themes were identified including the three constructs from the theory of planned behaviour i.e. attitudinal beliefs about EBP, normative beliefs about EBP and control beliefs about EBP. A number of sub-themes arose from the normative beliefs including the organisation, consumers and students. Similarly, three sub-themes were identified for behavioural beliefs and related to either the individual clinician, the evidence or the organisation.

The fourth major theme identified from the data related to the experience of dissonance participants described due to their acute awareness of the knowledge-behaviour gap. Although this is not a separate construct contained within the theory of planned behaviour, it appeared to be a fall-out due to the inability of participants to achieve the behavioural outcome in question i.e. EBP.

The opening question asked participants what EBP meant to them and revealed an inconsistent understanding of the term. Most participants focused only on the research component and described it as a quality assurance process. Surprisingly, a number of participants voiced concerns about the lack of instruction on how to use EBP clinically.

Everybody goes “oh we have to use EBP” but no one really exactly explains what it is and how to translate that into everyday practice (FG6)

All participants reported exposure to EBP either at undergraduate level or through their specific professional groups.

I think if you’ve come through a science degree basis, which all of us have, one way or another, we’re sort of taught it to a point (FG3)

5.3.1 Theme 1: Attitude towards EBP

The theory of planned behaviour suggests that behavioural beliefs link the studied behaviour to a particular outcome and each outcome has a value e.g. good or bad. The participants reported a number of advantages related to EBP including improved patient outcomes, strengthened practice and a sense of being able to ‘hold their own’ when working in a multidisciplinary team.

It’s (EBP) really about consistency of processes leading to better outcomes... better outcomes, reduced variation, reduced waste (FG1)

In some ways the evidence, with time, has potential to strengthen our practice (FG3)

I actually quite like it when there’s hard scientific evidence for some aspect of our practice. If you’re working in a hospital it counts for a lot more than softer evidence (FG10)

There were fewer disadvantages reported and these primarily centred on the perception that EBP could constrain clinical practice and that patient centred care should address the needs of the patient rather than simply fulfilling the requirements of EBP.

As a clinician, my goal is not just to fulfil EBP...my goal is to achieve best patient outcome and I don’t always necessarily have to follow EBP (FG6)

Summary of findings for attitude towards EBP

The results of this analysis suggest that participants have a strong overall positive attitude towards EBP, despite some frustrations regarding the model and its fit within clinical practice.

5.3.2 Theme 2: Subjective norm for EBP

A subjective norm is determined by the normative beliefs the individual holds in relation to referents. The analysis identified four referent groups who the participants' identified as either approving or disapproving of EBP.

5.3.2.1 Referent Group1: Patients and Family / Carers

A number of participants identified patients and their family/carers as an important referent group in relation to EBP. Participants described an increase in consumer knowledge regarding therapeutic interventions and there was a sense that allied health professionals should be able to describe their selection of treatment from an evidence base.

If you're going to talk to the family, or patients that want to know what you're doing and why, then I want to be able to say "look, the research shows this is going to be the most effective treatment for you" (FG2)

The patient's families go home and google (FG2)

5.3.2.2 Referent Group 2: Students

Many of the participants provide regular supervision for students on clinical placements at their workplace. They described a sense of responsibility for being able to explain their clinical practice through an EBP framework. They also recognised that supervision of students could provide opportunities to be more evidence-based by utilising the students' EBP skills.

There's also the idea of responsibility of when you're a clinical supervisor and what you're teaching students as evidence based (FG10)

The students who are coming through now are very well practiced...I mean they can show us how to search (literature) better than we can, I'm sure (FG2)

5.3.2.3 Referent Group 3: Workplace

Participants identified the workplace, including direct supervisors, as either ambiguous or disapproving of EBP behaviours. There was limited or no support from the organisation to pursue EBP. This was demonstrated by providing no protected time to pursue non-clinical activities and limited or no funding to attend continuing professional development activities. A number of participants described situations where they invested their own time and effort into EBP activities but felt the organisation as a whole didn't value this effort.

Another factor is the culture of the place that you work in. Some places I've worked in, they really encourage you to push and get evidence and find out if you're doing the right thing. Some places don't (FG6)

You bust a gut to do the evidence-based project, it doesn't get you anything. Like it's not like you get recognition, or you get time allocated to it, or that you get supported to then take what you've done and present it at a conference (FG2)

As soon as there are budgetary restrictions, research...anything that isn't core clinical business falls off the radar (FG7)

Well I don't do it (EBP) because my supervisor would tell me that's less of a priority than going and meeting the new patients (FG2)

Some respondents expressed frustration at the ambiguous messaging from the organisation in relation to EBP. They felt the organisation promoted their services as being evidence-based but their actions did not support this premise.

If we spent the time working on our EBP practice, then perhaps our work could become more efficient or our outcomes would improve in the longer term. However, in the short term, they want us to keep length of stay to a reasonable length (FG6)

The disappointing thing is you work for a big organisation that's flying the banner for excellence and saying we want you to be doing things but for allied health... we're not seen as a huge priority (FG9)

As an organisation, I think people would like to view (us) as being evidence-based... but at the ground level, on the clinical base, it's unfortunately a lot further from the truth... (FG2)

5.3.2.4 Referent Group 4: Professional Bodies & Organisations

Participants described their own professional groups as approving of and facilitating EBP. This referent group was perceived of as a significant resource in relation to EBP and many participants sought out this support in their own time.

We've got interest groups (profession specific) that are a really good resource (FG2)

I convene the (profession specific) special interest group and I'm getting people in that have got expertise (FG9)

To attend a lot of education stuff with (profession specific association), they tend to be in the evenings, outside of work hours (FG5)

Summary of findings for subjective norms towards EBP

The theory of planned behaviour suggests that the strength of the normative beliefs is determined by motivation to comply with the referents. The results of this analysis suggest that the participants are experiencing low subjective norm for EBP due to the perceived disapproval from the organisation.

5.3.3 Theme 3: Perceived behavioural control over EBP

Control beliefs include both internal and external variables that impact how easy or difficult the participant believes EBP will be. Analysis of the data revealed one group of internal variables related to skills and knowledge and two groups of external variables related to the workplace and the nature of the evidence.

5.3.3.1 Internal variables: The clinician and EBP

Although most clinicians reported receiving some training in the steps related to EBP, all described degradation of these skills over time and with lack of practice. This in turn resulted in inefficiencies as when clinicians attempted to look for evidence, they found the process time consuming and unfamiliar.

If you're not using those skills for two years or something, which is general, then you lose it...you just lose it (FG4)

I wouldn't be confident that what I'm reading is... that I understand it's a good study (FG1)

It's examining the statistics, the methods have changed. There are new statistical methods that I haven't learned (FG3)

You actually have to be reasonably good at it (research) to do it fast enough to actually then employ it clinically (FG4)

5.3.3.2 External variables: The workplace and EBP

Every participant in the study identified organisation specific factors as the greatest barrier to EBP behaviours. For those individuals who had been practicing longer, there was a sense that a decreasing length of stay for patients contributed to the lack of time to pursue anything other than clinical work. Participants described being unable to meet workload

demands which in turn affected their capacity to participate in EBP activities. Lack of resources, both human and other, made even basic EBP activities difficult.

We've got 4 computers for 11 staff of which 2 are dedicated so that's 2 for 9 staff (FG3)

More and more they're pushing towards discharge you know, discharging patients quicker. And our workloads, like at the clinical ward level, are getting huger, like larger and larger (FG4)

If you're back to back with clients all day, that's when you get frustrated. I feel like I don't know what I'm doing here or I want some more information but I haven't got the time to get it (FG2)

I mean, we are time poor. Clinicians are being pulled in multiple different directions in this current environment (FG3)

Clinical always comes first (FG4)

5.3.3.3 External variables: The nature of the Evidence and EBP

The nature of the evidence itself sparked a great deal of discussion between participants. There was frustration regarding lack of evidence to either support or refute practice or lack of detail in published studies to assist in applying the evidence.

We're always like "we need to use EBP" but there isn't evidence out there to support one way or another. Or there's not evidence to say that it's great, but there's also no evidence to say that it's causing any harm... so people continue to jog along using it, not having anything to support it (FG1)

They're just not giving you an example or a way to complete an intervention that's going to help you in your actual hands on practice (FG5)

In a study they restrict the inclusion and exclusion criteria so significantly that when you apply it to what you see in real life, they're not the same clients even though the diagnostic group might be the same (FG1)

Anything that's published as a best practice guideline generally assumes non-complex situations (FG6)

Summary of findings for perceived behavioural control in relation to EBP

Analysis of the data revealed that participants believe they do not have the skills or confidence to undertake EBP. Furthermore, numerous obstacles were identified within the workplace and the evidence itself, resulting in an overall low perceived behavioural control.

5.3.4 Theme 4: Awareness of the knowledge-behaviour gap

Participants in all of the focus groups were aware they were generally not working through an EBP framework. They described as knowing they should be participating in activities such as critiquing research and implementing new findings in practice. However, they believed that the numerous obstacles were difficult to overcome and prevented them from delivering an evidence-based practice. The fallout from this awareness of the knowledge-behaviour gap ranged from feeling overwhelmed and stressed to a sense of guilt.

I'm feeling bad because I don't have enough time to go and look for more evidence. Sometimes it's not even more evidence. Sometimes I think from being a clinician for so long, is actually forgetting or kind of going "I'm doing that, I've kind of forgotten a little bit why" (FG10)

I know I want to do this but it's just another stressor in a stressful working day (FG9)

It's just too daunting... so you just don't do it (FG10)

It's demoralising (FG9)

Sometimes you get a bit tired... not burnt out but run down... that demoralising stuff where we're not encouraged to do things just leaves you really flat (FG9)

It's overwhelming knowing where to start. It's just too much (FG6)

5.4 Discussion

This study found that allied health professionals' subjective norms regarding EBP are strongly influenced by the belief that the organisation in which they work does not approve of EBP activities. Participants reported that taking time away from seeing patients was discouraged by numerous individuals in the organisation including immediate supervisors. Subjective norms related to the organisation appeared to have a greater influence than those from other referent groups including colleagues, students and the patients. One other study has identified normative beliefs as a significant predictor of intention to use EBP. Kortteisto et al's large cross-sectional study on Finnish healthcare professionals found that normative beliefs and social pressure strongly correlated with nurses and "other professionals" intentions to use clinical guidelines (Kortteisto et al., 2010). However, it is unclear who exactly is included in the 'other' category. Diermayr et al's study found a negative correlation between perceived pressure to apply EBP and propensity to engage in EBP activities

(Diermayr et al., 2015). However, it is difficult to identify the source of this pressure as there is no information on referent groups.

The second important finding from this study was that the organisational context is a strong moderating influence on perceived behavioural control. Perceived behavioural control is comprised of factors internal to the individual such as knowledge and skills, and factors external to the individual such as time and resources. The theory of planned behaviour proposes that if an individual has adequate knowledge and skills with few obstacles then they will have an increased perception of control in relation to the behaviour (Ajzen & Klobas, 2013). It was not surprising to find that the participants in this study reported a lack of skills in relation to EBP. Numerous studies have found that lack of EBP skills, knowledge and confidence are significant barriers to engagement in EBP (Bennett et al., 2003; Connolly et al., 2001; Iles & Davidson, 2006; Jette et al., 2003; Kamwendo, 2002; Annie McCluskey, 2003; McKenna et al., 2005; Powell & Case-Smith, 2003, 2010; Salbach et al., 2009; Salbach et al., 2007). However, this study found that factors external to the participants and largely outside of their control are in fact greater predictors of the intention to participate in EBP. Increasing workloads and the expectation that patients must be discharged within a time-frame set as an organisational deliverable all acted as obstacles to EBP behaviours.

The final theme identified in this study related to the dissonance experienced by participants due to working in an inherently contradictory situation. On one hand participants believed that EBP would improve patient outcomes (attitude) and believed that numerous individuals and groups expected they be delivering their practice through an evidence-based framework (norm). On the other hand, the organisational context presented seemingly insurmountable obstacles to the delivery of EBP (control) including difficult to achieve organisational goals and a significant lack of resources. Participants appeared to be caught in a vicious cycle of being aware of what they 'should' be doing but having insufficient power to overcome the contextual factors. The result of this was profound and participants described the experience as stressful and overwhelming.

Another outcome for participants in this paradoxical situation was to revert to routines and habits. The effort to overcome the obstacles to EBP outweighed the benefits, particularly given the belief that the organisation did not value EBP.

Incorporating evidence into practice requires more than awareness of the EBP model or knowledge of the steps set out in the Sicily Statement. Interventions targeting only these factors have typically failed. If allied health professionals are to be evidence based in their clinical work, a transformative cultural change across the organisation is necessary. This could include using principles from “learning organisations” research, such as rewarding learning and innovation (Vassalou, 2001).

5.5 Conclusion

This study has demonstrated that the theory of planned behaviour is a useful framework for explaining allied health professionals’ experience of EBP. The results revealed that the organisational context has a strong moderating influence on perceived behavioural control, more so than variables internal to the participant such as skills and knowledge. This finding suggests that interventions aimed at enhancing the uptake of EBP with allied health professionals should target the organisational context along with skills and knowledge.

5.6 Limitations

Focus group methodology relies on smaller numbers of participants in order to be able to adequately explore complex topics, such as EBP. However, this makes it difficult to generalise the findings to a broader population. There is also the potential of moderator bias as the focus group discussions were led by one of the primary investigators of the study. However, a third researcher who was not in attendance during the focus groups assisted with transcription and analysis to reduce the potential of moderator bias.

5.7 Future research directions

There is a growing interest in interventions that may support allied health professionals with the uptake of EBP in their clinical work. However, it is critical to utilise a theory-based approach in order to target the behaviour and context specific barriers preventing EBP. Further studies on utilising social cognitive theories, such as the theory of planned behaviour, to enhance the uptake of EBP with allied health professionals would contribute to the growing field of implementation science. It is also recommended that interventions targeting EBP within allied health pay close attention to the organisational context and normative beliefs pertaining to organisational values.

Table 5-1 Questions guiding focus group discussion

Theory of planned behaviour construct	Questions
Background factors	<p>Where do you work?</p> <p>What other health professionals do you work with?</p> <p>How long have you been working clinically?</p> <p>Do you have any postgraduate training?</p>
Attitudes	<p>What does EBP mean to you?</p> <p>How do you feel about EBP?</p> <p>Tell me about the good things about EBP.</p> <p>Tell me about the bad things about EBP.</p>
Norms	<p>Why do you think EBP is or isn't important?</p> <p>Do you think you should be doing EBP? Why or why not?</p>
Perceived behavioural control	<p>What would make it easier for you to do EBP?</p> <p>What makes it harder to do EBP?</p>

Table 5-2 Respondent demographic information

	N (%)	Female gender N (%)	Work location N (%)			Role N (%)		Higher quals N (%)
			Acute	Sub- acute	Comm.	Clinical	Mgmt	
Dietetics	6 (12.24)	6 (100)	3 (50)	2 (33.33)	1 (16.67)	4 (83.33)	2 (16.67)	3 (50)
Occupational Therapy	7 (14.29)	7 (100)	1 (14.29)	3 (42.86)	3 (42.86)	7 (100)	0 (0)	0 (0)
Physiotherapy	3 (6.12)	3 (100)	1 (33.33)	2 (66.67)	0 (0)	3 (100)	0 (0)	2 (33.33)
Podiatry	4 (8.16)	4 (100)	1 (25)	0 (0)	3 (75)	4 (100)	0 (0)	1 (25)
Psychology	2 (4.08)	2 (100)	0 (0)	2 (100)	0 (0)	2 (100)	0 (0)	2 (100)
Social Work	2 (4.08)	1 (50)	0 (0)	1 (50)	1 (50)	2 (100)	0 (0)	1 (50)
Speech Pathology	2 (4.08)	1 (50)	0 (0)	1 (50)	1 (50)	2 (100)	0 (0)	0 (0)
Community Group	9 (18.37)	9 (100)	0 (0)	0 (0)	9 (100)	9 (100)	0 (0)	1 (11.11)
Mentorship Group	6 (12.24)	5 (83.33)	0 (0)	6 (100)	0 (0)	6 (100)	0 (0)	2 (33.33)
Acute Stroke Unit	8 (16.33)	8 (100)	8 (100)	0 (0)	0 (0)	8 (100)	0 (0)	1 (12.5)
Overall	49 (100)	46 (93.88)	14 (28.57)	17 (34.69)	18 (36.73)	47 (95.92)	2 (4.08)	13 (26.53)

Summary points

- This study sought to explore if the theory of planned behaviour could explain allied health professionals' EBP behaviours.
- Allied health professionals generally have positive attitudinal beliefs regarding EBP.
- Allied health professionals have low normative beliefs, particularly in relation to the perception that the workplace does not value engagement in EBP activities.
- Allied health professionals have weak control beliefs both in relation to their own skills to undertake EBP and their ability to overcome barriers to implementation of EBP in the workplace.
- The organisational context was a strong moderator of perceived behavioural control.
- The findings from this study, and the previous two studies, informed the development of a tailored intervention that aimed to address allied health professionals' perceived barriers to the implementation of EBP in clinical practice.
- The next chapter reports on the evaluation of a tailored intervention to enhance the uptake of EBP with allied health professionals.

Conclusion

- This study found that allied health professionals have positive attitudes towards EBP but low normative beliefs and weak perceived behavioural control. Organisation specific factors outside of the control of the individual clinician were found to have a significant impact on intention to participate in EBP. This has implications for those wishing to influence allied health professionals' EBP behaviours as the intervention should target the barriers as perceived by the participants.

Chapter 6: Paper 4

Preface

This chapter presents the findings from Phase 3. The aim of this study was to evaluate the effects of a tailored intervention aimed at enhancing the uptake of EBP with allied health professionals. A pre-intervention-post-intervention study design with two parallel control groups was used to measure the effectiveness of the intervention.

The research question guiding the study was:

Research question 5: Can EBP attitudes, beliefs, skills, confidence and behaviours be enhanced amongst a large group of allied health professionals through a tailored intervention?

The published studies on interventions that aim to enhance allied health care professionals' engagement with EBP and/or research utilisation have typically resulted only in changes in attitudes and knowledge with no subsequent behaviour change. Furthermore, the methodology of the published studies was often weak with small sample sizes and high numbers of drop-outs.

A PDF of the manuscript submitted to the Journal of Continuing Education in the Health Professions can be found in Appendix 22.

This chapter is an adaptation of the submitted manuscript as it does not include the abstract.

Can a tailored intervention enhance the uptake of EBP with a large group of allied health professionals? A quasi-experimental study

6.1 Introduction

Allied health professionals are ‘tertiary qualified providers of mainstream healthcare’ and include members of the following professional groups: audiology, dietetics, occupational therapy, physiotherapy, podiatry, social work and speech pathology (Allied Health Professions Australia, 2017). More than 25% of the Australian healthcare workforce are allied health professionals, with an estimated 195,000 clinicians delivering 200 million episodes of care annually (Allied Health Professions Australia, 2017; Buchan & Law, 2016). It is therefore not surprising that both consumers of healthcare and employers of allied health services, expect that allied health professionals will be evidence-based in their delivery of services and interventions (Jette et al., 2003; Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000; Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Evidence-based practice (EBP) is a term used to describe the “conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients” (Guyatt, Meade, Jaeschke, Cook, & Haynes, 2000). EBP involves integrating individual clinical expertise with the best available external clinical evidence derived from systematic research whilst incorporating client values and preferences.

Building the capacity of health professionals to use EBP has the potential to improve patient outcomes and reduce healthcare costs (Baker et al., 2010; Guyatt, Cook, & Haynes, 2004; Leufer & Cleary-Holdforth, 2009; Rotter et al., 2010; Tinetti et al., 2008). For example, a pre-post study measured whether providing workshops to assist health professionals in the understanding and application of evidence-based guidelines could improve early identification and management of sepsis, within an Australian emergency department (Romero, Fry & Roche, 2017). The intervention in this study included education packages, audits, workshops and site specific organisational strategies that aimed to enhance uptake. The results showed a significant improvement in adherence to and implementation of the guidelines, which in turn improved triage times and reduced mortality and morbidity in the population over the study period. This is one of several studies demonstrating the correlation between improved outcomes and interventions that aim to close the research-

practice gap (Emparanza et al., 2015; Morris, Wooding, & Grant, 2011; Peiris, Taylor, & Shields, 2011).

Despite the body of literature arguing that health professionals should make clinical decisions considering the best available evidence, implementation of this approach remains problematic. Numerous authors have cited the significant period between the publication and/or dissemination of evidence and subsequent practice change (Bates et al., 2003; Dizon & Lizarondo, 2010; Karin, Filip, Jo, & Bert, 2009; Scholten-Peeters et al., 2011). It has been reported that it takes on average five years after being published before clinical guidelines are implemented into routine practice, and even those guidelines that are broadly accepted are often not routinely utilised (Bates et al., 2003). Published literature on this topic has found that clinicians lack the skills to interpret studies reporting on new knowledge and evidence, and then apply this evidence in clinical practice (Bennett et al., 2003; Byham-Gray, Gilbride, Dixon, & Stage, 2005; McCluskey, 2003; Osterling & Austin, 2008; Salbach, Jaglal, Korner-Bitensky, Rappolt, & Davis, 2007; Stevens, 2011; Wilson, Armoutliev, Yakunina, & Werth Jr, 2009; Zipoli & Kennedy, 2005).

Recognition of the significant research-practice gap in allied health has led to an interest in interventions which have the potential to improve their uptake of EBP. Implementation strategies designed to enhance healthcare professionals' engagement with the evidence includes (Effective Practice and Organisation of Care (EPOC), 2016), the following categories: (1) audit and feedback; (2) education strategies; (3) tailored interventions; (4) local opinion leaders, and; (5) clinical practice guidelines. Studies evaluating the impact of these interventions with allied health professionals have typically resulted in a change in attitudes and knowledge but not a change in behaviours that would indicate greater use of evidence in decision making (Buchanan, Siegfried, Jelsma, & Lombard, 2014; Campbell, Novak, McIntyre, & Lord, 2013; Cheng, 2003; Dizon, Grimmer-Somers, & Kumar, 2014; McCluskey & Lovarini, 2005; Moore et al., 2018; Novak & McIntyre, 2010; Russell et al., 2010; Schreiber, 2009; Wilkinson, Hills, Street, & Hinchliffe, 2016; Young, Rohwer, Volmink, & Clarke, 2014). Studies that have reported a change in behaviours have either had small sample sizes, high drop-outs (Dizon, Dizon, Regino, & Gabriel, 2014) or intervention impacts that ceased once the study ended, suggesting only short-term benefits (Russell et al., 2010).

The aim of this study is to evaluate the effect of an intervention designed to have a sustained impact on the capacity of allied health professionals to use evidence in decision making and behaviours related to implementation of EBP.

6.2 Methods

6.2.1 Study design

This study utilised a quasi-experimental pre-intervention – post-intervention design with an intervention targeted at specific clinical areas within one health care organisation, and two control comparison groups. The first comparison group came from within the intervention organisation but comparing targeted clinical areas with non-targeted clinical areas, while the second comparison group came from the targeted clinical areas but in a separate, non-intervention control organisation. Assessment of the outcomes occurred immediately prior to the intervention and 12 months post-intervention at both organisations.

6.2.2 Participants and setting

The research took place across two health care organisations in Australia. The intervention organisation was a major metropolitan health service located in Victoria, Australia. The health service provides 260,000 episodes of hospital care and includes 40 locations across acute, sub-acute and community settings.

The control organisation was located in Tasmania, Australia and provides more than 50,000 episodes of hospital care and includes rehabilitation services and community-based centres.

All allied health professionals from both the control and experimental organisations were invited to participate in the baseline and follow-up surveys. The allied health professional groups included audiology, exercise physiology, nutrition/dietetics, occupational therapy, podiatry, physiotherapy, psychology (clinical and neuropsychology), speech pathology and social work.

6.2.3 Instrument

Allied health professionals' beliefs, attitudes, confidence, sources of information to guide clinical decisions and behaviour relating to EBP were evaluated using a self-reported survey comprised of previously validated tools. The survey consisted of a total of 56 questions

grouped into five sections to measure specific constructs of EBP. Four sections that measured beliefs, attitudes, sources of information and recent (prior 6 months) participation in EBP activities were based on a survey developed and validated by Jette et al for use with allied health professionals (Jette et al., 2003; Salbach et al., 2007). Respondents were asked to rate their attitudes and beliefs using a six-point Likert Scale from strongly agree to strongly disagree. Sources of information for clinical decision making was measured using a five-point Likert Scale from always to never whilst participation in EBP activities was measured using a yes/no response. The fifth section measured confidence to conduct EBP activities and was based on the evidence-based practice confidence scale (Salbach & Jaglal, 2011). This scale consists of questions related to the steps considered necessary for EBP, such as critically appraising the literature for reliability and relevance. Respondents are asked to rate their level of confidence on an 11-point scale from 0% (cannot do at all) to 100% (certain can do). The evidence-based practice confidence scale has excellent reliability and validity and has been used in several studies exploring allied health clinicians' self-efficacy to conduct EBP activities (Clyde, Brooks, Cameron, & Salbach, 2016; DeCleene Huber et al., 2015; Salbach & Jaglal, 2011; Salbach, Jaglal, & Williams, 2013).

Information regarding respondents' age, gender, years practicing, level of qualification and work setting were all collected on the first page of the survey. During the second phase of data collection, participants were also asked if they participated in the first phase survey.

6.2.4 Intervention

The areas targeted for intervention were inpatient and outpatient physical rehabilitation services, for adults and the aged population. To evaluate the effectiveness of a strategy that aimed to enhance the uptake of EBP, it was necessary to select a relevant project within clinically similar areas. Adult and aged rehabilitation services were selected as the clinical area of interest whilst acute wards, outpatient departments in a hospital and community health acted as parallel control groups. A tailored intervention approach was utilised, and the content was driven by the data obtained in the pre-implementation phase of this study, collected over a period of 12 months. Baseline data collection methods included a survey of allied health professionals at both the intervention and control sites, and focus group discussions with eight clinical reference groups at the intervention organisation. The barriers targeted in each intervention phase are illustrated in Figure 6-1.

Intervention phase	Purpose	Clinician involvement	Academic involvement	In this study, will result in
1.Stakeholder practice review, construct description and prioritisation	Examine existing practice, identify and prioritise practice change constructs	Clinical Reference Groups	Facilitation of Clinical Reference Groups	A list of prioritised outcome measure constructs from Clinical Reference Groups
2.Literature review	Gather and synthesise relevant international published data	Mentorship groups	Mentor individual clinicians	Summary of evidence regarding measurement approaches for prioritised constructs.
3.Stakeholder evaluation / formative decision making	Interpretation of international published data by local clinicians	Clinical Reference Groups	Facilitate interpretation by Clinical Reference Groups	Generation of a formative list of outcome measures to be used in clinical practice
4.Pilot test practice change	Generate local data regarding practice change	Participants in pilot study	Facilitate pilot testing	Summary of pilot test results indicating acceptability to patients and clinicians of measures selected
5.Stakeholder evaluation / definitive decision making	Integrate local data with published data previously considered	Clinical Reference Groups	Facilitation of Clinical Reference Groups	Generation of a definitive list of outcome measures to be used in clinical practice
6.Preparation for practice change	Prepare / equip clinicians for practice change	Clinical Reference Groups	Facilitation of clinical reference groups	Development and dissemination of materials to facilitate practice change by clinicians
7.Practice change	Implement the planned practice change	Change of practice by all clinicians	Communicate practice change schedule	Collection of selected outcome measures by clinicians, generation of database n=2000 patients
8.Evaluation of practice change	Review practice change and involve clinicians in research process	Mentorship groups	Mentor individual clinicians	Production of manuscripts evaluating practice change and analysing database

Figure 6-1 Application of the intervention to the project context

All data were analysed using the theory of planned behaviour (Figure 6-2), which enabled an in-depth understanding of the problem. The theory of planned behaviour proposes that an individual's behaviour is determined by their intention to perform the behaviour, which in turn is influenced by their attitudes towards the behaviour, normative beliefs about the behaviour and perceived behavioural control related to the behaviour. This model was selected for the study as it is one of the most widely researched and utilised theoretical frameworks for explaining human behaviour and supports knowledge translation interventions.

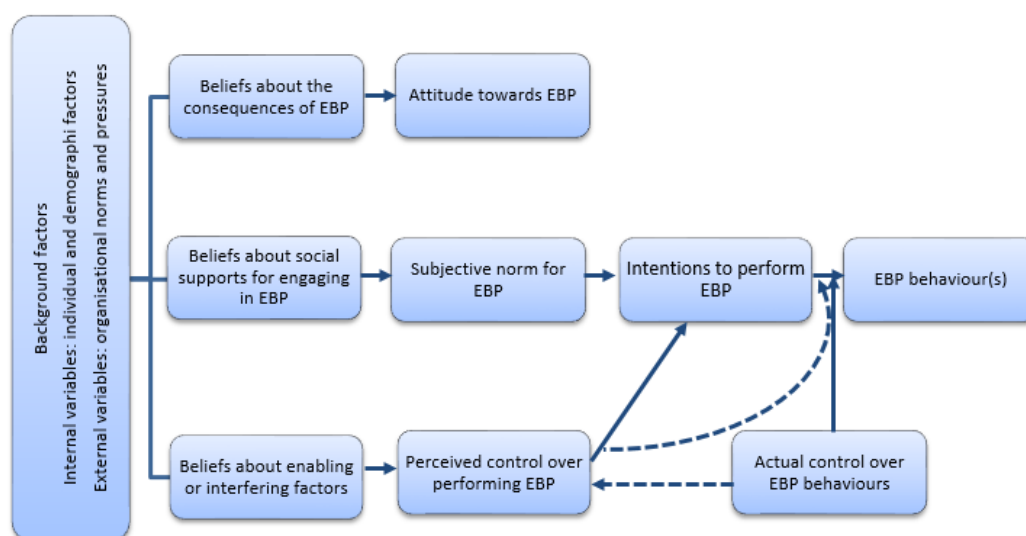


Figure 6-2 Theory of planned behaviour as applied to use of EBP behaviours

The tailored intervention was delivered over a 12-month period and was supported by a variety of implementation strategies, as described below:

Step 1: Stakeholder engagement

Clinical reference groups (CRG) for allied health professional groups and multidisciplinary teams working in subacute aged care, sub-acute rehabilitation, community rehabilitation and domiciliary services were established. The purpose of the clinical reference groups was to engage the broader team in identifying an area of clinical practice that they wished to address through an evidence-based project. A total of nine allied health professional groups or multidisciplinary teams were invited to participate including community rehabilitation, rehabilitation in the home (RITH) and discipline specific groups such as dietetics, occupational therapy, physiotherapy, podiatry, psychology, social work and speech pathology.

Step 2: Mentorship group

This phase of the intervention built on the concept of knowledge brokerage embedded within the organisation. Each CRG nominated an individual allied health professional to attend a mentorship program. Nominations involved a group discussion and identification of an individual who was motivated to participate in the program and able to leave their clinical caseload for a fixed period. Successful nominees will from hereon be referred to as mentees.

The role of the mentees was to become EBP champions for their specific professional group and/or team where they worked. It was conceived that this would happen in several ways. First, each mentee would need to deliver an evidence-based project that was selected by the CRG. This would also involve educating their colleagues on the methods they used to complete the project and ideas on implementation. Second, the mentees would become a reference point for their colleagues in relation to EBP skills and knowledge, including how to critically appraise literature.

Each mentee was seconded to the allied health research unit for a period of two weeks as part of the mentorship program. The program involved a combination of learning and support strategies, detailed below.

Skills-based workshop

The content of the 3-day workshop was based on the data collected in Phase 1 of the study and included the following topics:

4. How to formulate a question using PICO
5. How to effectively and efficiently search for literature
6. How to critically appraise literature

Mentees were able to directly apply the skills from these workshops to their evidence-based projects.

Academic support

Each mentee was matched with an academic mentor from the local university. There is a body of evidence to suggest that EBP skills, knowledge and behaviours can be enhanced when organisations are affiliated with academic institutions. The goal of this strategy was to

create a longer-term link between the intervention organisation and the academic institution. The academic mentors would provide guidance to the mentees on completing the evidence-based project, including later implementation.

Delivery of an evidence-based project

Each CRG identified an area of clinical practice they were concerned with and/or wished to improve upon. However, they perceived they either didn't have the skills or time to be able to address the issue individually. The mentees goal was to deliver a report based on a critical analysis of the published research on the construct identified and selected by their relevant clinical reference group.

Step 3: Organisational culture

The culture of an organisation can have a significant effect on health professionals' experience of EBP (Aarons & Sawitzky, 2006; Delany & Bialocerkowski, 2011; Robertson, Graham, & Anderson, 2013; Upton, Stephens, Williams, & Scurlock-Evans, 2014). A constructive culture is associated with more positive attitudes towards EBP and conversely, a negative and unsupportive culture is perceived to create significant barriers to all EBP related constructs. The elements of organisational culture which were addressed in this study included:

1. Managerial support for the research study. This included agreeing to release staff to attend CRG meetings and for the mentees to attend a 2-week mentorship program.
2. Development of a research hub with a drop-in design for all allied health professionals to use. Lack of computer resources was a frequently cited barrier in the literature. The research hub had dedicated computers in a quiet space for allied health professionals to use as they needed.
3. Launch of an organisation specific research web page with EBP resources.

Control Groups

The first parallel control group was derived from within the intervention organisation but from the clinical areas that had not been targeted as part of the intervention process. These clinical areas included acute care wards, hospital-based outpatient department and community health services / centres. The EBP champions did not work in these areas or sites.

The second parallel control group was from the same target areas but a different organisation. This group did not participate in the previously described intervention. A site-specific investigator provided from the control organisation provided annual information on any activities or initiatives that may impact on EBP skills, attitudes, belief and behaviours of allied health professionals.

6.2.5 Procedure

Email contact was made with the managers of each allied health professional group, across both sites, to explain the study and invite participation from all their qualified staff members. The survey was available online via a web-link to a Survey Monkey page. Each respondent was allocated a unique identifier to maintain confidentiality. A hard-copy of the survey was also available for those respondents who preferred this method. Prepaid addresses were provided with all hardcopies of surveys in order to enhance likelihood of return. All surveys that were returned as a hard-copy were then manually entered by a research assistant. All respondents who completed the survey, either online or hardcopy, were eligible to go into a draw to win a \$100 gift voucher. Implied consent was assumed for all respondents who submitted a completed survey.

6.2.6 Ethics

The study was approved by the Human Research Ethics Committee (HREC) at each site.

6.2.7 Data analysis

Data from Survey Monkey was exported via excel and copied into STATA SE 13.0 (College Station, Texas). The primary focus of the analysis was to establish if the intervention had any impact on EBP attitudes, beliefs, skills, knowledge and behaviour. Regression analyses both within the organisation and between the intervention and control organisations were completed, as follows:

1. Within intervention organisation: intervention target area vs non-intervention target area. Data from respondents who worked in sub-acute rehabilitation care ward, sub-acute aged care ward, community rehabilitation and domiciliary services such as rehabilitation in the home were compared with respondents who worked in all other

areas of the health service i.e. acute wards, outpatient department in a hospital and community health.

2. Within target area: between intervention and control organisations. Data pertaining to allied health professionals who worked in subacute rehabilitation, subacute aged care, community rehabilitation and domiciliary care were compared between the two organisations.

Regression analyses were completed to measure the effect of the intervention on the dependent variable i.e. EBP attitudes, beliefs, skills, knowledge and behaviour. Statistically significant results were set at $p < .05$.

6.3 Results

Evaluation of the different phases of the tailored intervention involved the following:

1. Clinical reference groups: a total of 3 clinical reference group meetings were conducted to enable stakeholder practice review, nomination of a mentee and attendance at mentee presentation.
2. Mentee engagement: all mentees attended every skills-based workshop. Each mentee was paired with an academic mentor. The number of meetings between mentee and mentor varied with some participants meeting up to six times and others only twice. It should be noted that one mentee subsequently enrolled in a post-graduate course and continued their relationship with their academic mentor. One mentee did not deliver their evidence-based project.
3. Research hub: mentees utilised the research hub, including computers and access to researchers, throughout their secondment and subsequent completion of the evidence-based project. Utility of this resource varied between mentees with some using it up to five times a week in the earlier stages of the project and others using it only during their secondment.

A total of 568 allied health professionals completed both phases of the survey. Of these, 194 were from the target areas related to the EBP champions clinical role. Pre-intervention baseline data included 103 respondents (n=71 intervention group and n=32 control group) while post-intervention data included 91 respondents (n=60 intervention group and n=31 control group). Overall response rate across the organisation was 58%.

At baseline, respondent demographics were comparable for gender, age groups, highest level of qualification received and employment status (Table 6-1). The primary difference between the groups related to the grade level of employment with a significantly higher number of senior staff (Gd.3 and above) in the control organisation (75%) in comparison to the intervention organisation (24%).

The results of the statistical analyses are displayed in Table 6-2. There were significant differences both within the intervention organisation and between the intervention and control organisations, in the target areas, primarily for EBP behaviours. Respondents from the intervention organisation became more confident in formulating a research question ($p=0.005$), more likely to review literature for their own practice ($p=0.03$) and write a manuscript for a journal ($p<0.01$). Respondents from the target areas within the intervention organisation also became more likely to collect information and/or lead a research project ($p=0.01$).

6.4 Discussion

This study found that allied health professionals employed at the intervention organisation were more likely to engage in EBP behaviours including reviewing literature to inform practice. To date, there have been no published studies demonstrating a change in EBP behaviours with a wide range of allied health professionals in an Australian setting. The intervention delivered in this study was developed following an extensive data collection process to prospectively identify the barriers to EBP. One of the criticisms of much of the prior research in this field is both the lack of robust data collection processes to identify the contextually specific barriers and the lack of a theoretical framework to guide data collection and intervention efforts (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005). This study utilised the theory of planned behaviour to obtain a better understanding of the participants' experience of EBP. We found that allied health professionals' perceived behavioural control was influenced by background factors related to the organisational context. This was a novel finding and had not previously been reported in published literature on this topic. We therefore ensured the intervention targeted multiple barriers that were identified from both the survey data and clarified through the focus group discussions held with the intervention organisation.

The mentorship group established as part of the intervention ensured that the skills gained by the allied health EBP champions could be shared with their specific professional groups and teams. We saw a change across all the target areas even though the intervention focused on eight individuals. A similar study was conducted by Russell et al and used knowledge brokers to facilitate the uptake of outcome measurement tools with a group of physiotherapists (Rivard et al., 2010). The knowledge broker role involved supporting participants to utilise specific outcome measurement tools over the study period of 6 months. The outcomes of the study indicate that the initial increase in using the outcome measurement tools was not sustained once the knowledge broker role ceased. One of the major differences between the intervention in this study and Russell et al's study was ensuring the EBP champions were trained in all the EBP steps and ensuring the EBP champion role was not a separate concept. Rather, we envisioned the EBP champions to be 'regular' clinicians who would be nominated by their peers to complete a piece of evidence-based work and then become an embedded resource.

It should be noted that greater changes were seen between the intervention and control organisations than between the target and non-target areas within the intervention organisation. This may be due to the EBP champions influencing areas other than their specific work groups / sites. This may have occurred through discipline specific meetings that cross sites and work areas, and through other collegial relationships.

6.5 Limitations

Participation in the surveys was anonymous in order to encourage honest responses. Consequently, it was not possible to match the pre-intervention cases with the post-intervention cases and it was not possible to conduct a paired *t*-test analysis. The advantage of a paired design is reduced experimental error which contributes to a more powerful statistical outcome (Portney & Watkins, 2009). The scale used to measure changes in confidence related to undertaking EBP activities had excellent reliability in relation to the total score but was only adequate for some of the individual scale items. This has implications when analysing EBP self-efficacy item scores. The sample size was underpowered due to the limited number of participants in the targeted intervention areas, potentially resulting in a type II error. A large number of statistical analyses were performed which may increase the risk of a type I error. However, this is not likely as the significant

findings were primarily found in one EBP construct i.e. behaviours. It is not possible to determine which component of the tailored intervention was most influential in effecting the changes observed. Other limitations include potential confounding variables such as changes in staff between the assessment periods. The control site commenced a journal club intervention with their community based allied health professionals. It is possible we may have seen greater differences between the intervention group and control group if they did not participate in an evidence-based journal club. Both sites are based in metropolitan regions, albeit different size cities. It is therefore difficult to generalise the results from this study to rural or regional areas. It must also be noted that survey data has limitations as it is a proxy measurement of the constructs.

6.6 Future research directions

This study identified that a tailored intervention can improve EBP behaviours with a large group of allied health professionals. It would be useful to conduct a longitudinal study to determine if the changes observed were sustainable. Furthermore, data on usage of the research hub could provide important information for other health services aiming to establish a similar service.

Table 6-1 Respondents' demographic data

	Pre-intervention data n=209			Post-intervention data n=190		
	Intervention group (n=71)	Control group – same organisation (n=106)	Control Group – different organisation (n=32)	Intervention Group (n=60)	Control group – same organisation (n=99)	Control group – different organisation (n=31)
Age	N (%)	N (%)	N (%)	N (%)		N (%)
Under 30	35 (49)	49 (46)	14 (44)	28 (47)	48 (48)	3 (10)
31-40	19 (27)	31 (29)	10 (31)	21 (35)	19 (19)	10 (32)
41-50	9 (13)	18 (17)	2 (6)	7 (12)	19 (19)	10 (32)
51-60	7 (10)	8 (8)	6 (19)	3 (5)	12 (12)	5 (16)
61 and over	1 (1)	0 (0)	0 (0)	1 (1)	1 (2)	3 (10)
Gender						
Male	7 (10)	11 (10)	5 (16)	10 (17)	7 (7)	4 (13)
Female	64 (90)	95 (90)	27 (84)	50 (83)	92 (93)	27 (87)
Profession						
Dietetics/Nutrition	6 (8)	28 (26)	3 (9)	9 (15)	24 (25)	1 (3)
Occupational Therapy	19 (27)	23 (22)	12 (38)	9 (15)	15 (15)	11 (36)
Physiotherapy	19 (27)	31 (29)	7 (22)	19 (32)	20 (20)	10 (32)
Psychology	3 (4)	2 (2)	4 (12)	1 (2)	0 (0)	4 (13)

Social Work	11 (15)	13 (12)	1 (3)	5 (8)	14 (14)	2 (6)
Speech Pathology	7 (10)	7 (7)	5 (16)	9 (15)	15 (15)	3 (10)
Other	6 (8)	2 (2)	0 (0)	8 (13)	11 (11)	0 (0)
Main work area						
Acute care ward	n/a	70 (66)	n/a	n/a	63 (64)	n/a
Sub-acute rehab ward	25 (35)	n/a	12 (38)	27 (45)	n/a	8 (26)
Sub-acute aged care ward	10 (14)	n/a	4 (13)	14 (23)	n/a	1 (3)
Hospital outpatient	n/a	13 (12)	n/a	n/a	24 (24)	n/a
Community rehab	29 (41)	n/a	13 (41)	15 (25)	n/a	17 (55)
Domiciliary	7 (10)	n/a	3 (8)	4 (7)	n/a	5 (16)
Community health	n/a	0	n/a	n/a	0	n/a
Other	n/a	23 (22)	n/a	n/a	12 (12)	n/a
Employment status						
Permanent full-time	38 (54)	62 (58)	14 (44)	33 (55)	51 (52)	12 (39)
Permanent part-time	22 (31)	28 (26)	14 (44)	18 (30)	28 (28)	18 (58)
Temp or casual FT	8 (11)	9 (9)	3 (8)	5 (8)	13 (13)	0 (0)
Temp or casual PT	3 (4)	7 (7)	1 (4)	4 (7)	7 (7)	1 (3)
Years worked clinically since graduation						
Less than 5 years	26 (36)	35 (33)	7 (22)	19 (32)	31 (32)	3 (10)

5-10 years	21 (30)	29 (27)	12 (38)	17 (28)	28 (28)	6 (19)
10-15 years	10 (14)	24 (23)	8 (25)	9 (15)	12 (12)	8 (26)
15-20 years	4 (6)	7 (7)	0 (0)	9 (15)	8 (8)	5 (16)
More than 20 years	10 (14)	11 (10)	5 (15)	6 (10)	20 (20)	9 (29)
Highest grade currently working in						
1	13 (18)	23 (22)	6 (19)	12 (20)	20 (20)	2 (6)
2	41 (58)	46 (43)	2 (6)	31 (52)	46 (47)	4 (13)
3	13 (18)	28 (26)	18 (56)	16 (27)	24 (24)	16 (52)
4 or above	4 (6)	9 (9)	6 (19)	1 (1)	9 (9)	9 (29)
Year graduated from entry level health degree						
2010	0 (0)	0 (0)	2 (6)	2 (3)	0 (0)	0 (0)
2009	2 (3)	1 (1)	3 (8)	7 (12)	12 (12)	0 (0)
2008	6 (8)	9 (8)	0 (0)	2 (3)	12 (12)	0 (0)
2007	3 (4)	7 (7)	2 (6)	4 (7)	4 (4)	1 (3)
2006	6 (9)	3 (3)	0 (0)	1 (1)	6 (6)	1 (3)
2005	6 (9)	11 (10)	11 (34)	5 (8)	8 (8)	0 (0)
2000-2004	23 (32)	28 (26)	9 (28)	16 (27)	21 (22)	7 (23)
1995-1999	9 (13)	21 (20)	0 (0)	9 (15)	9 (9)	6 (19)
1990-1994	3 (4)	5 (5)	5 (18)	8 (13)	8 (8)	7 (23)
Before 1990	13 (18)	21 (20)	0 (0)	6 (11)	19 (19)	9 (29)

Highest level of qualification obtained						
Bachelor degree	40 (56)	52 (49)	16 (50)	33 (55)	46 (47)	14 (45)
Bachelor degree Hons.	8 (11)	15 (14)	5 (18)	8 (13)	11 (11)	2 (6)
Graduate certificate	3 (4)	5 (5)	0 (0)	2 (3)	7 (7)	2 (6)
Graduate diploma	2 (3)	4 (4)	0 (0)	1 (2)	4 (4)	2 (6)
Post-graduate diploma	6 (8)	8 (7)	2 (6)	6 (10)	8 (8)	4 (13)
Master's Degree	10 (14)	20 (19)	6 (19)	10 (17)	20 (20)	3 (10)
PhD	2 (3)	2 (2)	3 (7)	0 (0)	3 (3)	4 (14)
Currently enrolled in higher qualification course						
Yes	9 (13)	7 (7)	2 (6)	7 (12)	14 (14)	3 (10)
No	62 (87)	99 (93)	30 (94)	53 (88)	85 (86)	28 (90)
Year graduated from most recent qualification						
2011	5 (7)	5 (5)	3 (9)	4 (7)	6 (6)	0 (0)
2010	8 (11)	14 (13)	3 (9)	10 (17)	15 (15)	1 (3)
2009	7 (10)	8 (7)	1 (3)	4 (7)	11 (11)	2 (6)
2008	7 (10)	3 (3)	2 (7)	3 (5)	8 (8)	0 (0)
2007	6 (8)	12 (11)	0 (0)	3 (5)	9 (9)	3 (10)
2006	22 (31)	31 (29)	12 (38)	4 ((7)	12 (12)	2 (6)
2005	5 (7)	16 (15)	10 (31)	13 (22)	19 (20)	1 (3)

2000-2004	4 (6)	6 (6)	1 (3)	5 (8)	4 (4)	6 (19)
1995-1999	1 (1)	4 (4)	0 (0)	11 (18)	7 (7)	7 (23)
1990-1994	4 (6)	2 (2)	0 (0)	1 (2)	4 (4)	2 (7)
Before 1990	2 (3)	5 (5)	0 (0)	2 (2)	4 (4)	7 (23)

Table 6-2 Regression analysis with data presented as coefficient (95% CI), *p* value

Survey questions	Within intervention organisation: Intervention target area vs non- intervention target area	Within target areas: Between intervention and control organisations
Beliefs about EBP measured on a 6-point Likert scale from strongly agree to strongly disagree		
In making clinical decisions, clinical experience is more important than scientific studies.	-0.09 (-0.56 to 0.38), <i>p</i> =0.71	-0.01 (-0.36 to 0.33), <i>p</i> =0.93
In making clinical decisions, seeking evidence from scientific studies is important.	-0.09 (-0.59 to 0.39), <i>p</i> =0.71	0.26 (-0.08 to 0.60), <i>p</i> =0.14
In making clinical decisions, assessing the quality of the research evidence is important.	-0.03 (-0.54 to 0.48), <i>p</i> =0.91	0.15 (-0.20 to 0.50), <i>p</i> =0.41
Clinical experience is the most reliable way to know what is effective.	0.3 (-0.26 to 0.71), <i>p</i> =0.36	-0.26 (-0.63 to 0.12), <i>p</i> =0.18
Patient care should be based, where possible, on scientific studies rather than the opinions of respected practitioners.	-0.05 (-0.59 to 0.49), <i>p</i> =0.86	0.19 (-0.22 to 0.59), <i>p</i> =0.37
Critical appraisal of the literature is not very practical in real-life day-to-day patient care.	-0.56 (-1.16 to 0.05), <i>p</i> =0.07	-0.20 (-0.66 to 0.26), <i>p</i> =0.39
Attitudes towards EBP measured on 5-point Likert scale from strongly agree to strongly disagree		
Application of EBP principles are necessary for the practice of my profession today.	-0.02 (-0.32 to 0.28), <i>p</i> =0.90	0.14 (-0.09 to 0.36), <i>p</i> =0.24
Literature and research findings are useful in my day-to-day practice.	-0.00 (-0.29 to 0.28), <i>p</i> =0.99	0.06 (-0.16 to 0.27), <i>p</i> =0.61
I need to increase the use of evidence in my daily practice.	-0.14 (-0.46 to 0.17), <i>p</i> =0.38	0.14 (-0.10 to 0.38), <i>p</i> =0.26
Incorporating EBP activities into day-to-day practice places an unreasonable demand on people working in my profession.	0.18 (-0.25 to 0.61), <i>p</i> =0.40	0.09 (-0.24 to 0.42), <i>p</i> =0.59
I am interested in learning or improving the skills necessary so that I can incorporate research evidence into my clinical decision making.	-0.05 (-0.37 to 0.27), <i>p</i> =0.76	0.13 (-0.11 to 0.38), <i>p</i> =0.29

Adoption of EBP activities into day-to-day practice improves the quality of patient care.	0.01 (-0.25 to 0.27), $p=0.95$	0.06 (-0.16 to 0.27), $p=0.61$
There is a definite divide between research and practice in my profession.	0.06 (-0.40 to 0.53), $p=0.79$	-0.16 (0.51 to 0.20), $p=0.38$
Allied health professionals should conduct their own literature reviews to answer their clinical questions.	-0.02 (-0.41 to 0.37), $p=0.91$	0.0 (-0.23 to 0.36), $p=0.68$
Allied health professionals should be responsible for critically evaluating the quality of the literature to address their clinical questions.	-0.20 (-0.55 to 0.14), $p=0.25$	0.21 (-0.05 to 0.47), $p=0.11$
Allied health professionals should be responsible for interpreting whether research findings apply to their individual patients.	-0.18 (-0.50 to 0.15), $p=0.29$	0.38 (0.12 to 0.63), $p<0.01^*$
Confidence to undertake EBP activities measured on an 11-point Likert scale from 0% cannot do at all to 100% certain can do		
Identify clinical problems following a patient assessment.	0.54 (-0.06 to 1.15), $p=0.08$	-0.46 (-0.94 to 0.01), $p=0.05^*$
Formulate a question based on the clinical problem to guide a literature search.	0.53 (-0.39 to 1.44), $p=0.26$	-1.04 (-1.76 to -0.32), $p<0.01^*$
Effectively search the relevant literature to address the question.	0.32 (-0.68 to 1.31), $p=0.53$	-0.43 (-1.19 to 0.33), $p=0.27$
Critically appraise the literature for reliability and relevance.	0.58 (-0.44 to 1.60), $p=0.26$	-0.17 (-0.93 to 0.60), $p=0.67$
Critically appraise the reliability and validity of outcome measures.	0.52 (-0.5 to 1.60), $p=0.34$	-0.21 (-1.00 to 0.58), $p=0.61$
Identify the strengths and weaknesses of different study designs.	0.34 (-0.76 to 1.44), $p=0.54$	-0.12 (-0.92 to 0.69), $p=0.77$
Interpret results of statistical procedures such as t tests, correlations and chi-square tests.	0.21 (-0.93 to 1.35), $p=0.72$	-0.50 (-1.40 to 0.40), $p=0.28$
Interpret results of statistical procedures such as linear or logistic regression.	-0.05 (-1.20 to 1.10), $p=0.93$	-0.13 (-1.02 to 0.77), $p=0.78$
Appropriately apply evidence from the literature to the individual patient.	0.09 (-0.78 to 0.96), $p=0.84$	-0.03 (-0.71 to 0.64), $p=0.93$
Understand your patient's needs and treatment preferences.	0.52 (-0.07 to 1.10), $p=0.08$	-0.25 (-0.71 to .21), $p=0.28$

Decide on an appropriate course of action in collaboration with the patient.	0.36 (-0.20 to 0.93), $p=0.21$	-0.04 (-0.48 to 0.40), $p=0.86$
Continually evaluate the effect of your practice.	0.47 (-0.28 to 1.23), $p=0.22$	-0.41 (-0.98 to 0.16), $p=0.15$
Sources of information in clinical decision making during prior 6 months measured on a 5-point Likert scale from always to never		
My own clinical experience.	-0.07 (-0.31 to 0.17), $p=0.56$	0.19 (-0.00 to 0.37), $p=0.05^*$
Opinions of colleagues.	0.27 (-0.02 to 0.56), $p=0.07$	0.03 (-0.19 to 0.25), $p=0.77$
Expert consultation.	0.04 (-0.34 to 0.43), $p=0.82$	0.15 (-0.14 to 0.4), $p=0.31$
Employer sponsored continuing education seminars or in-services.	-0.13 (-0.53 to 0.28), $p=0.54$	0.02 (-0.28 to 0.31), $p=0.92$
Clinical practice guidelines.	-0.24 (-0.63 to 0.15), $p=0.24$	0.02 (-0.28 to 0.32), $p=0.91$
Continuing education outside my place of employment.	0.21 (-0.9 to 0.62), $p=0.29$	0.25 (-0.07 to 0.56), $p=0.13$
Textbooks.	-0.12 (-0.50 to 0.27), $p=0.55$	-0.06 (-0.36 to 0.24), $p=0.71$
Videos, DVD, audiotapes, CD, podcasts.	0.08 (-0.30 to 0.45), $p=0.69$	-0.01 (-0.30 to 0.29), $p=0.97$
Case studies.	0.09 (-0.28 to 0.46), $p=0.63$	0.02 (-0.25 to 0.30), $p=0.87$
Internet resources (excluding previously mentioned sources of information or journal articles found via the internet).	-0.05 (-0.43 to 0.32), $p=0.78$	-0.14 (-0.42 to 0.14), $p=0.33$
Research studies (in general).	-0.03 (-0.40 to 0.34), $p=0.87$	0.27 (-0.007 to 0.56), $p=0.05^*$
Meta-analysis of randomized controlled trials.	-0.09 (-0.60 to 0.42), $p=0.72$	0.36 (-0.04 to 0.75), $p=0.08$
Results from a randomized controlled trial.	-0.03 (-0.53 to 0.47), $p=0.91$	0.23 (-0.16 to 0.62), $p=0.25$

Results of a controlled study without randomization.	-0.18 (-0.68 to 0.31), $p=0.46$	0.15 (-0.23 to 0.53), $p=0.43$
Results of a quasi-experimental study.	-0.13 (-0.64 to 0.39), $p=0.63$	-0.11 (-0.50 to 0.28), $p=0.58$
Results from a single-subject design study.	-0.07 (-0.53 to 0.39), $p=0.76$	0.05 (-0.9 to 0.40), $p=0.77$
Results from studies investigating reliability or validity of a measurement instrument / approach.	-0.38 (-0.90 to 0.14), $p=0.15$	0.31 (-0.08 to 0.70), $p=0.12$
Results from an economic evaluation (e.g. cost-effectiveness study).	0.02 (-0.40 to 0.44), $p=0.94$	-0.017 (-0.49 to 0.15), $p=0.29$
EBP behaviours in prior 6 months measured as a yes/no response		
Reviewing literature individually for my own clinical practice.	-0.14 (-0.32 to 0.04), $p=0.13$	0.15 (0.01 to 0.29), $p=0.03^*$
Reviewing literature (in group) for practice as a group/department.	-0.14 (-0.34 to 0.07), $p=0.19$	0.01 (-0.15 to 0.17), $p=0.88$
Collecting information for a quality assurance project.	-0.13 (-0.34 to 0.08), $p=0.22$	0.14 (-0.02 to 0.30), $p=0.09$
Collecting information for a clinical practice protocol/guideline.	-0.10 (-0.33 to 0.12), $p=0.37$	0.11 (-0.06 to 0.28), $p=0.21$
Collecting information for a research project.	-0.19 (-0.32 to -0.05), $p=0.01^*$	0.200 (0.03 to 0.37), $p=0.02^*$
Leading a quality assurance project.	-0.08 (-0.30 to 0.14), $p=0.49$	0.08 (-0.09 to 0.25), $p=0.34$
Leading a clinical practice protocol/guideline project.	-0.10 (-0.32 to 0.12), $p=0.37$	0.22 (0.06 to 0.38), $p<0.01^*$
Leading a research project.	-0.21 (-0.31 to -0.11), $p<0.01^*$	0.31 (0.18 to 0.43), $p<0.01^*$
Preparing a conference presentation (poster or podium).	-0.02 (-0.22 to 0.19), $p=0.88$	-0.01 (-0.17 to 0.14), $p=0.86$
Writing a manuscript for a journal.	-0.01 (-0.16 to 0.14), $p=0.91$	0.19 (0.08 to 0.30), $p<0.01^*$

Summary points

- This study sought to explore if a tailored intervention could enhance the uptake of EBP skills and behaviours of a group of allied health professionals.
- A tailored approach which targets prospectively identified barriers appears to be effective at enhancing allied health professionals' experience of EBP, particularly in relation to behaviours.
- Respondents from the intervention organisation became more confident with the 5-steps of EBP including formulating a research question and using research studies to guide clinical decision making.
- To date, there have been no published studies that have demonstrated a positive change in EBP behaviours with a wide range of allied health professionals, in an Australian setting.

Conclusion

- This study found that an intervention tailored to address the barriers identified by the study participants can enhance allied health professionals EBP skills and behaviours. However, it remains unclear if the change was sustained over a longer period of time and which component of the intervention was the most (or least) effective.

Chapter 7: Discussion

Overview

This chapter summarises and compares the key findings from this program of research with published literature on allied health professionals' experience of EBP. The limitations of the study design will be discussed before making recommendations regarding future research on the topic of allied health professionals' engagement with EBP.

The aim of this program of research was to measure the effectiveness of a tailored intervention designed to enhance allied health professionals' uptake of EBP. To address this aim, a 3-phase study was undertaken. The first phase measured allied health professionals' current EBP attitudes, beliefs, skills, confidence and behaviours using a validated survey. Further data on the salient beliefs influencing the likelihood to engage in EBP were elicited using the theory of planned behaviour in focus group discussions at the intervention site. The second phase of the study involved the development and implementation of an intervention that was tailored to address the barriers as identified and perceived by the participants central to this study. The third and final phase evaluated the effects of the tailored intervention using a pre-intervention-post-intervention design with two parallel control groups. The findings from the program of research are described in full detail in Chapters 3, 4, 5 and 6.

7.1 Key findings

Results from phase 1 of the study revealed that although allied health professionals generally have a positive attitude towards EBP, there were some differences between the groups. Social workers were significantly less likely to believe that scientific evidence was important when making clinical decisions. Several published studies have found differences between the allied health professional groups in relation to attitudes and beliefs about EBP. Gudjonsdottir et al compared physical therapists' attitudes towards EBP with those of social workers (2018). The authors of this study concluded there was an association between more positive attitudes and being a physical therapist. There are a number of reasons why social workers may have less positive attitudes towards EBP, including the reported tension between the philosophy of EBP and the person-in-environment model favoured by many social workers (Simmons, 2012). It has been suggested that the EBP model does not adequately account for the individual needs of the patient / client within their particular context. In response to the perceived short-comings of the EBP model, social work

researchers have argued for the evidence-informed practice (EIP) model. Described as an approach to clinical decision making where evidence from multiple sources, including qualitative studies, is integrated with the patient's values and preferences along with the health professionals' clinical experience (Nevo & Slonim-Nevo, 2011). The main difference between EBP and EIP is that the latter is less reliant on the hierarchy of evidence and as such, does not utilise the steps prescribed in the Sicily Statement to translate evidence into practice. Rather, EIP considers evidence as part of clinical decision making but does not 'base' the selection of interventions or actions on the strength of published research. The weakness in the arguments put forward by those in favour of the EIP model is a lack of understanding of the flexibility of the EBP model. The three-circle EBP model gives equal consideration to all three sources of evidence i.e. published evidence, clinical experience and patient values and preferences. Guyatt has argued "evidence alone does not make decisions" (Haynes, Devereaux & Guyatt, 2002. p.1350). Rather, evidence-based clinical decisions begin with considering the presentation of the patient, reviewing the relevant evidence and considering the patient's preferences before integrating all of these factors to recommend the most appropriate course of action, in collaboration with the patient.

The multivariable regression that was completed in phase 1 revealed a negative correlation between confidence to undertake EBP activities and years of clinical practice. New graduate allied health professionals initially report a moderate to high level of confidence with EBP activities but appear to begin losing confidence within a couple of years of clinical practice. This is a new and important finding. Although previous studies have identified a correlation between EBP skills and time since graduation, none have identified when new graduates begin to lose confidence to undertake EBP activities. Two previous studies (Jette et al., 2003; Salbach et al., 2007) had found that EBP confidence was lower in respondents who had graduated more than 15 years ago in comparison to those who had graduated less than 5 years ago. However, both studies analysed age as a predictor variable in 5-year intervals which makes it difficult to identify when the degradation of skills begins. It should also be noted that both studies did not account for higher levels of qualifications in their analyses which may have confounded the results.

The theory of planned behaviour guided data collection and interpretation with focus groups conducted in phase 1. Participants reported low normative beliefs and weak perceived behavioural control in relation to lack of support from the organisation, including

immediate supervisors, to engage in EBP activities. Two previous studies have identified that allied health professionals have low normative beliefs in relation to EBP. Diermayr found a negative correlation between perceived pressure to apply EBP and likelihood to engage in EBP activities (2015). However, this study did not identify the source or nature of the perceived pressure. The second study explored Finnish healthcare professionals' intention to use clinical guidelines (Kortteisto, Kaila, Komulainen, Mäntyranta, & Rissanen, 2010). The authors found that normative beliefs and social pressure strongly correlated with nurses and "other professionals" intentions to use clinical guidelines. However, it is unclear who exactly is included in the other professionals category.

The implications of this finding are significant as normative beliefs play an important role in the likelihood to participate in a behaviour. If allied health professionals believe that important people, such as immediate supervisors, do not value EBP, it is highly unlikely they will participate in EBP activities.

Data from the focus groups also revealed that allied health professionals work in contradictory situations. On one hand participants believed that EBP would improve patient outcomes (attitude) and believed that their patients expected them to be delivering their practice through an evidence-based framework (norm). On the other hand, the organisational context presented seemingly insurmountable obstacles to the delivery of EBP (control) including difficult to achieve organisational goals and a significant lack of resources. Participants appeared to be caught in a vicious cycle of being aware of what they 'should' be doing but having insufficient power to overcome the contextual factors. The result of this was profound and participants described the experience as stressful and overwhelming. Furthermore, there was recognition from some of the participants that attempting to address the barriers to EBP would come at a personal cost to them in terms of time and effort. One previous qualitative study with a small group of speech pathologists (Foster, Worrall, Rose, & O'Halloran, 2015) described a similar phenomenon as the 'disempowering' nature of EBP. No other published studies have used the theory of planned behaviour to explain Australian allied health professionals' experience of EBP.

The final phase of the study evaluated the effects of the tailored intervention and found that allied health professionals' EBP attitudes, skills, confidence and behaviours had changed. Relatively few of the intervention studies reviewed in Chapter 1 had effected a change in the

behaviours. It is likely that the intervention reported in this program of research was successful due to the extensive prospective identification of barriers as identified by the participants. According to Eccles et al, many interventions are developed to target barriers that the researcher assumes from other studies or his/her own perceptions and experience of EBP (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005). The flaw in failing to identify barriers as perceived by the subjects, is that the intervention may not actually target the areas of greatest concern. This may in part be the reason why there have been relatively few interventions that have effected a change in the behaviour of allied health professionals, such as increasing the use of research evidence in practice.

7.2 Limitations and strengths

Several elements of the study design presented challenges and must be acknowledged as limitations.

7.2.1 Unmatched pre-post samples

Participation in the surveys was anonymous in order to encourage honest responses. Consequently, it was not possible to match the pre-intervention cases with the post-intervention cases and it was not possible to conduct a paired *t*-test analysis. The advantage of a paired design is reduced experimental error which contributes to a more powerful statistical outcome (Portney & Watkins, 2009).

7.2.2 Self-report data and bias

The primary aim of this study was to measure effectiveness of an intervention that aimed to enhance EBP attitudes, beliefs, skills, confidence and behaviours of allied health professionals. A survey with previously validated psychometric properties was used to measure the changes. However, there are limitations with using self-report tools, particularly when measuring human behaviour, as respondents may answer questions according to what they think is more desirable. Secondary sources of data collection such as observation of the clinicians or audit of medical records may have reduced the potential of social desirability bias.

It is also possible that the respondents who completed the survey were already interested in EBP. This may have led to overrepresentation of allied health professionals who have a

positive attitude towards EBP. However, a reward strategy of potentially winning a \$100 prize was used to attract participation from a large variety of allied health professionals. The final response rate of 58% is generally thought to be adequate representation of the population from which the sample was drawn (Nulty, 2008).

7.2.3 Maturation bias

The survey collected data on a large number of variables at two specific points in time over a twelve-month period. One of the criticisms of this type of design is the potential impact of maturation. It is possible that the respondents' EBP attitudes, beliefs, skills, confidence and behaviours might have changed over this period of time, irrespective of the intervention. However, the inclusion of parallel control groups with pre-intervention data provides some control over maturation bias.

7.2.4 Intervention limitations

The tailored intervention involved seconding the 'EBP champions' to the allied health research unit for a two-week period. Funding was provided to the various allied health departments to backfill the EBP champions. The intervention was reliant on the cooperation of management to release staff to be able to participate in the study. It is possible that without financial remuneration, management may not have been supportive of staff engagement in EBP activities. Lack of organisational support was identified in the focus groups as a significant barrier to participation in EBP activities. It is possible that the changes observed following the intervention would not be sustained beyond the duration of the study without the financial incentives for management support.

It is also not possible to determine which aspect of the tailored intervention was the most (or least) effective. This is one of the major criticisms of this form of intervention (Baker et al., 2010).

7.3 Implications of findings

The findings from this program of research have implications for both employers of allied health professionals and for professional bodies responsible for ensuring that the practice of its members is safe and competent.

7.3.1 Implications for employers of allied health

Allied health professionals graduate with a moderate level of confidence to undertake EBP activities, such as critically appraising research studies. The findings from phase 1 of this study suggest that this confidence degrades from the second year of practice. It is likely this is due to a lack of opportunity to practice the skill set due to the predominant focus on clinical work in the early years of practice. However, if employers of allied health professionals expect clinical practice to be evidence-based, there must be a commitment to the resources necessary to maintain and build EBP skills. This may include encouraging a practice-based research approach (Epstein, 1996) which fosters critical analysis of one's own practice. Another strategy is engaging allied health professionals to systematically and comprehensively collect data, as part of a team, and subsequently analyse this data as part of a clinical practice improvement exercise (Horn & Gassaway, 2007). This approach has the potential to expose new graduate clinicians to EBP activities and prevent early degradation of confidence.

7.3.2 Implications for allied health professional bodies

The Australian Health Practitioner Regulation Agency works with a variety of health profession boards to ensure that practicing health professionals are competent and safe. EBP skills feature through most accreditation and competency documents. However, only 10 allied health professional groups are part of AHPRA and the other groups typically do not require compulsory registration with the relevant professional body in order to practice. There is a need for greater accountability from professional bodies and associations in relation to maintaining EBP skills. This could take the form of mandatory annual refreshers on the 5-steps detailed in the Sicily Statement. Compulsory registration with professional bodies may also assist in ensuring currency of knowledge and training.

7.4 Future research

To date, few published studies have effected a change in allied health professionals' EBP behaviours. This study utilised a tailored intervention but did not measure if the observed changes were sustained beyond the duration of the study. Future longitudinal research could determine if this approach effects a lasting change in the EBP attitudes, beliefs, skills, confidence and behaviours of allied health professionals. It is also important to note that

that the tailored intervention described in this program of research involved a significant investment in time and resources. A cost-benefit analysis was not conducted and should be a topic of future research.

The theory of planned behaviour was used extensively throughout this program of research. Only two published studies have specifically explored allied health professionals' experience of EBP using theory of planned behaviour. Further research on this theoretical model using both qualitative and quantitative data may assist in a better understanding of allied health professionals' EBP behaviours.

Finally, it is important to consider whether EBP is the ideal model for allied health. It has been a feature of discourse within allied health literature for nearly 30 years. In this time, there have been limited attempts to adapt or modify the model to suit the needs of this large group of health professionals. This is despite the significant body of literature which suggests that allied health professionals face numerous barriers affecting their engagement with EBP, particularly in relation to the research evidence component. Future research should explore if other models of clinical decision making may be more appropriate (and achievable) for allied health professionals.

7.5 Conclusion

This thesis described an original research study that sought to determine if a tailored intervention could effect a change in the evidence-based practice beliefs, attitudes, skills, knowledge and behaviours of a group of allied health professionals. A rigorous process was undertaken to identify barriers and facilitators to EBP and a theoretical framework enabled in-depth interpretation of the data collected during this phase. The tailored intervention was developed to specifically target the barriers identified and subsequent evaluation determined significant changes primarily for behaviours related to EBP.

Several findings from this study make important original contributions to the body of literature on allied health professionals' experience of and engagement with EBP. First, allied health professionals appear to have the skills, knowledge and confidence to undertake EBP activities at graduation. However, confidence in these skills appears to deteriorate from the second year of clinical practice. Second, allied health professionals' experience of EBP is strongly influenced by the organisational context in which they work. Although they may

have positive attitudes and beliefs and potentially the skills (in the first five years following graduation) to undertake EBP activities, they do not feel supported by the organisation to do so. This suggests that there is a mismatch between what allied health professionals think they 'should be doing' and what they are in fact encouraged to do.

In moving forward, it is imperative that registration bodies, professional associations and employers of allied health professionals collaborate on strategies that seek to preserve EBP skills and support allied health professionals to bridge the current research-to-practice gap.

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Appendices

Appendix 1 Summary of systematic reviews included in literature review 1

Reference	Purpose	Methodology	Key Findings
(Baatiema et al., 2017)	To examine the overall barriers and enablers, as perceived by health professionals, which affect how evidence-based practice guidelines for acute stroke care are adopted in hospital settings.	Design: systematic review Participants: AHP Sample: n=10 studies Country: n/a	EBP attitudes/beliefs: EBP barriers: capacity for organisational change e.g. lack of support, lack of resources; individual health professionals e.g. lack of skills; resources and incentives e.g. lack of physical space; guideline factors e.g. lack of efficacy; patient factors e.g. patient preference; professional interactions e.g. inadequate communication EBP facilitators: a/a EBP behaviours: n/a
(Bach-Mortensen & Montgomery, 2018)	To examine the barriers and facilitators that third sector practitioner identify in relation to evaluating the services their organisations provide.	Design: systematic review Participants: AHP Sample: n=24 studies Country: n/a	EBP attitudes/beliefs: EBP barriers: lack of expertise and internal capability, mismatch between funder requirements and appropriate goals, lack of financial resources EBP facilitators: funder requirements, involvement of stakeholders to identify outcome indicators and evaluation goals, training of staff and evaluation literacy EBP behaviours: n/a
(Condon, McGrane, Mockler, & Stokes, 2016)	To conduct a scoping review into physiotherapists performing the steps of EBP.	Design: scoping review Participants: PT Sample: n=25 studies Country: n/a	EBP attitudes/beliefs: n/a EBP barriers: lack of time to find/analyse/apply EBP, patient presentation doesn't conform to the evidence, organisational resources EBP facilitators: professional obligation, interprofessional communication, individual personal drivers

(Da Silva, 2015)	To describe the current evidence on EBP knowledge, skills, behaviour, opinions and barriers by physiotherapists.	Design: systematic review of quantitative studies Participants: PT Sample: n=12 Country: n/a	EBP attitudes/beliefs: high levels of belief that EBP is necessary or important EBP barriers: lack of time, inability to understand statistics, lack of support from employer, lack of resources, lack of interest, lack of generalisability of results EBP facilitators: n/a
(Hannes, 2012)	To examine commonalities in the obstacles perceived by different groups of health care practitioners.	Design: systematic review of qualitative studies Participants: MDT Sample: n=8 Context: Belgium	EBP attitudes/beliefs: n/a EBP barriers: limited accessibility and applicability of evidence, suboptimal evidence, political agendas, lack of clinician competence in the EBP steps EBP facilitators: n/a
(Lizarondo, 2011)	To examine the individual characteristics of allied health practitioners which determine their uptake of evidence into practice.	Design: systematic review Participants: AHP Sample: n=6 Country: n/a	EBP attitudes/beliefs: positive correlation between perceptions, attitudes, beliefs and EBP uptake EBP barriers: age negatively correlates to EBP behaviours EBP facilitators: higher qualifications, involvement in research or EBP activities
(Scurlock-Evans, 2014)	To synthesise the findings of research into EBP barriers, facilitators and interventions in physiotherapy.	Design: systematic review Participants: PT Sample: n=32 Country: n/a	EBP attitudes/beliefs: overall positive attitudes towards EBP EBP barriers: lack of time and skills, evidence insufficiency EBP facilitators: membership to professional bodies
(Scurlock-Evans, 2015)	To synthesise research findings exploring social workers' EBP orientation, attitudes, adoption, knowledge, skills and perceived EBP barriers and facilitators.	Design: systematic review Participants: SW Sample: n=31 Country: n/a	EBP attitudes/beliefs: majority held positive views EBP barriers: lack of time, lack of training, lack of expertise/knowledge/skills, suspicion of research, agency characteristics

			EBP facilitators: perceived support, protected time, workload easement, increased staffing, targeted skills training
(Upton et al., 2014)	To determine occupational therapists' attitudes, knowledge and utilization of EBP.	Design: systematic review Participants: OT Sample: n=32 studies Country: n/a	EBP attitudes/beliefs: overall positive EBP barriers: workload pressures, time pressures, insufficient staff/resources/finances, lack of training, lack of skills, lack of support, relevance of research, communication and team functioning, personal motivation, conflict with client centred practice, patient safety

AHP = multidisciplinary group of allied health professionals; ART = art therapists; CHIRO = chiropractor; DIET = dietitians / nutritionists; MUSIC = music therapists; OT = occupational therapists; OTH = other allied health professional groups; OPT = optometry; P&O = prosthetists / orthotists; PERF = perfusionists; PT= physiotherapists; POD = podiatrists; PSY = psychologists / neuropsychologists; SLT = speech and language therapists / speech pathologists; SW = social workers

Appendix 2 Summary of cross-sectional studies included in literature review 1

Reference	Purpose	Methodology	Key Findings
(Aarons & Sawitzky, 2006)	To examine the association of organisational culture and climate with attitudes towards EBP	Design: cross-sectional survey Participants: AHP Sample: n=301 Country: USA	EBP attitudes/beliefs: demoralizing climate negatively associated with constructive culture EBP barriers: Defensive culture correlated to perceiving EBP as not clinically useful EBP facilitators: constructive culture positively associated with EBP
(Abrefa-Gyan, 2016)	To examine possible differences in knowledge and attitudes toward EBP among social workers across geographic regions.	Design: cross-sectional survey Participants: SW Sample: n=169 Country: USA	EBP attitudes/beliefs: knowledge and attitude did not differ significantly across geographic work locations
(Akinbo, Odebiyi, Okunola, & Aderoba, 2009)	To describe the knowledge, attitudes and beliefs of physiotherapists in Nigeria to EBP	Design: cross-sectional survey Participants: PT Sample: n=217 Country: Nigeria	EBP attitudes/beliefs: 99% strongly agreed that EBP is necessary & improves patient care EBP barriers: insufficient time, lack of information resources and inability to apply findings to patients Facilitators: n/a
(Andrysek, Christensen, & Dupuis, 2011)	To examine current practices, beliefs, value and usefulness of EBP in prosthetics & orthotics	Design: cross-sectional survey Participants: P&O Sample: n=114 Country: Canada	EBP attitudes/beliefs: overall agreed that research was useful in clinical practice EBP barriers: time, system, evidence, lack of encouragement EBP facilitators: workplace, moderate level of knowledge EBP behaviours: colleague most likely information source

(Arnadottir & Gudjonsdottir, 2016)	To explore associations between attitudes and personal and environmental factors towards EBP	Design: cross-sectional survey Participants: PT Sample: n=211 Country: Iceland	EBP attitudes/beliefs: positive attitudes correlated to female gender, higher qualifications, workplace with more than 10 PTs EBP barriers: n/a EBP facilitators: n/a EBP behaviours: n/a
(Baker, Stephens, & Hitchcock, 2010)	To explore whether SW are engaging in practice evaluation.	Design: cross-sectional survey Population: SW Sample: n=134 Country: USA	EBP attitudes/beliefs: n/a EBP barriers: time constraints, caseload, lack of training, lack of administrative support EBP facilitators: training in program evaluation (undergraduate, post-graduate and employer provided)
(Bauer, Peck, Studebaker, & Yu, 2017)	To explore attitudes of art therapists towards EBPs	Design: cross-sectional survey Participants: ART Sample: 43 Country: USA	EBP attitudes/beliefs: correlation between experience in EBP and perception of ease to integrate EBP barriers: n/a EBP facilitators: n/a EBP behaviours: n/a
(Bennett et al., 2003)	To explore attitudes to EBP, perception of implementation barriers and educational needs.	Design: cross-sectional survey Population: OT Sample: n=649 Country: Australia	EBP attitudes/beliefs: high level of agreement that EBP is important & improves client care EBP barriers: lack of time, insufficient evidence, lack of skills and lack of resources EBP facilitators: metro setting, previous training in EBP, less years of practice & postgrad qualifications EBP behaviours: primarily rely on clinical experience for decision making
(Bernhardsson et al., 2014)	To investigate attitudes, knowledge, behaviour, pre-requisites and barriers related to EBP and guideline use	Designs: cross-sectional survey Participants: PT	EBP attitudes/beliefs: 90% agree that EBP is necessary to practice & guidelines are important

		<p>Sample: n=271</p> <p>Country: Sweden</p>	<p>EBP barriers: lack of time, poor availability, limited access, unable to apply</p> <p>EBP facilitators: attitude towards, awareness of and belief in guidelines correlated to use</p> <p>EBP behaviours: 48% felt confident accessing online databases; 47% use guidelines frequently; 13% know where to find guidelines on the internet</p>
(Bridges, Bierema, & Valentine, 2007)	To determine the extent to which personal characteristics and the characteristics of the social system in the workplace influence the propensity to adopt EBP	<p>Design: cross-sectional survey</p> <p>Participants: PT</p> <p>Sample: n=831</p> <p>Country: USA</p>	<p>EBP attitudes/beliefs: n/a</p> <p>EBP barriers: age and years licensed negatively correlated with propensity to adopt EBP</p> <p>EBP facilitators: self-directed learning predictor of propensity to adopt EBP</p>
(Brown et al., 2010a)	To investigate and compare the perceived barriers to research utilisation by paediatric allied health professions	<p>Design: cross-sectional survey</p> <p>Participants: OT</p> <p>Sample: n=696</p> <p>Country: Australia, UK & Taiwan</p>	<p>EBP attitudes / beliefs: n/a</p> <p>EBP barriers: participants from Taiwan perceived larger number of barriers to research utilisation; participants from UK & Taiwan perceived characteristics of the organisation to be the greatest barrier; participants from Australia perceived communication of research to be the greatest barrier</p> <p>EBP facilitators: level of academic qualification and attitudes toward EBP were predictive factors</p>
(Byham-Gray et al., 2005)	To measure dietitians' perceptions, attitudes and knowledge of EBP and to determine impact of factors such as sociodemographic characteristics and education	<p>Design: cross-sectional survey</p> <p>Participants: DIET</p> <p>Sample: n=258</p> <p>Country: USA</p>	<p>EBP attitudes/beliefs: no correlation between years of experience and attitude</p> <p>EBP barriers: lack of time</p> <p>EBP facilitators: level of education ($r=.28$), completion of research course ($r=.28$), frequency reading research articles ($r=.41$), work status i.e. full-time employment ($r=.26$) and membership to professional organisations ($r=.18$)</p>

(Caldwell et al., 2017)	To identify levels of research awareness and attitudes towards research in a regional cancer centre	Design: cross-sectional survey Participants: AHP Sample: n=127 (30.2% AHP) Country: UK	EBP attitudes/beliefs: strong belief in benefit of research across all groups EBP barriers: AHP less likely than both doctors and nurses to report they have skills & knowledge / training/ support to engage in research EBP facilitators: n/a
(Caldwell, Coleman, Copp, Bell, & Ghazi, 2007)	To explore the perceptions of recently qualified practitioners about their confidence to engage in EBP	Design: cross-sectional survey Population: AHP Sample: n=85 Country: UK	EBP attitudes/beliefs: 96% report research relevant to practice EBP barriers: lack of time to implement, EBP facilitators: encouragement from employer & colleagues from same & different professional groups. NB. there were no significant differences between the occupational groups
(Cameron et al., 2005)	To examine the use of EBP during intervention planning	Design: cross-sectional survey Population: OT Sample: n=131 Country: USA	EBP attitudes/beliefs: 98% agree research builds a scientific basis for the profession EBP barriers: lack of time, lack of expectation from payers to be EBP, negative correlation between years of experience and EBP EBP facilitators: higher degrees EBP behaviours: poor pursuit or implementation of research in practice
(Chiu, Weng, Wahlqvist, Yang, & Kuo, 2012)	To investigate how dietitians looks for nutritional information and perceive evidence based nutrition	Design: cross-sectional survey Population: DIET Sample: n=67 Country: Taiwan	EBP attitudes/beliefs: strong positive attitude EBP barriers: lack of knowledge and skill in implementation, lack of library resources, time constraints Facilitators: n/a
(Christensen & Andrysek, 2012)	To examine the associations between demographics of clinicians, factors involved in	Design: cross-sectional survey	EBP attitudes/beliefs: n/a

	implementation of EBP and access to sources of information	Population: P&O Sample: n=114 Country: Canada	EBP barriers: employment in public clinic correlates to prohibitive financial support of EBP EBP facilitators: authoring a peer reviewed article EBP behaviour: more likely to consult colleague for clinical information if increase in number of clinicians in a facility
(Closs & Lewin, 1998)	To investigate what therapists perceive as barriers to implementing research findings into practice	Design: cross-sectional survey Population: AHP Sample: n=103 Country: UK	EBP attitudes/beliefs: EBP barriers: time to implement and read research, skills in statistical analyses, facilities inadequate for implementation EBP facilitators: time, increased facilities and support EBP behaviours:
(Connolly, Lupinnaci, & Bush, 2001)	To examine the relationships with EBP from student through to first year of practice	Design: cross-sectional survey Population: PT Sample: n=34 Country: USA	EBP attitudes/beliefs: perceptions about professional responsibilities in relation to research and value of research to the clinician did not show a change over time EBP barriers: perceptions of the importance of published research to clinical practice showed change during education but was not sustained after 1 year of practice
(Cooke, Bacigalupo, Halladay, & Norwood, 2008)	To investigate the level of research activity, use, interests and skills	Design: cross-sectional survey Population: SW Sample: n=368 Country: UK	EBP attitudes/beliefs: higher qualifications correlated to more positive attitudes EBP barriers: work pressure, lack of available expertise, not a priority in the workplace EBP facilitators: protected time, mentorship
(Döpp et al., 2012)	To measure Dutch OTs perception of EBP, sources of evidence used in clinical decision making and barriers to implementing EBP	Design: cross-sectional survey Population: OT Sample: n=100 Country: Netherlands	EBP attitudes/beliefs: 53% perceived that it requires too much effort to use evidence in clinical practice EBP barriers: Difficulty evaluating quality of evidence EBP facilitators: working in academic hospital, higher numbers of colleagues

			EBP behaviours: colleagues most frequent source of info
(Dougherty, Burrowes, & Hand, 2015)	To explore dietitians perceptions of research, current participation and barriers and facilitators to EBP	Design: cross-sectional survey Population: DIET Sample: n=4132 Country: USA	EBP attitudes/beliefs: all agreed research was important EBP barriers: lack of time, perception that other work is more important, lack of ability to obtain funding; lack of support from employer EBP facilitators: standard processes, mentorship opportunities, webinars EBP behaviours: 75% had searched & analysed literature in the last year
(Ekeland, Bergem, & Myklebust, 2018)	To explore understanding of EBP and attitudes towards it	Design: cross-sectional survey Population: SW Sample: n=2060 Country: Norway	EBP attitudes/beliefs: overall positive but poor understanding of EBP EBP barriers: higher degrees EBP facilitators: higher degrees EBP behaviours: own clinical experience most important source of information
(Fujimoto, Kon, Takasugi, & Nakayama, 2017)	To investigate attitudes of EBP and clinical practice guidelines	Design: cross-sectional survey Population: PT Sample: n=384 Country: Japan	EBP attitudes/beliefs: strong positive belief that EBP is important EBP barriers: n/a EBP facilitators: previous participation in research, no. of people at workplace, higher degree were all predictors of attitudes and behaviour toward EBP
(Graham, 2013)	To explore New Zealand therapists' perceptions of their behaviours, skills and attitudes regarding EBP.	Design: cross-sectional survey Population: OT Sample: n=473 Country: New Zealand	EBP: attitudes/beliefs: majority perceived EBP was useful in daily practice and improving client-centred care EBP barriers: lack of time, lack of sufficient relevant research, lack of access to resources, EBP too recipe-based EBP facilitators: access to resources such as internet and databases, greater involvement in research, more relevant research,

(Gray et al., 2013)	To examine the views on EBP held by social workers	<p>Design: cross-sectional survey</p> <p>Population: SW</p> <p>Sample: n=428</p> <p>Country: Australia</p>	<p>EBP attitudes/beliefs: 80% generally positive about EBP and deem it useful in day to day work</p> <p>EBP barriers: time, inadequate resources for EBP, unsupportive organisational culture, inadequate skills and knowledge, mismatch between expectations of EBP and nature of SW practice</p> <p>EBP facilitators: n/a</p> <p>EBP behaviours: 65% reported a change in practice in last two years due to impact of research findings; 93% had searched the literature</p>
(Grimmer-Somers, Lekkas, Nyland, Young, & Kumar, 2007)	To examine perceptions of the importance of research and barriers to the uptake of evidence in clinical practice	<p>Design: cross-sectional survey</p> <p>Population: PT</p> <p>Sample: n=166</p> <p>Country: Australia</p>	<p>EBP attitudes/beliefs: n/a</p> <p>EBP barriers: Being positive about undertaking future research was positively correlated with not perceiving barriers to uptake of evidence</p> <p>EBP facilitators: previous research experience, being positive about undertaking further research, working in hospitals and holding a postgraduate degree were all predictors of positive perceived importance of research were</p> <p>EBP behaviours: n/a</p>
(Gudjonsdottir, Arnadottir, Gudmundsson, Juliusdottir, & Arnadottir, 2017)	To explore attitudes towards EBP and correlations to background characteristics	<p>Design: cross-sectional survey</p> <p>Population: AHP</p> <p>Sample: n=377</p> <p>Country: Iceland</p>	<p>EBP attitudes/beliefs: overall positive attitude correlated to being a PT, female, younger, higher qualifications & more colleagues; PT more positive than SW</p> <p>EBP barriers: n/a</p> <p>EBP facilitators: n/a</p> <p>EBP behaviours: n/a</p>
(Hadley et al., 2008)	To measure basic knowledge, skills and beliefs concerning the main principles of EBP	<p>Design: cross-sectional survey</p> <p>Population: AHP (62.7%)</p>	<p>EBP attitudes/beliefs: n/a</p> <p>EBP barriers: clinicians with > 11 years' experience stated that they had not had good training previously in EBM (p = 0.04)</p>

		<p>Sample: n=193</p> <p>Country: UK</p>	<p>and felt that original research papers were confusing ($p = 0.02$) more often than less experienced clinicians</p> <p>EBP facilitators: n/a</p> <p>EBP behaviours: n/a</p>
(Harvey, Plummer, Pighills, & Pain, 2013)	To explore health practitioner research capacity	<p>Design: cross-sectional survey</p> <p>Population: SW</p> <p>Sample: n=103</p> <p>Country: Australia</p>	<p>EBP attitudes/beliefs: high level of interest in research</p> <p>EBP barriers: lack of time, staffing,</p> <p>EBP facilitators: line manager, work colleagues,</p>
(Heiwe et al., 2011)	To explore attitudes, beliefs, knowledge and behaviour concerning EBP	<p>Design: cross-sectional survey</p> <p>Population: AHP</p> <p>Sample: n=227</p> <p>Country: Sweden</p>	<p>EBP attitudes/beliefs: overall positive belief that EBP is necessary & useful</p> <p>EBP barriers: lack of time, lack of knowledge in statistics, lack of generalisability to patients, lack of research skills; PT more likely to report difficulty applying research findings to patients</p> <p>EBP facilitators: 85% reported their facility approved of current research in practice</p>
(Heiwe et al., 2013)	To explore social workers' attitudes, beliefs, knowledge and behaviour concerning EBP	<p>Design: cross-sectional survey</p> <p>Population: SW</p> <p>Sample: n=174</p> <p>Country: Sweden</p>	<p>EBP attitudes/belief: 93% perceived EBP as necessary and useful in practice</p> <p>EBP barriers: lack of time, lack of ability to implement in practice, lack of knowledge about relevant research</p> <p>EBF facilitators: access to current research through journals, support from workplace,</p> <p>EBP behaviours: 47% used research between 2-5 times a week</p>
(Hitch & Lhuede, 2015; Hitch, 2016)	To measure the attitudes of a cohort of mental health OTs toward EBP	<p>Design: cross-sectional survey</p> <p>Population: OT</p>	<p>EBP attitudes/beliefs: overall positive regard to EBP</p> <p>EBP barriers: negative correlation between years of experience & EBP</p>

		Sample: n=41 Country: Australia	EBP facilitators: higher qualifications correlate to increased likelihood to try new interventions
(Hoffman, 2013)	To identify EBP patterns as reported by SLTs employed in public schools	Design: cross-sectional survey Population: SLT Sample: n=2,762 Country: USA	EBP attitudes/beliefs: n/a EBP barriers: no dedicated time for EBP activities, access to other practitioners who are knowledgeable about EBP EBP facilitators: n/a
(Hu, 2012)	To explore the perception, involvement and participation of EBP of occupational therapists in rural areas.	Design: cross-sectional survey Population: OT Sample: n=64 Country: UK	EBP attitudes/beliefs: overall positive attitude; correlation with higher qualifications EBP barriers: lack of time, lack of skills and expertise, lack of support from management Facilitators: protected time for EBP activities,
(Iles & Davidson, 2006)	To investigate self-reported practice, skills and knowledge of EBP and to examine differences between recent and experienced graduates, low and high levels of training and private practice and hospital settings	Design: cross-sectional survey Population: PT Sample: n=124 Country: Australia	EBP attitudes/beliefs: positive EBP barriers: time, access to understandable summaries, journal access, skills in searching & evaluating EBP facilitators: higher qualifications correlated to higher skills
(Jansen et al., 2012)	To identify methods used to acquire evidence amongst allied health professionals, along with barriers to evidence acquisition and implementation	Design: cross-sectional survey Participants: AHP Sample: n=166 Country: Australia	EBP attitudes/beliefs: EBP barriers: clinical work a priority, insufficient time, large workload (no difference between disciplines); acute reported insufficient computers; lack of research culture more common in community EBP facilitators: Electronic journals more often used by post-graduate trained respondents (80% vs 63%) EBP behaviours: 84% sourced evidence from colleagues

(Jette et al., 2003)	To describe the beliefs, attitudes knowledge and behaviours as they relate to EBP	Design: cross-sectional survey Population: PT Sample: n=488 Country: USA	EBP attitudes/beliefs: correlation between years since licensure, age and access to online database at home & attitude EBP barriers: time, lack of generalisability EBP facilitators: n/a
(Kamwendo, 2002)	To investigate perceptions and attitudes towards research, intentions to perform as well as actual engagement in research-related activities	Design: cross-sectional survey Population: PT Sample: n=343 Country: Sweden	EBP attitudes/beliefs: Level of education correlated positively with attitude towards research and self-rated ability to perform research; respondents who supervised students regarded research as part of their role to a greater extent and rated their ability to perform research activities higher EBP barriers: high workload, lack of time, family situation, character of organisation EBP facilitators: working at university hospitals
(Karlsson & Tornquist, 2007)	To identify perceptions and attitudes to research-related activities as well as present and future engagement in research	Design: cross-sectional survey nested in f/up design Population: OT Sample: n=425 & n=442 Country: Sweden	EBP attitudes/beliefs: generally positive EBP barriers: high workload, lack of time, character and organization of work, family situation EBP facilitators: working in university hospitals
(Korner-Bitensky, Menon-Nair, Thomas, Boutin, & Arafah, 2007)	To identify the prevalence of practice style traits in clinicians working in stroke rehabilitation and to explore associations	Design: cross-sectional survey Population: AHP Sample: n=243 Country: Canada	EBP attitudes/beliefs: n/a EBP barriers: pragmatic trait more likely to change practice based on workload demands, patient flow and patient satisfaction as opposed to scientific validity EBP facilitators: funding for CPD increased likelihood to rely EBP behaviours: selection of interventions based on university training

(Lai et al., 2010)	To examine the confidence and perceptions of EBP	<p>Design: cross-sectional survey</p> <p>Population: AHP</p> <p>Sample: n=52</p> <p>Country: Malaysia</p>	<p>EBP attitudes/beliefs: doctors more positive attitudes towards EBP</p> <p>EBP barriers: no difference between groups; lack of IT support, lack of time, lack of awareness</p> <p>EBP facilitators: n/a</p> <p>Overall, doctors expressed slightly higher confidence on EBP compared to NAH staff</p>
(Long & Matthews, 2016)	To identify perfusionists' EBP knowledge and its possible relationship to clinical behaviour and educational level	<p>Design: cross-sectional survey</p> <p>Population: PERF</p> <p>Sample: 254</p> <p>Country: USA</p>	<p>EBP attitudes/beliefs: n/a</p> <p>EBP barriers: IT skills, critical appraisal and research skills</p> <p>EBP facilitators: higher qualifications at Master's level; hospital employees</p>
(Lyons et al., 2010)	To investigate the knowledge, attitudes, practices and barriers to EBP and research utilisation	<p>Design: cross-sectional survey</p> <p>Population: OT</p> <p>Sample: n=145</p> <p>Country: UK</p>	<p>Respondents knowledge of and attitudes towards 'identifying clinical problems' and attitude towards 'implementing research into practice' were rated as high</p> <p>Respondents knowledge and practice of 'administering research implementation' were rated as low</p>
(Lyons et al., 2011)	To investigate the knowledge, attitudes, practices of and barriers to EBP and research utilisation	<p>Design: cross-sectional survey</p> <p>Population: OT</p> <p>Sample: n=138</p> <p>Country: Australia</p>	<p>EBP attitudes/beliefs: positive</p> <p>EBP barriers: knowledge, skills</p> <p>EBP facilitators: n/a</p> <p>EBP behaviours: limited involvement in research</p>
(McCleary & Brown, 2002)	To investigate research use and attitudes among paediatric health professionals	<p>Design: cross-sectional survey</p> <p>Population: AHP</p>	<p>EBP attitudes/beliefs: prior research, CPD, professional activities, level of education</p> <p>EBP barriers: n/a</p>

		Sample: n=80 Country: Canada	EBP facilitators: prior participation in research, higher qualifications EBP behaviours: 25% engaged in research in last 2 years
(McCurtin & Healy, 2017)	To identify which therapies and techniques are used by dysphagia therapists.	Design: cross-sectional survey Population: SLT Sample: n=116 Country: Ireland	EBP attitudes/beliefs: EBP barriers: lack of training and knowledge EBP facilitators: clinical experience
(McCurtin & Clifford, 2015)	To identify the factors underpinning SLTs treatment decisions	Design: cross-sectional survey Population: SLT Sample: n=249 Country: Ireland	EBP attitudes/beliefs: strong agreement with EBP EBP barriers: n/a EBP facilitators: more years of experience, more expertise and higher qualifications correlated with reading more research
(McKenna, Bennett, Dierselhuis, et al., 2005)	To explore use and perceptions of OTseeker and its impact on clinician knowledge and practice	Design: cross-sectional survey Population: OT Sample: n=213 Country: Australia	EBP barriers: lack of time, no question, lack of awareness EBP behaviours: 14% had changed their practice after accessing information on OTseeker
(Metcalfe et al., 2001)	To examine the attitudes to research and the barriers to implementing EBP	Design: cross-sectional survey Population: AHP Sample: n=572 Country: UK	EBP attitudes/beliefs: SP and DIET perceiving research to be more important than PT and OT; overall positive attitude EBP barriers: SP perceiving more barriers than OT and PT; lack of time, inadequate facilities, isolation from colleagues, lack of cooperation with doctors
(Morris & Smyth, 2017)	To map recent research activity among mental health OT	Design: cross-sectional survey	EBP attitudes/beliefs:

		<p>Population: OT</p> <p>Sample: n=145</p> <p>Country: UK</p>	<p>EBP barriers:</p> <p>EBP facilitators: work in higher education; support, time, promoting work, leadership</p> <p>EBP behaviours: 48% had been involved in research in past 5 years</p>
(O'Connor & Pettigrew, 2009)	To investigate the perceived barriers that are faced when attempting to implement EBP	<p>Design: cross-sectional survey</p> <p>Population: SLT</p> <p>Sample: n=32</p> <p>Country: Ireland</p>	<p>EBP attitudes/beliefs: no association between grade and perceived value of research or between grade and understanding of statistical results</p> <p>EBP barriers: no time to read research, research has methodological inadequacies, insufficient time to implement new ideas, no association with grade/years of experience or workplace settings</p>
(Pager, Holden, & Golenko, 2012)	To develop a better understanding of how motivators, enablers, and barriers impact on research for allied health	<p>Design: cross-sectional survey</p> <p>Population: AHP</p> <p>Sample: n=85</p> <p>Country: Australia</p>	<p>EBP attitudes/beliefs: n/a</p> <p>EBP barriers: other work roles, lack of time, desire for work/life balance, lack of funds</p> <p>EBP facilitators: desire to develop skills, increase job satisfaction, solving problem</p>
(Pain, Magill-Evans, Darrah, Hagler, & Warren, 2004)	To compare perceived research use and knowledge sources across professions, practice situations and work environments	<p>Design: cross-sectional survey and interviews</p> <p>Population: AHP</p> <p>Sample: n=165</p> <p>Country: Canada</p>	<p>EBP attitudes/beliefs: SP rating for perceived research use across different settings was higher than other disciplines</p> <p>EBP barriers: n/a</p> <p>EBP facilitators: urban areas had better access to lectures on research findings than smaller communities</p>
(Parrish & Rubin, 2012)	To explore and compare orientation toward and implementation of EBP between social workers, psychologists and licensed marriage and family therapists	<p>Design: cross-sectional survey</p> <p>Population: AHP</p> <p>Sample: PSY n=108; SW n=688</p>	<p>EBP attitudes: more recent graduates had more favourable views of EBP</p> <p>EBP barriers: n/a</p> <p>EBP facilitators: n/a</p>

		Country: USA	EBP behaviours: PSY more likely to read research to guide practice
(Paynter & Keen, 2015)	To investigate staff attitudes, knowledge and use of EBP	Design: cross-sectional survey Population: AHP Sample: n=19 Country: Australia	EBP attitudes/beliefs: EBP barriers: n/a EBP facilitators: metropolitan location
(Philibert, 2003)	To investigate whether members of the American Occupational Therapy Association read their flagship journal or other scholarly journals.	Design: cross-sectional survey Population: OT Sample: 328 Country: USA	EBP attitudes/beliefs: overall positive attitude EBP barriers: time constraints, difficulty interpreting results, lack of clinical relevance/applicability, too much scientific information Facilitators: n/a
(Pighills et al., 2013)	To investigate occupational therapists' research experience, support needs & barriers To compare levels of anxiety between allied health disciplines related to research	Design: cross-sectional survey Population: OT Sample: n=86 Country: Australia	EBP attitudes: 82% felt engaging in research was relevant to their job EBP facilitators: 67% felt their line manager was supportive of them conducting research EBP barriers: 79% felt there was too little time throughout the working day to conduct research; 68% had little to no experience with analysing / interpreting research results; 10% were moderately experienced with developing a research question; 67% felt anxious at the thought of doing research OTs were significantly more anxious at the thought of doing research than all other health professionals collectively
(Pignotti & Thyer, 2009)	To investigate the use of supported and unsupported interventions used in practice and the reasons for choices and attitudes toward EBP	Design: cross-sectional survey Population: SW Sample: n=191	EBP attitudes/beliefs: overall positive EBP barriers: n/a EBP facilitators: n/a

		Country: USA	EBP behaviours: 76% used novel unsupported treatments in the last year
(Pollock, Legg, Langhorne, & Sellars, 2000)	To determine the perceived barriers to EBP by health professionals working within the field of stroke rehabilitation	Design: cross-sectional survey Population: AHP Sample: n=86 Country: UK	EBP attitudes/beliefs: PT & OT less confident that “findings of published research are reliable” than nurses EBP barriers: PT & OT less likely to agree that “it’s easy to implement research findings” than nurses; PT & OT less likely to agree that “research papers are always clear about the type of therapy that has been given and for how long than nurses EBP facilitators: n/a
(Pope, Rollins, Chaumba, & Risler, 2011)	To examine the knowledge, skills and use of EBP in a sample of social workers	Design: cross-sectional survey Population: SW Sample: n=200 Country: USA	EBP attitudes/beliefs: n/a EBP barriers: 34% reported an inability to critically appraise professional literature, 83% agreed they were familiar with social work databases but only 56% used relevant research to answer clinical questions EBP facilitators: n/a
(Ramirez-Velez, 2015)	To describe the current state concerning perceived barriers engagement in EBP.	Design: cross-sectional survey Population: PT Sample: n=1064 Country: Colombia	EBP attitudes/beliefs: EBP barriers: lack of research skills, lack of understanding of statistical analysis, inability to apply research findings to patients, insufficient time
(Salbach et al., 2007)	To identify practitioner barriers and organisational barriers to implementation of EBP for people with stroke.	Design: cross-sectional survey Population: PT Sample: n=270 Country: Canada	EBP attitudes/beliefs: correlation between age, sex, highest degree, hours of work per week, MDT, supervision of students & participation in research EBP barriers: insufficient time, lack of generalizability of research findings, lack of research skills, lack of understanding of statistical analyses

			EBP facilitators: Location and type of facility, no. of full-time staff and status as a teaching institution were associated with perceived organizational resources to support EBP
(Salbach, Guilcher, Jaglal, & Davis, 2009)	To identify practitioner, organization and research characteristics that are associated with searching or reading the research literature among physical therapists involved in stroke management	Design: cross-sectional survey Population: PT Sample: n=265 Country: Canada	EBP attitudes/beliefs: n/a EBP barriers: n/a EBP facilitators: participation in research, self-efficacy for implementing EBP, perceived facility support, internet access
(Salls et al., 2009)	To explore attitudes, knowledge and use of EBP	Design: cross-sectional survey Population: OT Sample: n=930 Country: USA	EBP attitudes/beliefs: 96% agree with EBP being important EBP barriers: insufficient time, lack of information resources, lack of work site support EBP behaviours: 12% frequently use electronic databases
(Scholten-Peeters et al., 2013)	To examine the attitudes, knowledge and behaviour towards EBP, and participation in scientific research.	Design: cross-sectional survey Population: PT Sample: n=165 Country: Netherlands	EBP attitudes/beliefs: weak positive with teacher highest and students lowest EBP barriers: low perceived behavioural control EBP facilitators: positive norms
(Silva, 2015)	To identify behaviour, knowledge, skills, resources, opinions and perceived barriers of Brazilian physiotherapist.	Design: cross-sectional survey Population: PT Sample: n=256 Country: Brazil	EBP attitudes/beliefs: overall positive belief that EBP is important for practice EBP barriers: difficulties obtaining studies, higher costs with implementing EBP, language of publications Facilitators: access to resources
(Suttle, Jalbert, & Alnahedh, 2012)	To explore the forms of evidence that are used by optometrist in Australia and New Zealand	Design: cross-sectional survey	EBP attitudes/beliefs: overall positive EBP barriers: lack of evidence; poor access to evidence

		Population: OPT Sample: n=279 Country: AUS	EBP facilitators: longer experience EBP behaviours: university training primary source of info
(Tadyanemhandu, 2016)	To investigate the attitudes of physiotherapists towards utilisation of EBP during patient care.	Design: cross-sectional survey Population: PT Sample: n=50 Country: Zimbabwe	EBP attitudes/beliefs: overall positive attitude EBP barriers: lack of time, limited access to online information EBP facilitators: training to improve skills in critical evaluation, organisational support / resources
(Taylor, 1998)	To investigate the extent of involvement by dietitians in publication in peer reviewed journals	Design: cross-sectional survey Population: DIET Sample: n=183 Country: UK	EBP attitudes/beliefs: high positive value EBP barriers: non-published participants lacking in confidence & identified time as a barrier more so than published respondents;
(Taylor, 2009)	To examine the research experience and level of research interest of allied health professionals	Design: cross-sectional survey Population: AHP Sample: n=132 Country: Australia	EBP attitudes/beliefs: correlation between research experience and research interest, SP were most interested in research followed by SW, OT, PT and DIET but there was no difference in research experience between disciplines EBP barriers: n/a EBP facilitators: n/a
(Thomas et al., 2003)	To investigate knowledge and use of EBP	Design: cross-sectional survey Population: DIET Sample: n=59 Country: Australia	EBP attitudes: 90% believe in an evidence-based approach EBP barriers: lack of time, lack of skills to evaluate and search, difficulties applying research in practice EBP behaviours: 73% either did not practice evidence-based nutrition or rated themselves as beginners.

(Thomas & Law, 2014)	To identify the presence of individual and organizational EBP supports	Design: cross-sectional survey Population: OT Sample: n=368 Country: Canada	EBP attitudes/beliefs: overall positive EBP barriers: limited time EBP facilitators: interdisciplinary team, specialized team, affiliation with a university, number of students supervised, mentor, involvement in research, current and past, expectation/support from managers at workplace
(Thomas, Zimmer-Gembeck, & Chaffin, 2014)	To investigate practitioners' knowledge, attitudes and use of EBP when providing interventions to children and families	Design: cross-sectional survey Population: AHP Sample: n=81 Country: Australia	EBP attitudes/beliefs: overall positive EBP barriers: higher qualifications associated with less barriers EBP facilitators: organization;
(Tuten, 2016)	To identify variables that predict social workers' use of EBP.	Design: cross-sectional survey Population: SW Sample: n=180 Country: USA	EBP attitudes/beliefs: n/a EBP barriers: EBP facilitators: knowledge, perceived organisational innovation and flexibility
(Upton, 1996)	To record the level of knowledge of EBP and clinical effectiveness and to examine the attitudes towards these concepts	Design: cross-sectional survey Participants: AHP Sample: n=207 Country: UK	EBP attitudes/beliefs: overall positive EBP barriers: overall knowledge of EBP rated low with POD rating it higher than the other groups EBP behaviours: clinicians across all disciplines are highly unlikely to critically analyse the literature or measure the outcomes of their care against set standards
(Upton & Upton, 2006)	To compare the knowledge and practice of 14 different professional groups from allied health (AHP) and health science services (HSS)	Design: cross-sectional survey Participants: AHP Sample: n=666	EBP attitudes/beliefs: n/a EBP barriers: problems obtaining money, limitations of time and organisational structure. PODS, P&O and radiographers reported having less knowledge of EBP than PT, OT, DIET, SP and PSYCH

		UK	EBP behaviours: professionals from the HSS groups rated their knowledge and application of EBP as lower than members of the AHP
(Upton, Scurlock-Evans, Stephens, & Upton, 2012)	To assess and characterise adoption of EBP in newly qualified (NQP) allied health professionals' clinical practice	Design: cross-sectional survey Participants: AHP Sample: n=153 Country: Scotland	EBP attitudes/beliefs: NO significant difference across professions or setting for the implementation of EBP, attitudes, knowledge or skills related to EBP EBP facilitators: NQP have slightly higher than average understanding of EBP in the workplace in comparison to other similar studies
(Valdes & von der Heyde, 2012)	To assess the current attitudes and opinions of hand therapists towards EBP	Design: cross-sectional survey Participants: PT Sample: n=312 Country: USA	EBP attitudes/beliefs: overall positive EBP barriers: time, lack of high level evidence, lack of access to full-text articles EBP facilitators: n/a EBP behaviours: clinical experience
(Vallino-Napoli & Reilly, 2004)	To explore the sources of evidence that guide practice and to investigate attitudes toward research	Design: cross-sectional survey Participants: SLT Sample: n=378 Country: Australia	EBP attitudes/beliefs: overall positive EBP barriers: time, EBP facilitator: Clinicians who practiced < 10 years were more likely to use research findings to guide their practice
(Verloo, Desmedt, & Morin, 2017)	To explore the beliefs about and implementation of EBP among nurses and allied healthcare providers in 9 acute care hospitals in Switzerland	Design: cross-sectional survey Participants: AHP Sample: n=391 (AHP n=62) Country: Switzerland	EBP attitudes/beliefs: overall positive Barriers: n/a EBP behaviours: low implementation of EBP
(Vogt et al., 2012)	To describe perceptions, attitudes, knowledge (PAK) & clinical use of EBP	Design: cross-sectional survey	EBP attitudes/beliefs: n/a

	To investigate relationships between PAK score and clinician demographics	Participants: DIET Sample: n=178 Country: USA	EBP barriers: lack of training in critical analysis, time & lack of mentors EBP facilitators: frequency of use of EBP & reading professional journals were associated with higher PAK scores EBP behaviours: 56.5% had access to databases but used evidence based resources less than once a month
(Walker, Stomski, Hebert, & French, 2014)	To explore Australian chiropractors' knowledge and skills in relation to EBP	Design: cross-sectional survey Participants: CHIRO Sample: n=584 Country: Australia	EBP attitudes/beliefs: EBP barriers: insufficient time, lack of generalisability of literature findings to patient population; inability to apply research findings to individual patients
(Weng et al., 2013)	To investigate the EBP of 6 groups of health professionals	Design: cross-sectional survey Population: AHP Sample: n=6160 Country: Taiwan	EBP attitudes/beliefs: Physicians & pharmacists more likely to hold positive beliefs and attitudes towards EBP EBP barriers: lack of resources was the most commonly reported barrier (57.7%) followed by time (53.9%) and knowledge (48.8%) EBP behaviours: Physicians implemented EBP the most with nurses, pharmacists and technicians the least
(Wilkinson et al., 2012)	To capture baseline measurements of the level of EBP self-efficacy, outcome expectancy knowledge & use prior to an intervention	Design: cross-sectional survey Population: AHP Sample: n=180 Country: Australia	EBP attitudes/beliefs: scores for EBP attitudes & knowledge higher than EBP use EBP barriers: OT & SW significantly lower for EBP self-efficacy and use than DT, PT & PSY EBP facilitators: Previous training in literature searching & research design/analysis significantly influenced positive perception across all EBP constructs
(Williams & Lazzarini, 2015)	To investigate the research capacity and culture of the podiatry profession within Australia	Design: cross-sectional survey Population: POD	EBP attitudes/beliefs: n/a

		<p>Sample: n=232</p> <p>Country: Australia</p>	<p>EBP barriers: other work roles take priority, lack of time, desire for work/life balance, lack of skills for research, lack of funds for research</p> <p>EBP facilitators: desire to develop skills, increased job satisfaction brain stimulation</p>
(Wressle, 2015)	To explore how occupational therapists in Sweden perceive research utilization.	<p>Design: cross-sectional survey</p> <p>Population: OT</p> <p>Sample: n=472</p> <p>Country: Sweden</p>	<p>EBP attitudes/beliefs: n/a</p> <p>EBP barriers: length of clinical experience correlates negatively with EBP</p> <p>EBP facilitators: higher qualifications</p>
(Yahui, 2017)	To identify the knowledge, attitude, and barriers towards the implementation of EBP among physiotherapists in Malaysia.	<p>Design: cross-sectional survey</p> <p>Population: PT</p> <p>Sample: n=102</p> <p>Country: Malaysia</p>	<p>EBP attitudes/beliefs: positive belief that EBP is necessary and improves patient care</p> <p>EBP barriers: time constraints, limited access to search engines, lack of generalizability of research evidence</p> <p>EBP facilitators: n/a</p>
(Zipoli & Kennedy, 2005)	To examine attitudes toward research and EBP, use of research to guide clinical decision making and perceptions of barriers to EBP	<p>Design: cross-sectional survey</p> <p>Population: SLT</p> <p>Sample: 240</p> <p>Country: USA</p>	<p>EBP attitudes/beliefs: exposure to research correlated with a positive attitude towards EBP</p> <p>EBP barriers: professional time to participate in EBP, quantity and quality of research, resources, knowledge & skills</p> <p>EBP behaviours: exposure to research and EBP during the CFY correlated with the use of EBP resources (guidelines & research studies)</p>
(Ziviani, Wilkinson, Hinchliffe, & Feeney, 2015)	To examine EBP self-efficacy, outcome expectancy, knowledge and use among AH staff	<p>Design: cross-sectional survey</p> <p>Population: AHP</p> <p>Sample: n=138</p>	<p>EBP attitudes/beliefs: OT & SW scored lower than other groups</p> <p>EBP barriers: n/a</p> <p>EBP facilitators: previous EBP training,</p>

		Country: Australia	
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AHP = multidisciplinary group of allied health professionals; ART = art therapists; CHIRO = chiropractor; DIET = dietitians / nutritionists; MUSIC = music therapists; OT = occupational therapists; OTH = other allied health professional groups; OPT = optometry; P&O = prosthetists / orthotists; PERF = perfusionists; PT= physiotherapists; POD = podiatrists; PSY = psychologists / neuropsychologists; SLT = speech and language therapists / speech pathologists; SW = social workers

Appendix 3 Summary of qualitative studies included in literature review 1

Reference	Purpose	Methodology	Key Findings
(Alnahedh, Suttle, Alabdelmoneam, & Jalbert, 2015)	To assess optometrists' perceptions of EBP.	Design: focus group Participants: OPT Sample: n=16 Country: Australia & Saudi Arabia	EBP attitudes/beliefs: overall positive belief that EBP improves patient care EBP barriers: information not reliable, lack of skills and/or training in EBP, lack of resources EBP facilitators: professional association, protected time for EBP, education/training EBP behaviours: most participants reported examples of RU; conferences, journals and books were frequently used sources of information
(Barnard & Wiles, 2001)	To explore physiotherapists' views and experiences of EBP.	Design: focus group, group or individual interviews Participants: PT Sample: n=56 Country: UK	EBP attitudes/beliefs: positive beliefs that EBP improved patient care and supported the profession EBP barriers: limited access to resources, lack of time, lack of money, poor motivation, lack of skills EBP facilitators: access to resources, positive culture of the organisation, adequate education and training, proactive colleagues
(Barrett & Paterson, 2009)	To understand the unique experiences, perceptions, barriers and feasible solutions to implementing EBP in private sector occupational therapy.	Design: focus group Participants: OT Sample: n=5 Country: Canada	EBP attitudes/beliefs: n/a EBP barriers: isolation, heightened accountability, administrative demands, time, money EBP facilitators: students, resources,
(Bennett et al., 2016)	To explore the perceptions of occupational therapy staff regarding the influence of organisational initiatives to support EBP on workplace culture and clinical practice.	Design: semi-structured interviews Participants: OT Sample: n=30	EBP attitudes/beliefs: embedded value for EBP EBP barriers: competing demands, lack of time, EBP facilitators: leadership, culture of the organisation EBP behaviours: development of EB resources

		Country: Australia	
(Bohannon, 1990)	To gain an indication on the ways in which physical therapists obtain information relevant to their practice.	Design: semi-structured interview Participants: PT Sample: n=27 Country: USA	EBP attitudes/beliefs: n/a EBP facilitators: seminars, workshops, lectures EBP behaviours: reading books and journals, colleagues were the most frequent source of clinical information
(Bowman, 2006)	To explore the process used by occupational therapists to measure the effect of their interventions.	Design: focus group Participants: OT Sample: n=10 Country: Australia	EBP attitudes/beliefs: n/a EBP barriers: caseload, competing demands, nature of the profession, lack of knowledge and skills EBP facilitators: education, training, support EBP behaviours: lack of practice evaluation
(Copley & Allen, 2009)	To explore occupational therapy practitioners' perceptions of the scope and sources of evidence that they use in clinical decision-making.	Design: focus group Participants: OT Sample: n=9 Country: Australia	EBP barriers: time, evidence lacks clarity and applicability to patient, limitations of available research EBP facilitators: systems EBP behaviours: experience was the primary source of information for practice
(Curtin & Jaramazovic, 2001)	To explore the views and perceptions that senior occupational therapists working in different settings had of EBP.	Design: focus group Participants: OT Sample: n=27 Country: UK	EBP attitudes/beliefs: generally positive about EBP and believed it could improve clinical practice and raise the profile of the profession EBP barriers: lack of time & resources, caseloads, staffing EBP facilitators: support, access to resources, characteristics of the clinician EBP behaviours: colleagues, courses, journal articles and clinical experience main sources of information

(Dannapfel, Peolsson, Ståhl, Öberg, & Nilsen, 2014)	To explore motivations behind physiotherapists' use of research in clinical practice.	Design: focus group Participants: PT Sample: n=45 Country: Sweden	EBP attitudes/beliefs: RU enables best care, personal and professional development, builds confidence, facilitates careers EBP barriers: lack of motivation / value EBP facilitators: patients and funding bodies expect it,
(Dubouloz et al., 1999)	To examine current perceptions and use of EBP among OT	Design: semi-structured interview Participants: OT Sample: n=8 Country: Canada	EBP attitudes/beliefs: most agreed that research enables best care of clients but are threatened my change EBP barriers: lack of evidence, lack of time, lack of support, lack of applicability of research to patients EBP behaviours: clinical experience is the primary source of evidence followed by scientific literature, peers and the client
(Finch, Cornwell, Nalder, & Ward, 2015)	To explore the experiences and attitudes of SLTs in regards to undertaking research in their clinical settings.	Design: focus group Participants: n=21 Sample: SLT Country: Australia	EBP attitudes/beliefs: research viewed as important means of improving and validating services EBP barriers: lack of confidence, lack of organisational support, time constraints, competing priorities EBP facilitators: prior engagement in research, training, support, supportive organisation
(Foster, Worrall, Rose, & O'Halloran, 2015)	To provide an understanding of SLTs conceptualisation of EBP for acute post-stroke aphasia.	Design: in-depth interviews Participants: SLT Sample: n=14 Country: Australia	EBP attitudes/beliefs: EBP is disempowering EBP barriers: lack of resources, inadequate staffing, lack of time, competing demands, lack of mentoring, restricted concept of EBP, poor relationships with research literature, inability to implement research in practice EBP facilitators: organisational support,
(Fristedt, Areskoug-Josefsson, & Kammerlind, 2016)	To identify factors that influence the use of EBP and the experienced effects of the use of EBP.	Design: group interview Participants: AHP Sample: n=21 Country: Sweden	EBP attitudes/beliefs: found to be satisfying and meaningful but linked to perception of barriers EBP barriers: lack of knowledge to search/analyse evidence, lack of motivation, prioritising patient care, lack of time, lack of evidence

			EBP facilitators: time, colleagues, team EBP behaviours: courses and basic training are primary source of evidence
(Janssen, Hale, Mirfin-Veitch, & Harland, 2016)	To explore the perceptions of physiotherapists towards the use of and participation in research.	Design: in-depth interviews Participants: PT Sample: n=25 Country: New Zealand	EBP attitudes/beliefs: overall perception that research was useful and increased professional status EBP barriers: perception that research is complicated and academic, lack of skills / confidence in locating and analysing research, lack of time, lack of leadership
(Karin, Filip, Jo, & Bert, 2009)	To explore obstacles among Belgian physiotherapists to the implementation of EBP in clinical work.	Design: focus groups Participants: PT Sample: n=43 Country: Belgium	EBP barriers: lack of autonomy/authority, personal attitude, accessibility of research, language of research is hard to understand, applicability of research to patients
(Kristensen, Borg, & Hounsgaard, 2012)	To investigate aspects affecting occupational therapists' reasoning when implementing research-based evidence within stroke rehabilitation.	Design: interviews, focus groups and observation Participants: OT Sample: n=25 Country: Denmark	EBP barriers: lack of team support, competing priorities, isolation, physical environment prevents implementation, EBP facilitators: colleagues
(McCluskey, Vratsistas-Curto, & Schurr, 2013b)	To identify barriers and enablers to implementing multiple stroke guideline recommendations.	Design: individual and group interviews Participants: AHP Sample: n=28 Country: Australia	EBP barriers: low belief about capability to deliver an EB intervention, concern about adverse outcome related to EBP with patients, failure to remember to implement and EBP, lack of knowledge and skills, lack of resources (time, staffing and EBP materials). NB. Different barriers according to professions
(McDermott et al., 2017)	To analyse social workers' practice decisions and identify the sources of knowledge underpinning their practice decisions.	Design: individual interviews Participants: SW	EBP behaviours: primary source of knowledge guiding practice was drawn from past experience; there was an absence of reference to using empirical evidence

		Sample: n=6 Country: Australia	
(Miao, Power, & O'Halloran, 2015)	To examine the barriers and facilitators that speech pathologists perceive and experience when implementing guidelines.	Design: semi-structured interview Participants: SLT Sample: n=8 Country: Australia	EBP attitudes/beliefs: belief that evidence strengthens clinical practice EBP barriers: lack of awareness of and/or access to guidelines, lack of transferability to specific context/population, lack of team support, lack of intervention knowledge/experience, lack of funding / resources EBP facilitators: collaboration with the family of patients and the team, leadership/management, professional integrity, motivation to adopt
(Mosson, Hasson, Wallin, & Von Thiele Schwarz, 2017)	To explore the role of line managers in implementing EBP.	Design: interviews Participants: SW Sample: n=28 Country: Sweden	EBP attitudes/beliefs: overall belief that EBP is important, valuable and ethical EBP barriers: lack of EBP leadership EBP facilitators: knowledge, attitudes
(Patel et al., 2017)	To examine how rehabilitation clinicians gain access to literature and whether they are able to implement this into practice.	Design: semi-structured interviews Participants: AHP Sample: n=21 Country: USA	EBP attitudes/beliefs: belief that research is important in clinical practice EBP barriers: time constraints to find and/or implement research, lack of specificity of the evidence EBP facilitators: supportive work environment, resources, librarian EBP behaviours: likely to use systematic reviews
(Pitout, 2014)	To explore barriers to and supports for occupational therapy research.	Design: focus groups Participants: OT Sample: n=26 Country: South Africa	EBP attitudes/beliefs: belief there is a need for research within the profession EBP barriers: lack of clinical relevance of the research, inadequate education in EBP steps, lack of personal attributes related to research

			EBP facilitators: career progression, funding, mentorship/supervision, academic collaborations
(Pollock et al., 2000)	To determine the perceived barriers to EBP by health professionals working within the field of stroke rehabilitation.	Design: focus groups Participants: AHP Sample: n=105 Country: Scotland	EBP attitudes/beliefs: n/a EBP barriers: lack of ability, lack of opportunity and difficulties with implementation. Differences between the professions with PT more confident than OT & nursing to read research EBP facilitators: training, time, support
(Robertson et al., 2013)	To explore what New Zealand occupational therapists consider 'evidence' to be and how the search for evidence is accomplished in their practice.	Design: semi-structured interviews Participants: OT Sample: n=14 Country: New Zealand	EBP attitudes/beliefs: evidence viewed as core to practice EBP barriers: published evidence not consistent with parameters of practice, evidence not available or difficult to apply in practice, culture of organisation, cost of obtaining articles for those in private practice, limited access to resources EBP facilitators: access to databases and/or library services, supportive work environment EBP behaviours: colleagues primary source of information, short articles such as abstracts and checklists preferred
(Schreiber, Stern, Marchetti, Provident, & Turocy, 2008a)	To describe the current knowledge, beliefs, attitudes and practices of a group of school-based paediatric physical therapists regarding EBP.	Design: in-depth interviews Participants: PT Sample: n=5 Country: USA	EBP attitudes/beliefs: overall positive EBP barriers: lack of time, lack of confidence with search and appraisal skills, lack of workplace support, decreased access to research databases EBP facilitators: CPD, further academic training, access research evidence summaries EBP behaviours: clinical decisions generally made on past experiences, interaction with colleagues and based on response of the patient
(Shrubsole, Worrall, Power, & O'Connor, 2018)	To explore factors influencing Australian speech pathologists' guideline recommended aphasia management practices.	Design: semi-structured interviews	EBP attitudes/beliefs: beliefs about EBP generally positive

		<p>Participants: SLT</p> <p>Sample: n=20</p> <p>Country: Australia</p>	<p>EBP barriers: lack of time, competing demands, the physical environment making implementation difficult, organisational culture, lack of knowledge</p> <p>EBP facilitators: leadership, expectations of consumers, knowledge</p> <p>EBP behaviours: provide information according to guidelines, collaborate to set goals</p>
(Swedlove, 2010)	To explore occupational therapists' perceptions of the value of research and the elements influencing their perceptions.	<p>Design: semi-structured interviews</p> <p>Participants: OT</p> <p>Sample: n=10</p> <p>Country: Canada</p>	<p>EBP attitudes/beliefs: belief that research provided objectivity and was helpful to decision making</p> <p>EBP barriers: lack of relevant research, lack of funding, lack of access to resources/supports, disconnect between research culture and clinician culture</p> <p>EBP facilitators: a/a</p>
(Udo, Forsman, Jensfelt, & Flink, 2018)	To explored medical social workers' perceptions of EBP.	<p>Design: focus groups</p> <p>Participants: SW</p> <p>Sample: n=27</p> <p>Country: Sweden</p>	<p>EBP attitudes/beliefs: both research and experience valued but some tension / stress related to lack of confidence with RU reported</p> <p>EBP barriers: lack of research, lack of applicability of research, fear of EBP, misfit between EBP and SW, lack of opportunity, lack of managerial support, lack of time</p> <p>EBP facilitators: n/a</p> <p>EBP behaviours: colleagues, intranet and short courses were the main source of new knowledge</p>
(Whiteside, Smith, Gazarek, Bridge, & Shields, 2016)	To explore the individual and organisational enablers of EBP from the perspective of allied health discipline leaders and practitioners.	<p>Design: focus groups</p> <p>Participants: AHP</p> <p>Sample: n=17</p> <p>Country: Australia</p>	EBP facilitators: understanding the concept, adequate knowledge and skills, motivation and passion, supportive organisational culture, supervision / mentorship, university partnerships
(Wilson & Douglas, 2007)	To explore the professional and organisational barriers to developing EBP.	Design: group interview	EBP attitudes/beliefs: overall belief that EBP was important

		Participants: SW Sample: n=28 Country: Ireland	EBP barriers: lack of time, workload pressures, lack of information/knowledge/training, low staffing, lack of management support, lack of access to resources, lack of IT skills EBP facilitators: access to internet, library, relevant journals, presentations, EBP behaviours: majority of participants seldom use EBP in clinical practice
(Wilson, Armoutliev, Yakunina, & Werth Jr, 2009b)	To examine clinical and counselling psychologists' attitudes toward EBPP using grounded theory.	Design: interview Participants: PSY Sample: n=8 Country: USA	EBP attitudes/beliefs: overall positive attitudes but confused about the definition EBP barriers: gap between research and practice EBP facilitators: managed care

AHP = multidisciplinary group of allied health professionals; ART = art therapists; CHIRO = chiropractor; DIET = dietitians / nutritionists; MUSIC = music therapists; OT = occupational therapists; OTH = other allied health professional groups; OPT = optometry; P&O = prosthetists / orthotists; PERF = perfusionists; PT= physiotherapists; POD = podiatrists; PSY = psychologists / neuropsychologists; SLT = speech and language therapists / speech pathologists; SW = social workers

Appendix 4 Quality appraisal of systematic reviews from literature review 1 using AMSTAR

Reference details	Include PICO	Established review methods	Selection of study designs	Literature search strategy	Study selection in duplicate	Data extraction in duplicate	List of excluded studies justified	Included studies described	Sources of funding for studies included	Explained heterogeneity	Conflict of interest	Total Points	Score	Quality
Baatiema 2017	0	1	1	1	1	1	0.5	1	0	0	1	6.5	0.59	Mod-Weak
Bach-Mortensen 2018	0	1	1	1	0	0	0.5	1	0	0	1	5.5	0.50	Weak

Condon 2016	0	1	1	1	1	1	0	1	0	0	0	6	0.55	Mod-Weak
Da Silva 2015	0	1	1	1	0	1	0.5	1	0	1	0	6.5	0.59	Mod-Weak
Hannes 2012	0	1	1	1	0	0	0	1	0	0	0	4	0.36	Weak
Lizarondo 2011	0	1	1	1	1	0	0	1	0	0	1	6	0.55	Mod-Weak
Scurlock-Evans 2015	0	1	1	1	0	0	0	1	0	0	0	4	0.36	Weak
Scurlock-Evans 2014	0	1	1	1	0	0	1	1	0	0	1	6	0.55	Mod-Weak
Upton 2014	0	1	1	1	0	0	0	1	0	0	1	5	0.45	Weak

Appendix 5 Quality appraisal of cross-sectional studies from literature review 1 using Estabrooks' tool

Reference details	Sample					Measurement			Statistical Analysis				Total Points	Score	Quality
	Probabilistic	Representative	Size appropriate for power	Sample drawn > 1 site	Response rate > 50%	DV directly measured	DV reliability	DV validity	Appropriate tests used	p values reported	CI reported	Missing data managed			
Aarons 2006	0	1	1	1	1	0	1	1	1	1	0	1	9	0.69	Mod-Strong
Abrefa-Gyan, 2016	1	2	0	1	0	1	1	1	1	1	0	1	10	0.76	Mod-Strong
Akinbo 2009	0	1	0	1	0	0	0	0	1	1	0	0	6	0.46	Weak
Andrysek 2011	0	2	0	1	0	1	0	0	1	0	0	0	5	0.38	Weak
Arnadottir 2016	0	2	0	1	0	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Baker 2010	1	2	0	1	0	0	0	0	1	0	0	1	6	0.46	Weak
Bauer 2017	0	1	0	1	0	0	0	0	1	0	0	0	3	0.23	Weak
Bennett 2003	1	1	0	1	0	0	0	0	1	0	0	0	4	0.31	Weak
Bernhardsson 2014	0	1	0	0	1	0	1	1	1	0	1	0	6	0.46	Weak
Bridges 2007	1	1	1	1	1	0	0	0	1	1	0	1	8	0.62	Mod-Weak
Brown 2010	0	1	0	1	1	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Byham-Gray 2005	1	1	0	1	1	0	0	0	1	1	0	1	7	0.54	Mod-Weak
Caldwell 2017	0	1	0	0	0	0	0	0	1	1	0	1	4	0.31	Weak
Caldwell 2007	1	1	0	1	0	0	0	0	1	0	0	1	5	0.38	Weak
Cameron 2005	1	1	0	1	0	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Chiu 2012	0	1	0	1	1	0	1	1	0	0	0	1	6	0.46	Weak
Christensen 2012	0	1	0	1	0	0	0	0	1	1	0	1	4	0.31	Weak
Closs 1998	0	1	0	1	1	0	0	1	0	0	0	1	5	0.38	Weak
Connolly 2001	0	0	0	0	0	0	0	0	0	1	0	1	2	0.15	Weak
Cooke 2008	0	1	0	1	0	0	0	0	01	1	0	0	3	0.23	Weak
Dopp 2012	1	1	0	1	1	0	1	0	1	1	0	1	8	0.62	Mod-Weak
Dougherty 2015	0	1	0	1	0	0	0	0	0	0	0	0	2	0.15	Weak
Ekeland 2018	0	1	0	1	0	0	0	0	0	1	0	1	4	0.31	Weak

Fujimoto 2017	1	1	0	1	0	0	0	0	1	1	1	1	7	0.54	Mod-Weak
Graham 2013	0	1	0	1	0	0	1	1	1	0	0	1	6	0.46	Weak
Gray 2013	0	1	0	1	0	0	0	0	1	0	0	1	4	0.31	Weak
Grimmer-Somers 2007	1	1	0	1	1	0	1	1	1	1	1	0	9	0.69	Mod-Strong
Gudjonsdottir 2017	0	1	0	1	0	0	1	1	1	1	0	1	7	0.54	Mod-Weak
Hadley 2008	0	0	0	0	0	0	0	0	0	1	0	0	1	0.08	Weak
Harvey 2013	0	1	0	1	1	0	0	0	1	1	0	1	6	0.46	Weak
Heiwe 2011	0	0	0	0	1	0	1	1	1	1	0	1	6	0.46	Weak
Heiwe 2013	0	0	0	1	1	0	1	1	1	1	0	1	7	0.54	Mod-Weak
Hitch 2016	0	0	0	0	1	0	1	1	1	1	0	1	6	0.46	Weak
Hoffman 2013	0	1	0	1	0	0	0	0	1	0	0	0	3	0.23	Weak
Hu 2013	0	2	1	1	1	0	0	0	1	1	0	1	8	0.62	Mod-Weak
Iles 2006	0	0	0	1	1	0	0	0	1	1	1	1	6	0.46	Weak
Jansen 2012	0	1	0	0	0	0	0	0	1	0	0	1	3	0.23	Weak
Jette 2003	1	1	0	1	0	0	1	1	1	1	1	1	9	0.69	Mod-Strong
Kamwendo 2002	0	1	0	1	1	0	0	1	1	1	0	1	7	0.54	Mod-Weak
Karlsson 2007	0	1	0	1	1	0	0	1	1	1	0	1	7	0.54	Mod-Weak
Korner-Bitensky 2008	0	2	1	1	1	0	1	1	1	1	0	1	10	0.77	Mod-Strong
Lai 2010	0	1	0	1	1	0	0	0	1	1	0	1	6	0.46	Weak
Long 2016	0	1	0	1	0	0	0	0	1	1	0	1	5	0.38	Weak
Lyons 2011	0	1	0	1	0	0	1	1	1	0	0	1	6	0.46	Weak
Lyons 2010	0	1	0	1	0	0	1	1	1	0	0	1	6	0.46	Weak
McCleary 2002	0	0	0	0	0	0	1	1	1	1	0	1	5	0.38	Weak
McCurtin 2015	0	1	0	1	0	0	0	0	1	1	0	1	5	0.38	Weak
McCurtin 2017	0	1	0	1	1	0	0	0	1	1	0	1	6	0.46	Weak
McKenna 2005	1	1	0	1	0	0	1	1	1	0	0	1	7	0.54	Mod-Weak
Metcalfe 2001	0	2	1	1	1	0	1	0	1	1	0	1	9	0.69	Mod-Strong
Morris 2017	0	1	0	1	0	0	0	0	0	0	0	1	3	0.23	Weak
O'Connor 2009	0	1	0	1	0	0	1	1	1	1	0	1	7	0.54	Mod-Weak
Pager 2012	0	0	0	1	1	0	1	1	0	0	0	0	4	0.31	Weak
Pain 2004	1	0	0	1	0	0	1	1	1	1	0	1	7	0.54	Mod-Weak
Parrish 2012	1	1	0	1	0	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Paynter 2015	0	1	0	0	0	0	1	1	1	1	0	1	6	0.46	Weak
Philibert 2003	1	1	0	1	1	0	0	1	0	0	0	1	6	0.46	Weak
Pighills 2013	0	1	0	1	1	0	0	0	1	1	0	0	5	0.38	Weak

Pignotti 2009	1	1	0	1	1	0	0	0	1	0	0	0	5	0.38	Weak
Pollock 2000	0	0	0	0	1	0	0	0	0	1	0	0	2	0.15	Weak
Pope 2011	0	1	0	1	0	0	0	1	1	1	0	0	6	0.46	Weak
Ramirez-Velez 2015	0	1	1	1	1	0	1	1	1	1	1	0	9	0.69	Mod-Strong
Salbach 2009	0	1	0	1	1	0	1	1	1	1	1	0	8	0.62	Mod-Weak
Salbach 2007	0	1	0	1	1	0	1	1	1	1	1	0	8	0.62	Mod-Weak
Salls 2009	0	1	0	1	0	0	0	0	1	0	0	0	3	0.23	Weak
Scholten-Peeters 2013	0	1	0	0	0	0	0	1	1	0	0	0	3	0.23	Weak
Silva 2015	1	1	0	1	1	0	0	0	1	0	0	0	5	0.38	Weak
Stephens 2009	0	0	0	1	1	0	1	1	1	1	0	0	6	0.46	Weak
Suttle 2012	0	1	0	1	0	0	0	0	1	0	0	0	3	0.23	Weak
Tadyanemhandu 2016	1	2	1	1	1	0	0	0	1	1	0	0	8	0.62	Mod-Weak
Taylor, M 1998	0	1	0	1	0	0	0	0	1	1	0	1	5	0.38	Weak
Thomas, A 2014	0	1	0	1	0	0	0	0	1	0	0	0	3	0.23	Weak
Thomas, D 2003	0	1	0	1	1	0	0	0	0	0	0	0	3	0.23	Weak
Thomas, R 2014	0	1	0	1	1	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Tuten 2016	1	1	0	1	0	0	1	1	1	1	1	1	9	0.69	Mod-Strong
Upton, 1999	1	1	0	1	0	0	0	0	1	0	0	1	5	0.38	Weak
Upton 2006	0	1	0	1	1	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Upton 2012	0	1	0	1	0	0	1	1	1	1	0	1	7	0.54	Mod-Weak
Valdes 2012	0	1	0	1	0	0	0	0	1	1	0	1	5	0.38	Weak
Valino-Napoli 2009	0	1	0	1	1	0	0	0	1	0	0	1	5	0.38	Weak
Verloo 2017	0	1	0	1	0	0	1	1	1	1	1	1	8	0.62	Mod-Weak
Vogt 2013	1	1	0	1	0	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Waker 2014	0	1	0	1	0	0	1	1	1	0	1	1	7	0.54	Mod-Weak
Weng 2013	1	1	0	1	1	0	1	1	1	1	1	1	10	0.77	Mod-Strong
Wilkinson 2012	0	1	0	1	1	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Williams 2015	0	1	0	1	0	0	1	1	1	1	0	1	7	0.54	Mod-Weak
Wressle 2015	1	1	0	1	1	0	1	1	1	1	0	1	9	0.69	Mod-Strong
Yahui 2017	0	0	0	1	1	0	0	0	1	1	0	1	5	0.38	Weak
Zipoli 2005	1	1	0	1	0	0	1	1	1	1	0	1	8	0.62	Mod-Weak
Ziviani 2015	0	1	0	1	0	0	1	1	1	1	0	0	6	0.46	Weak

Appendix 6 Quality appraisal of qualitative studies from literature review 1 using CASP

Reference details	Clear aims	Appropriate methodology	Appropriate research design	Appropriate recruitment strategy	Data collection matches research aim	Relationship between researcher and participants	Ethical issues considered	Rigorous data analysis	Clear statement of findings	Value of research to topic	Total Points	Score	Quality
Alnahedh 2015	1	1	1	1	1	1	1	1	1	1	10	1.0	Strong
Barnard 2001	1	1	1	1	1	0	0	1	1	1	8	0.8	Strong
Barrett 2009	0	0	0	0	0	0	0	0	1	0	1	0.1	Weak
Bennett 2016	1	1	1	1	1	1	1	1	1	1	10	1.0	Strong
Bohannon 1990	1	1	1	0	0	0	0	0	0	0	3	0.3	Weak
Bowman 2006	1	1	0	0	0	0	1	1	1	1	6	0.6	Mod-Weak
Copley 2009	1	1	1	0	1	0	1	1	1	1	8	0.8	Strong
Curtin 2001	1	0	1	0	0	0	1	1	1	0	5	0.5	Weak
Dannapfel 2014	1	1	1	1	1	0	1	1	1	1	9	0.9	Strong
Dubouloz 1999	1	1	1	1	1	0	1	1	1	1	9	0.9	Strong
Finch 2015	1	1	1	1	1	0	1	1	0	0	7	0.7	Mod-Strong
Foster 2015	1	1	1	1	1	0	1	1	1	1	9	0.9	Strong
Fristedt 2016	1	1	1	0	0	1	0	0	1	0	5	0.5	Weak
Janssen 2016	1	1	1	1	0	0	1	0	1	0	6	0.6	Mod-Weak
Karin 2009	1	1	1	1	1	1	0	1	1	1	9	0.9	Strong
Kristensen 2012	1	1	1	0	1	0	1	1	1	1	8	0.8	Strong
McCluskey 2013	1	1	1	1	1	1	1	1	1	1	10	1.0	Strong
McDermott 2017	1	1	1	1	1	0	1	1	1	1	9	0.9	Strong
Miao 2015	1	1	1	1	1	0	1	1	1	1	9	0.9	Strong
Mosson 2017	1	0	0	0	0	0	1	0	1	0	3	0.3	Weak

Patel 2017	1	0	0	0	0	0	0	1	1	0	3	0.3	Weak
Pitout 2014	1	1	1	1	1	0	1	0	1	0	7	0.7	Mod-Strong
Pollock 2000	1	0	0	0	0	0	0	0	1	0	2	0.2	Weak
Robertson 2013	1	1	1	1	0	1	0	0	1	1	7	0.7	Mod-Strong
Schreiber 2008	1	1	0	0	0	0	0	0	0	0	2	0.2	Weak
Shrubsole 2018	1	1	1	1	1	0	1	1	1	1	9	0.9	Strong
Swedlove 2010	1	1	1	0	1	0	1	1	0	0	6	0.6	Mod-Weak
Udo 2018	1	1	1	1	1	0	1	0	1	1	8	0.8	Strong
Whiteside 2016	1	1	1	0	0	0	1	0	0	0	4	0.4	Weak
Wilson 2007	1	0	0	0	0	0	0	0	1	0	2	0.2	Weak
Wilson 2009	1	1	1	0	0	0	0	0	1	0	4	0.4	Weak

Appendix 7 Summary of quantitative studies included in literature review 2

Reference	Objective(s)	Design	Population	Intervention / Control	Outcome Measures	Results
Baker et al., 2015	To determine whether tailored intervention strategies are effective in improving practice and healthcare outcomes.	Systematic review	MDT N=32 studies	EXP tailored interventions CON no intervention or intentions not tailored to the determinants	Outcome measured was implementation of recommended practice.	Tailored interventions can be effective but results are variable and tend to be small to moderate.
(Campbell, Novak, McIntyre, & Lord, 2013)	To evaluate the effectiveness of a multifaceted KT intervention for improving EBP behaviour of AHPs	Cluster randomised trial	AHP EXP=73 CON: =62 Australia	EXP group: 3-day skills training workshop on EBP skills such as utilising an evidence alert system; mentoring; policy changes including paid EBP time and compulsory use of outcome measures CON group: 3-day skills training workshop on communication & work place supports such as mentoring and paid communication time	EBP attitudes/beliefs: self and peer rated using EBPAS EBP knowledge/skills: measured using exams EBP behaviours: self and peer rated using GAS and measuring hits on an evidence based alert system Collected at baseline & 8 weeks post intervention	EBP attitudes/beliefs: no change EBP knowledge: increase in EXP group EBP behaviours: no change
(Cheng, 2003)	To evaluate the effectiveness of a 3-hour education workshop on clinical question formulation, information-seeking skills, knowledge, attitudes and search outcomes.	Randomised trial	MDT EXP=400 CON=400 Hong Kong	EXP group: 3-hour face to face workshop including learning how to formulate a research question and search databases; workplace support; optional librarian assistance CON group: waitlisted	EBP attitudes/beliefs: n/a EBP knowledge/skills: survey and library usage statistics EBP behaviours: self-reported measure of information sources Collected post intervention and after 3 months	EBP skills: change in question formulation & effective database searching

(Dizon, Grimmer-Somers, & Kumar, 2014)	To evaluate the effectiveness of a contextualized EBP training program in improving knowledge, skills, attitudes and behaviour of Filipino physical therapists	Randomised trial	PT EXP=27 CON=27 Philippines	EXP group: 1-day face to face training including lectures and practical sessions on EBP topics such as drafting clinical questions, critically appraising the evidence and answering clinical questions from the evidence found. Additional supports include access to EBP printed materials and online EBP support. CON group: waitlisted	EBP attitudes/beliefs: validated survey EBP knowledge/skills: adapted Fresno test EBP behaviours: activity diaries Collected pre, post and 3 months after training	EBP attitudes/beliefs: no change EBP knowledge/skills: changes in all areas except sources of information for making clinical decisions. Maintained at 3 months EBP behaviours: changes including formulating PICO questions and then appraising and applying the evidence
(Fruth et al., 2010)	To determine whether evidence based presentations influence clinicians' beliefs and practices related to EBP	Single group pre-post study	PT N=24 USA	Intervention: 1-hr face-to-face session where PT students presented an evidence based review on a clinical topic selected by site participants. Information included methods of literature search and critical analysis. Participants were provided with written handouts	EBP attitudes/beliefs: measured using non-validated surveys EBP behaviours: a/a Collected pre, 1-week post and 3-months after	EBP attitudes/beliefs: change in interest in EBP EBP barriers: lack of equipment, lack of support, lack of generalisability of evidence to patient(s) EBP behaviours: evidence integrated into practice & sustained by 68%
(Gosling & Westbrook, 2004a)	To measure the impact of a state health department policy to provide allied health professional staff with access to a point-of-care 24h online evidence system.	Evaluation	AHP N=790 Australia	Implementation of the Clinical Information Access Program (CIAP) – an online, web-based evidence retrieval system. Promotion of CIAP and training were included in the implementation strategy.	EBP attitudes/beliefs: measure perceived usefulness of CIAP a survey EBP knowledge/skills: measure awareness of CIAP using a survey	EBP attitudes/beliefs: 63% agreed CIAP was important EBP knowledge/skills: 82% aware of CIAP but

					EBP behaviours: measured using a survey: Collected 4 years following implementation of CIAP	differences across professional groups EBP behaviours: 76% used CIAP 28% used it at least once a week EBP barriers: access to computers; lack of training; lack of time
(Lizarondo, Grimmer- Somers, Kumar, & Crockett, 2012)	To examine the impact of a structured model of journal club, known as iCAHE JC, on the EBP knowledge, skills and behaviour of the different allied health disciplines	Single group pre-post intervention study	AHP N=93 Australia	Experimental group: 6 monthly journal club sessions using the iCAHE model No control	EBP attitudes/beliefs: measured using a validated survey EBP knowledge/skills: measured using the adapted Fresno test EBP behaviours: measured using a validated survey Collected prior to implementation of journal club and 6 months later	EBP attitudes/beliefs: only PT changed EBP knowledge/skills: change in knowledge for all disciplines EBP behaviours: change EBP uptake for PT, SW & DIET
(McCluskey & Lovarini, 2005)	To evaluate the effect of a multifaceted intervention on EBP knowledge, skills, attitudes and behaviours of OTs	Single group pre-post intervention study	OT N=106 Australia	Experimental group: 2-day workshop on EBP including writing clinical questions, searching electronic databases, critically appraising research, interpreting statistics and overcoming barriers to EBP. Participants developed learning contracts to facilitate post-workshop development and were provided outreach support via e-mail, telephone and/or workplace visit	EBP attitudes/ beliefs: measured using non- validated survey EBP knowledge/skills: measuring using the adapted Fresno test EBP behaviours: measured using activity diary	EBP attitudes/beliefs: EBP knowledge/skills: increase in knowledge of how to complete critical appraisals – maintained at 8 months EBP barriers: decrease in participants reporting their searching and

				No control group	Collected pre, immediately after and 8 months post workshop	appraisal skills were a barrier to EBP EBP behaviours; decrease in number of participants engaged in searching; research utilisation remained low
(McKenna, Bennett, Dierselhuis, Hoffman, Tooth & McCluskey, 2005)	To explore Australian occupational therapists' use and perceptions of OTseeker and its impact on their knowledge and practice.	Evaluation	OT N=213 Australia	Implementation of OTseeker – an online evidence retrieval system which provides information on the validity of interventions and trials. - No control group	EBP knowledge/skills: measured using a non-validated survey EBP behaviours: a/a Collected 2 years following launch of OTSeeker	EBP knowledge/skills: 86% had heard of OTseeker; 63% reported it increased their knowledge; EBP behaviours: 56% had accessed OTseeker; use of journals to guide clinical decisions increased to first rank; 14% reported it changed their practice EBP barriers: no relevant evidence, barriers in work environment or policies
(Morténus, Marklund, Palm, Fridlund, & Baigi, 2012)	To determine the utilisation, knowledge and interest in research and development among primary care staff by means of a strategic communication process.	Evaluation	MDT N=846 Sweden	Implementation of a strategic communication process including seminars, research days, research bullets and a research webpage. No control group	EBP attitudes/beliefs: measured using a validated survey EBP knowledge/skills: a/a EBP behaviours: a/a Collected 7 years following implementation	EBP attitudes/beliefs: 60% interested in research; EBP knowledge/skills: 97% utilised the internal channels for information EBP barriers: not relevant, low priority, not important

(Novak & McIntyre, 2010)	To evaluate the effects of a 1-day workshop with workplace supports on allied health professionals' EBP knowledge and behaviours.	Single group pre-post study	AHP N=88 Australia	1-day EBP workshop, individual coaching and workplace supports including management engagement, provision of tools and addition of EBP performance indicators to role descriptions. No control group	EBP knowledge/skills: measured using the adapted Fresno test EBP behaviours: measured using counts of critical appraisal topic presentations, number of peer-reviewed conference presentations Collected at baseline and post intervention	EBP knowledge/ skills: improved ($p<0.0001$) EBP behaviours: increased conference presentations and CATs produced ($p<0.0001$)
(Parrish & Rubin, 2011)	To evaluate the impact of a 1-day continuing education training program on the EBP process with community practitioners	Single group pre-post study	SW N=69 USA	Intervention: 7hr face to face workshop utilising local opinion leaders. Format consistent of large group discussion, lectures and practicing the steps of EBP in small groups	EBP attitudes/beliefs: measured using EBPAS EBP knowledge/skills: a/a EBP behaviours: a/a Collected pre, immediately post and at 3 months	EBP attitudes/beliefs: improvement immediately following intervention but not at 3 months EBP knowledge/skills: improvement post intervention but decreased at 3 months EBP behaviours: improvement in intentions maintained at 3 months
(Russell et al., 2010)	To evaluate the impact of a multifaceted KT intervention to facilitate the use in clinical practice of evidence based measurement tools	Single group pre-post study	PT N=122 Canada	Intervention was based on a knowledge broker model embedded within the clinical context for a 6-month period. The model focused on knowledge uptake specifically related to evidence based outcome measures	EBP skills / knowledge / behaviours: measured using a validated survey Collected pre, immediately post and at 12 and 18 months	EBP knowledge/skills: increase in familiarity of evidence based outcome measurement tools EBP behaviours: increased use of 3 of outcome measurement

						tools. Changes sustained at 12 months
(Schreiber, Stern, Marchetti, & Provident, 2009)	To identify, implement and evaluate the effectiveness of strategies aimed at enhancing the ability of paediatric physical therapists to integrate scientific research evidence into clinical decision making	Formative evaluation	PTs N=5 USA	Intervention consisted of a 4-hour EBP workshop, enhanced practice web site resources and an online EBP exercise	EBP attitudes / beliefs / knowledge / skills / behaviours: measured using a validated survey, goal attainment scale and group interviews Collected at conclusion of the intervention	EBP attitudes/beliefs: improvement EBP knowledge/skills: EBP behaviours: increase in reading literature and using it for decision making EBP barriers: no change in perception of barriers to EBP such as lack of time and support
(Stevenson, Lewis, & Hay, 2004)	To investigate physiotherapists' attitudes towards EBP and evaluate if they change following an education package utilizing local opinion leaders	Randomised trial	PT EXP=17 CON=13 UK	EXP group: workshop with opinion leaders focusing on critical appraisal skills and literature searching skills CON group: standard in-service training package	EBP attitudes/beliefs: measured using validated survey Collected pre, and repeated at 3 and 6 months post workshop	EBP attitudes/beliefs: minimal improvement in preference of training programmes for EBP and increased support from management to undertake EBP
(Taylor, Reeves, Ewings, & Taylor, 2004)	To evaluate the effectiveness and cost of a critical appraisal skills educational intervention aimed at health care professionals	Randomised trial	MDT EXP=73 CON=72 UK	EXP group: ½ day workshop on critical appraisal skills including examining studies for rigour and validity. Participants practice skills during the workshop and receive follow up materials following the intervention Control group: Waiting list	EBP attitudes / beliefs / knowledge / skills / behaviours: measured using a validated survey Secondary measure(s): cost of the intervention Collected six months after the workshop	EBP attitudes/beliefs: no change EBP knowledge: improved EBP behaviours: no change cost calculated to be £250 per participant
(Villanueva, Burrows, Fennessy, Rajendran, &	To determine whether adding simple instructions and examples on clinical question formulation would	Randomised trial	MDT EXP=17	EXP group: revised form for submitting clinical questions which included an	EBP knowledge/skills: number of questions in PICO format	EBP knowledge/skills: improvement in explicit description of patients,

Anderson, 2001)	increase the specificity of the question		CON=22 Australia	explanation on the importance of proper formulation Control group: received original form with no additional information	Collected at baseline and post intervention	comparisons and outcomes
(Wilkinson, Hills, Street, & Hinchliffe, 2016)	To measure the effect of training and organisational change on EBP measures amongst allied health professionals.	Single group pre-post study	AHP N=139 No control Australia	Implementation of organisation wide changes including research symposia, EBP champions, EBP research governance structure, active tutorial sessions	EBP knowledge / skills / behaviour: measured using a valid survey tool Collected pre, 1 year post and 4 years post	EBP skills/knowledge: increase in self-efficacy for all professions, EBP behaviours: no change in EBP use

AHP = multidisciplinary group of allied health professionals; ART = art therapists; CHIRO = chiropractor; CON = control group; DIET = dietitians / nutritionists; EXP = experimental group; MDT = multidisciplinary team including nursing and/or medicine; MUSIC = music therapists; OT = occupational therapists; OTH = other allied health professional groups; OPT = optometry; P&O = prosthetists / orthotists; PERF = perfusionists; PT= physiotherapists; POD = podiatrists; PSY = psychologists / neuropsychologists; SLT = speech and language therapists / speech pathologists; SW = social workers

Appendix 8 Summary of qualitative studies included in literature review 2

Reference	Objective(s)	Design	Population	Intervention / Control	Results
(Bayley et al., 2012)	To describe the barriers to implementation of evidence based recommendations for stroke rehabilitation	Focus Groups	MDT N=79 Canada	Local facilitators identified and upskilled with knowledge and skills to promote implementation of the stroke guidelines recommendations.	EBP barriers: lack of time; inadequate staffing; lack of training; mistrust of the evidence; lack of equipment; lack of team approach
(Bennett et al., 2016)	To explore the perceptions of occupational therapy staff regarding the influence of organisational initiatives to support EBP on workplace culture and clinical practice.	Semi-structured interviews	OT N=30 Australia	Implementation of the Research and Evidence in Practice (REP) model including EBP coordinator, REP champions, journal club, research fellow, research leaders, library access, mentoring, training, communication strategy and mentoring	EBP attitudes/beliefs: pride in engaging in research, greater confidence in research skills EBP barriers: increased pressure added to demands of workloads, lack of time, competing demands EBP facilitators: organisational culture values research, leadership supporting EBP EBP behaviours: improved use of evidence based assessments and treatments
(Munce et al., 2017)	To understand the factors influencing the implementation of recommended treatments and KT interventions from the perspective nurses, occupational therapists and physical therapists.	Focus groups	MDT N=33 Canada	Implementation of either a passive or active KT intervention. Active sites received funding for 2 facilitators over 16 months, training and protocols. Passive sites only received guidelines and a handbook.	EBP barriers: lack of facilitation, lack of agreement or familiarity with intervention, environmental factors including space, equipment, organisation constraints, time and staffing. Barriers apparent at both passive and active KT sites EBP facilitators: facilitation, agreement and familiarity with the intervention, team communication and collaboration
(Welch & Dawson, 2006)	To investigate if practice based collaborative learning is a catalyst to increase therapist's competence and confidence in consuming research.	Semi-structured interviews	AHP N=6 UK	Implementation of collaborative learning groups including written information, group learning, buddy support system and monthly meetings.	EBP attitudes/beliefs: change in perception that research was separate to clinical practice EBP knowledge/skills: increased confidence in consuming research

					EBP behaviours: incorporation of evidence into practice
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AHP = multidisciplinary group of allied health professionals; ART = art therapists; CHIRO = chiropractor; CON = control group; DIET = dietitians / nutritionists; EXP = experimental group; MDT = multidisciplinary team including nursing and/or medicine; MUSIC = music therapists; OT = occupational therapists; OTH = other allied health professional groups; OPT = optometry; P&O = prosthetists / orthotists; PERF = perfusionists; PT= physiotherapists; POD = podiatrists; PSY = psychologists / neuropsychologists; SLT = speech and language therapists / speech pathologists; SW = social workers

Appendix 9 Quality appraisal of systematic reviews from literature review 2 using AMSTAR

Reference details	Include PICO	Established review methods	Selection of study designs	Literature search strategy	Study selection in duplicate	Data extraction in duplicate	List of excluded studies justified	Included studies described	Sources of funding for studies included	Explained heterogeneity	Conflict of interest	Total Points	Score	Quality
Baatiema 2017	0	1	1	1	1	1	1	1	1	1	1	10	0.91	Strong

Quality key: weak <0.50, moderate-weak 0.51-0.65, moderate-strong 0.66-0.79 or strong 0.80-1.0

Appendix 10 Quality appraisal of randomised trials from literature review 2 using PEDro

Reference details	Eligibility criteria specific	Random allocation of subjects	Allocation concealed	Groups matched at baseline	Blinding of all subjects	Blinding of all assessors measuring outcome(s)	Measures obtained from min 85% of subjects	All subjects received treatment or control or intention to treat	Results of between group statistical comparisons reported	Point measures and measured of variability provided	Total Points	Score	Quality
Campbell 2013	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8	0.8	Strong
Cheng 2003	Y	Y	N	N	Y	Y	N	Y	Y	Y	7	0.7	Mod-Strong
Dizon 2014	Y	Y	Y	Y	N	Y	N	Y	Y	Y	8	0.8	Strong
Stevenson 2004	Y	Y	N	Y	Y	N	Y	Y	Y	N	7	0.7	Mod-Strong
Taylor 2004	Y	Y	Y	Y	N	Y	N	Y	Y	Y	8	0.8	Strong
Villanueva 2001	Y	Y	Y	Y	Y	Y	N	N	Y	N	7	0.7	Mod-Strong

Quality key: weak <0.50, moderate-weak 0.51-0.65, moderate-strong 0.66-0.79 or strong 0.80-1.0

Appendix 11 Quality appraisal of non-randomised studies from literature review 2 using Estabrooks' Tool

Reference details	Sample					Measurement			Statistical Analysis				Total Points	Score	Quality
	Probabilistic	Representative	Size appropriate for power	Sample drawn > 1 site	Response rate > 50%	DV directly measured	DV reliability	DV validity	Appropriate tests used	p values reported	CI reported	Missing data managed			
Fruth 2010	0	1	0	1	1	0	1	1	0	0	0	1	6	0.50	Weak
Gosling 2004	0	1	1	1	1	0	0	0	1	1	0	1	7	0.58	Mod-Weak
Lizarondo 2012	0	1	0	1	0	0	1	1	1	1	1	1	8	0.67	Mod-Strong
McCluskey 2005	0	0	0	1	0	0	1	1	1	1	0	1	6	0.50	Weak
McKenna 2005	1	1	0	1	0	0	0	0	1	0	0	1	5	0.42	Weak
Mortenijs 2012	0	1	0	0	1	0	1	0	1	1	0	0	5	0.42	Weak
Novak 2010	0	1	0	0	1	0	1	1	1	1	1	1	8	0.67	Mod-Strong
Parrish 2011	0	1	0	1	0	0	1	1	1	1	0	1	7	0.58	Mod-Weak
Russell 2010	0	1	0	1	0	0	0	0	1	1	1	0	5	0.42	Weak
Schreiber 2009	0	0	0	0	0	0	1	1	0	0	0	1	3	0.25	Weak
Wilkinson	0	1	0	0	1	0	1	1	1	1	0	0	6	0.50	Weak

Quality key: weak <0.50, moderate-weak 0.51-0.65, moderate-strong 0.66-0.79 or strong 0.80-1.0

Appendix 12 Quality appraisal of qualitative studies from literature review 2 using CASP

Reference details	Clear aims	Appropriate methodology	Appropriate research design	Appropriate recruitment strategy	Data collection matches research aim	Relationship between researcher and participants	Ethical issues considered	Rigorous data analysis	Clear statement of findings	Value of research to topic	Total Points	Score	Quality
Bayley 2012	1	1	1	1	1	1	1	0	1	1	9	0.90	Strong
Bennett 2016	1	1	1	1	1	1	1	0	1	1	9	0.90	Strong
Munce 2017	1	1	1	1	1	0	1	1	1	1	9	0.90	Strong
Welch 2006	1	0	0	1	0	1	1	1	0	0	5	0.50	Weak

Quality key: weak <0.50, moderate-weak 0.51-0.65, moderate-strong 0.66-0.79 or strong 0.80-1.0

1. Demographics

4. What is your main work area?

- ☐ Acute care ward
- ☐ Sub-acute (rehabilitation) care ward
- ☐ Sub-acute (aged care) ward
- ☐ Outpatient department based in a hospital
- ☐ Other (please specify)

- ☐ Community rehabilitation
- ☐ Domicillary
- ☐ Community health / multipurpose centre outpatient clinic

5. Where is your main work location?

- ☐ Royal Hobart Hospital
- ☐ Other (please specify)
- ☐ Repatriation Centre / Karingal

6. How many departmental or program/service managers do you directly report to?

- ☐ 1
- ☐ 2
- ☐ 3

7. What is your main employment status?

- ☐ Permanent Full-time
- ☐ Temporary Full-time
- ☐ Casual Full-time
- ☐ Permanent Part-time
- ☐ Temporary Part-time
- ☐ Casual Part-time

8. How many years have you worked clinically in your profession since graduation?

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5-10

☐ 10-15

☐ 15-20

☐ >20

9. What is the highest grade you that you are currently working in?

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ Other (please specify)

10. In what year did you graduate from your entry level health professional degree?

☐ 2009

☐ 2008

☐ 2007

☐ 2006

☐ 2005

☐ 2000-2004

☐ 1995-1999

☐ 1990-1994

☐ Before 1990

11. What is the highest level of qualification that you have attained?

- ☐ Bachelor's degree
- ☐ Bachelor's degree with honours
- ☐ Graduate certificate
- ☐ Graduate diploma
- ☐ Post-graduate diploma
- ☐ Masters degree
- ☐ PhD

12. Are you currently enrolled in a higher qualification course?

- ☐ No
- ☐ Yes. Please specify:

13. In what year did you graduate from your most recent qualification?

- | | | |
|----------------------------|---------------------------------|-----------------------------------|
| <input type="radio"/> 2009 | <input type="radio"/> 2005 | <input type="radio"/> 1985-1989 |
| <input type="radio"/> 2008 | <input type="radio"/> 2000-2004 | <input type="radio"/> 1980-1984 |
| <input type="radio"/> 2007 | <input type="radio"/> 1995-1999 | <input type="radio"/> Before 1980 |
| <input type="radio"/> 2006 | <input type="radio"/> 1990-1994 | |

2. Please indicate how much you agree or disagree with the following statement...

1. In making clinical decisions, clinical experience is more important than scientific studies.

☐ 1 Strongly Agree ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 Strongly Disagree

2. In making clinical decisions, seeking evidence from scientific studies is important.

☐ 1 Strongly Agree ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 Strongly Disagree

3. In making clinical decisions, assessing the quality of the research evidence is important.

☐ 1 Strongly Agree ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 Strongly Disagree

4. Clinical experience is the most reliable way to know what is effective.

☐ 1 Strongly Agree ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 Strongly Disagree

5. Patient care should be based, where possible, on scientific studies rather than the opinions of respected practitioners.

☐ 1 Strongly Agree ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 Strongly Disagree

6. Critical appraisal of the literature is not very practical in real-life day-to-day patient care.

☐ 1 Strongly Agree ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 Strongly Disagree

3. For the following items, place a mark in the appropriate box that indicates...

1. Application of EBP principles are necessary for the practice of my profession today.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

2. Literature and research findings are useful in my day-to-day practice.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

3. I need to increase the use of evidence in my daily practice.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

4. Incorporating EBP activities into day-to-day practice places an unreasonable demand on people working in my profession.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

5. I am interested in learning or improving the skills necessary so that I can incorporate research evidence into my clinical decision making.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

6. Adoption of EBP activities into day-to-day practice improves the quality of patient care.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

7. There is a definite divide between research and practice in my profession.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

8. Allied health professionals should conduct their own literature reviews to answer their clinical questions.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

9. Allied health professionals should be responsible for critically evaluating the quality of the literature to address their clinical questions.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

10. Allied health professionals should be responsible for interpreting whether research findings apply to their individual patients.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

4. Confidence to conduct Evidence Based Practice

For each of the following activities, please indicate how confident you are in your current level of ability by choosing the corresponding number on the scale.

1. Identify clinical problems following a patient assessment.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☐ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☐ 70%

☐ 80%

☐ 90%

☐ 100%
Certain can do

2. Formulate a question based on the clinical problem to guide a literature search.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☐ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☐ 70%

☐ 80%

☐ 90%

☐ 100%
Certain can do

3. Effectively search the relevant literature to address the question.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☐ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☐ 70%

☐ 80%

☐ 90%

☐ 100%
Certain can do

4. Critically appraise the literature for reliability and relevance.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☐ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☐ 70%

☐ 80%

☐ 90%

☐ 100%
Certain can do

5. Critically appraise the reliability and validity of outcome measures.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☒ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☐ 70%

☐ 80%

☐ 90%

☐ 100%
Certain can do

6. Identify the strengths and weaknesses of different study designs.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☒ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☐ 70%

☐ 80%

☐ 90%

☐ 100%
Certain can do

7. Interpret results of statistical procedures such as t tests, correlations and chi-square tests.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☒ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☐ 70%

☒ 80%

☐ 90%

☐ 100%
Certain can do

8. Interpret results of statistical procedures such as linear or logistic regression.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☒ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☒ 70%

☐ 80%

☐ 90%

☐ 100%
Certain can do

9. Appropriately apply evidence from the literature to the individual patient.

☐ 0%
Cannot do at all

☐ 10%

☐ 20%

☒ 30%

☐ 40%

☐ 50%
Moderately certain can do

☐ 60%

☐ 70%

☒ 80%

☐ 90%

☐ 100%
Certain can do

10. Understand your patient's needs and treatment preferences.

☐ 0% Cannot do at all ☐ 10% ☐ 20% ☐ 30% ☐ 40% ☒ 50% Moderately certain can do ☐ 60% ☐ 70% ☐ 80% ☐ 90% ☐ 100% Certain can do

11. Decide on an appropriate course of action in collaboration with the patient.

☐ 0% Cannot do at all ☐ 10% ☐ 20% ☐ 30% ☐ 40% ☒ 50% Moderately certain can do ☐ 60% ☐ 70% ☐ 80% ☐ 90% ☐ 100% Certain can do

12. Continually evaluate the effect of your practice.

☐ 0% Cannot do at all ☐ 10% ☐ 20% ☒ 30% ☐ 40% ☒ 50% Moderately certain can do ☐ 60% ☐ 70% ☐ 80% ☐ 90% ☐ 100% Certain can do

1. My own clinical experience.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

2. Opinions of colleagues.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

3. Expert consultation.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

4. Employer sponsored continuing education seminars or inservices.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

5. Clinical practice guidelines.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

6. Continuing education outside my place of employment.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

7. Textbooks.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

8. Videos, dvds, audiotapes, cds, podcasts.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

9. Case studies.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

10. Internet resources (excluding previously mentioned sources of information or journal articles found via the internet).

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

11. Research studies (in general).

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never

12. Meta-analysis of randomized controlled trials.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Not sure

13. Results from a randomized controlled trial.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Not sure

14. Results of a controlled study without randomization.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Not sure

15. Results of a quasi-experimental study.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Not sure

16. Results from a single-subject design study.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Not sure

17. Results from studies investigating reliability or validity of a measurement instrument / approach.

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Not sure

18. Results from an economic evaluation (eg. cost-effectiveness study).

☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Not sure

19. Other sources of information (please specify).

20. Do you have any further comments regarding sources of information for clinical decision making? Please specify.

6. In the past 6 months I have been involved in:

1. Reviewing literature individually for my own clinical practice.

- ☐ Yes
☐ No

2. Reviewing literature as a part of a group for practice as a group/department.

- ☐ Yes
☐ No

3. Collecting information for a quality assurance project.

- ☐ Yes
☐ No

4. Collecting information for a clinical practice protocol/guideline.

- ☐ Yes
☐ No

5. Collecting information for a research project.

- ☐ Yes
☐ No

6. Leading a quality assurance project.

☐ Yes

☐ No

7. Leading a clinical practice protocol/guideline project.

☐ Yes

☐ No

8. Leading a research project.

☐ Yes

☐ No

9. Preparing a conference presentation (poster or podium).

☐ Yes

☐ No

10. Writing a manuscript for a journal.

☐ Yes

☐ No

11. In the past 6 months have you been involved in any other EBP activities? Please specify.

7. Details for voucher draw

Thank you for completing this survey. To go into the draw to win your choice of a \$100 Myer/Bunnings/Movie Voucher send an email with the code below as the subject to: eva.pausenberger@southernhealth.org.au from your Royal Hobart email address.

T%rh*ng

Please remember to click "DONE" to ensure your responses are submitted.

Appendix 14 Questions to guide focus group discussion

Theory of planned behaviour construct	Questions
Background factors	<p>Where do you work?</p> <p>What other health professionals do you work with?</p> <p>How long have you been working clinically?</p> <p>Do you have any postgraduate training?</p>
Attitudes	<p>What does EBP mean to you?</p> <p>How do you feel about EBP?</p> <p>Tell me about the good things about EBP.</p> <p>Tell me about the bad things about EBP.</p>
Norms	<p>Why do you think EBP is or isn't important?</p> <p>Do you think you should be doing EBP? Why or why not?</p>
Perceived behavioural control	<p>What would make it easier for you to do EBP?</p> <p>What makes it harder to do EBP?</p>
Additional issues	<p>Is there anything else you would like to say about EBP?</p>



MONASH University
Medicine, Nursing and Health Sciences

Southern Health

Participant Information and Consent Form
Health Professional Participants - Southern Health

Full Project Title: Enhancing the uptake of evidence-based practice with allied health professionals.

Principal Researchers: Dr Terry Haines, Dr Ted Brown, Dr Peter New, Prof Barbara Workman, Mr Ralph Hampson, Dr Teresa Iacono, Prof Jenny Keating, A/Prof Fiona McDermott, Ms Marlena Klačić

1. Introduction

You are invited to take part in this research project because you are an allied health professional who has volunteered to take part in the "Clinical Reference Groups" for this project. This is because we are interested in your current attitudes towards evidence-based practice (EBP) as a part of your clinical practice as an allied health professional. This component of the research project aims to explore and contrast the different attitudes to and experiences of EBP by different allied health professionals.

This Participant Information and Consent Form tells you about the research project. It explains what is involved to help you decide if you want to take part.

Please read this information carefully. Ask questions about anything that you don't understand or want to know more about. Before deciding whether or not to take part, you might want to talk about it with a relative, friend or your local health worker.

Participation in this research is voluntary. If you don't wish to take part, you don't have to.

If you decide you want to take part in the research project, you may be asked to sign the consent section. By signing it you are telling us that you:

- understand what you have read;
- consent to take part in the research project;
- consent to be involved in the procedures described;
- consent to the use of your personal and health information as described.

You will be given a copy of this Participant Information and Consent Form to keep.

2. What is the purpose of this research project?

This project seeks to facilitate the implementation of a tailored intervention to enhance the uptake of EBP amongst allied health professionals. To do this successfully, we need to better understand the experiences of allied health professionals in engaging in EBP activities so that factors that make it more or less difficult can be addressed. We anticipate that approximately 70 allied health professionals will be taking part in this component of the project. There will be up to 14 different clinical reference groups like this one taking part in the project encompassing different professional groups and different health care settings (eg3. Inpatient

wards and community rehabilitation centres). Each clinical reference group will have approximately 8 participants.

Marlena Klaic will use the results of this study as a part of a PhD research degree.

3. What does participation in this research project involve?

Participation in this phase of the study will entail participation in group discussions at the clinical reference group meetings. There are three scheduled clinical reference group meetings for this project.

• Procedures

Each clinical reference group meeting will be tape recorded and what was spoken will later be written down and analysed. There will be a facilitator at each meeting who will lead the group discussions. The discussions will focus on use of outcome measures by allied health professionals. Each clinical reference group meeting will last for approximately 1 hour. The clinical reference group meetings will be held at Southern Health facilities. The exact venue will be determined by who the participants in the clinical reference group are and where they normally work within Southern Health such that travel time can be minimised. Members of clinical reference groups will each receive an edited summary of the meeting's discussions in the form of meeting minutes.

There will be no reimbursement for participation in this component of the project.

4. What are the possible benefits?

None applicable.

5. What are the possible risks?

The likelihood of physical or psychological harm from participation in this study is low.

6. Do I have to take part in this research project?

Participation in any research project is voluntary. If you do not wish to take part, you do not have to. If you decide to take part and later change your mind, you are free to withdraw from the project at a later stage.

If you do consent to participate, you may only withdraw prior to the focus group / clinical reference group beginning.

Your decision whether to take part or not, or to take part and then withdraw, will not affect your relationship with the researchers or Southern Health or Monash University.

7. How will I be informed of the final results of this research project?

Summaries of clinical reference group findings will be disseminated to clinical reference group members via their Southern Health e-mail on an ongoing basis during the study period. It is anticipated that all clinical reference group meetings will be concluded over a 6 month period.

8. What will happen to information about me?

The information collected during the clinical reference group meetings will be stored for a period of 7 years following publication of results. After this time the electronic transcripts of the meetings will be deleted and audio-tapes destroyed. The data will be individually

identifiable, will be stored as a password-protected file on the hard drive of the computer (electronic transcripts) or in a locked filing cabinet (audio-tapes) of one of the investigators (TH) located at the Allied Health Clinical Research Unit at the Kingston Centre. Project investigators will have access to this data. This data will be used for the current project. Data for this component of the project will not be used for establishment of a databank.

Any information obtained in connection with this research project that can identify you will remain confidential and will only be used for the purpose of this research project. It will only be disclosed with your permission, except as required by law.

In any publication and/or presentation, information will be provided in such a way that you or any other members of the clinical reference group cannot be identified.

9. Can I access research information kept about me?

In accordance with relevant Australian and/or Victorian privacy and other relevant laws, you have the right to access the information collected and stored by the researchers about you. Please contact one of the researchers named at the end of this document if you would like to access your information.

In addition, in accordance with regulatory guidelines, the information collected in this research project will be kept for at least 7 years.

10. Is this research project approved?

The ethical aspects of this research project have been approved by the Human Research mark Committee of Southern Health and Monash University.

This project will be carried out according to the National Statement on Ethical Conduct in Human Research (2007) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

11. Who can I contact?

The person you may need to contact will depend on the nature of your query. Therefore, please note the following:

For further information or appointments:

If you want any further information concerning this project or if you have any problems which may be related to your involvement in the project (for example, feelings of distress), you can contact the principal researcher (Dr Terry Haines) on [REDACTED]

For complaints:

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about being a research participant in general, then you may contact:

Name: Ms Malar Thiagarajan

Position: Director, Research Services

Telephone: [REDACTED]

12. Consent

I have read, or have had this document read to me in a language that I understand, and I understand the purposes, procedures and risks of this research project as described within it.

I have had an opportunity to ask questions and I am satisfied with the answers I have received.

I freely agree to participate in this research project, as described.

I understand that I will be given a signed copy of this document to keep.

Participant's name (printed)

Signature

Date

Declaration by researcher*: I have given a verbal explanation of the research project, its procedures and risks and I believe that the participant has understood that explanation.

Researcher's name (printed)

Signature

Date

Note: All parties signing the consent section must date their own signature.

Appendix 16 Skills-based workshop content

MONASH University
Medicine, Nursing and Health Sciences

ENGAGING ALLIED HEALTH
PROFESSIONALS TO ENHANCE THE
UPTAKE OF EVIDENCE BASED
PRACTICE

Phase 2 – Mentorship Groups

Presenters: Associate Professor Terry Haines and Marlena Klaic

Southern Health

Overview

- Introduction
- Definitions
- Research Plan
- Research Strategy
- Search Practice

MONASH University
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Southern Health

Introduction

- Presenters, chief investigators and mentors
- Mentees
- Project background and aims
- Mentorship group aims and objectives

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Southern Health

Project background & aims

- Evidence based practice
 - What, why & how?
- Project aims
 - To evaluate a **strategy** to enhance EBP
 - **Strategy** is development & implementation of an evidence-based project

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Mentorship group objectives

- Develop skills in
 - Asking “good” research questions
 - Using search engines / databases
 - Evaluating & summarising evidence
- Produce a systematic report

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Mentorship group course outline

Lecture topics:

- Asking the right questions
- Finding relevant evidence
- Using search engines and EBP databases
- Synthesising findings
- Report format and delivery

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Definitions – outcome measures

- Outcome measures in health related fields are an instrument, device, or method used to assess change in a patient or population over time
- Outcome measures enable clinicians /services/ to evaluate the impact of their treatment.
- Outcome measures include, but are not limited to, an evaluation of the change in patient impairments, activity limitations (disability), participation restrictions (handicaps), or quality of life

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Asking the right question

1. Consider the different questions which may arise from your topic
2. Break your topic into major concepts – 2 to 4 concepts is usually adequate
3. Consider appropriate keywords, synonyms, truncations, Boolean searching
4. Keep records of your searches

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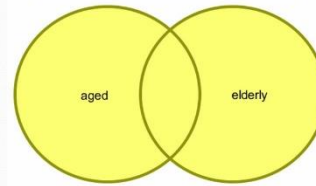
Asking the right question – an example

1. Main topic – how confident are allied health professionals with evidence based practice?
2. Major concepts: confidence, allied health professionals and evidence based practice
3. Consider keywords, synonyms: allied health clinicians, allied health personnel etc...



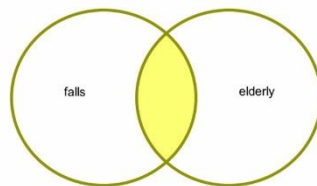
Asking the right question – Boolean searching

OR looks for articles with any of our search terms. It's particularly useful when searching for synonyms, e.g., **aged OR elderly**.



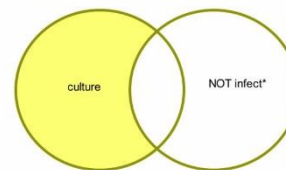
Asking the right question – Boolean searching

Searching with **AND** finds articles containing **both** of our search terms.



Asking the right question – Boolean searching

Searching with **NOT** removes articles containing the undesired search term, e.g., **NOT infect**.
*Using an asterisk, broadens the searches to various forms of the word such as, **infected infection**, etc.



Asking the right question – Quotation marks and truncation

- Use quotation marks to search for phrases e.g., "wound management"
- Use * to retrieve variations in the ending of a word e.g. measur* will retrieve measure, measures, measurement, measuring
- Use a symbol in the middle of a word to retrieve spelling variations e.g. organi#ation will retrieve both the American and English spelling of the word

Finding relevant evidence

- The type of information you are looking for will determine the best places to search
- Key databases and search engines that are commonly used and available through Southern Health
 - Ovid Medline – covers medicine, nursing, allied health
 - Cochrane Library – includes systematic reviews but usually focuses on treatment
 - CINAHL Plus – covers nursing, allied health, biomedicine, alternative/complementary medicine,
 - Google / Google Scholar – a good starting point scholar.google.com.au

Ovid Medline – some tips

- Largest medical index
- MeSH vs. Keywords
- Basic vs. Advanced
- Explode vs. Focus
- Combining concepts
- Limiting results

CINAHL – some tips

- Largest nursing and allied health index
- Subject Headings vs. Keywords
- Expand vs. Major Concept
- Subheadings

GOOGLE Scholar – some tips

- Simple, broad search
- Operators can be added in the search box or via Advanced Scholar Search Page. They include:
 - Author search
 - Publication restriction
 - Date restriction
 - Legal opinion and journals
 - Jurisdiction restriction
 - Other

Asking the right question – your turn

1. What is your question?
2. Identify the main search terms
3. Combine search terms with or/and, use quotes and truncation where needed
4. What limits will you apply? Consider language, years

ENGAGING ALLIED HEALTH PROFESSIONALS TO ENHANCE THE UPTAKE OF EVIDENCE BASED PRACTICE

Phase 2 – Mentorship Groups
Day 2 Lecture Series – Analysing the evidence
Presenters: Associate Professor Terry Haines and Marlena Klacik

Overview

- Measurement scales
- Validity
- Reliability
- Measurement properties
- Reporting matrix
- Practice

Measurement Scales

- Measurement helps us to:
 - Understand
 - Evaluate
 - Differentiate
- Measurement “*assigns numerals¹ to variables² to represent quantities of characteristics³ according to certain rules⁴*”

Measurement Scales

1. *assigns numerals* – symbol or label in the form of a number
2. *to variables* – property that differentiates individuals or objects. Can be quantity or quality
3. *quantities of characteristics* – usually indirect
 - Abstract constructs must be defined
4. *rules* – how are the numerals assigned?
 - Operational definitions

Measurement Scales

- The nature of the construct being measured will determine the scale of measurement
- Each measurement scale has rules for manipulating and interpreting data
 - Nominal Scale
 - Ordinal Scale
 - Interval Scale
 - Ratio

Nominal Scale

- Lowest level of measurement
- Also known as classificatory or categorical scale
- Objects or people are assigned to categories according to some criterion
- Placing data into categories without order or structure

Nominal Scale - examples

- Scales of questionnaires with YES / NO responses
- Blood type
- Numbers on a footy jumper
- Favourite colour
- Handedness
- Religion



Ordinal Scale

- Ranks categories
- Objective distance between any two points on an ordinal scale may not be known
- Only lets you interpret gross order and not the relative positional distances

Ordinal Scale - examples

- Sensation: normal > impaired > absent
- Spasticity: none < minimal < moderate < severe
- Surveys that measure preferences: strongly agree > agree
- FIM



Interval Scale

- Ranks categories on an ordinal scale, but also demonstrates equidistant points between each of the scale elements
- Not related to a true zero
- Enables interpretation of differences along the scale

Interval Scale - examples

- Measures of temperature using °C or Farenheit
- Calendar years i.e. BC / AD because year 1 is an arbitrary historical designation, not the beginning of time



Ratio Scale

- Highest level of measurement
- Interval scale with an absolute zero point i.e. 0 means total absence of the construct being measured
- Ratio data can be directly transformed from one scale to another

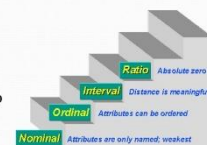
Ratio Scale - examples

- Range of motion
- Height,
- Weight
- Force



Tips about measurement scales

- The 4 scales of measurement are a hierarchy based on precision of assigned values
- It is to the researcher's advantage to achieve ↑ possible level of measurement
- Data can always be manipulated to use a ↓ scale but not vice versa
- Identifying the level of measurement is important for analysing and interpreting data



Reliability

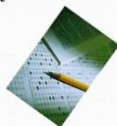
- The extent to which a measurement is consistent and produces similar results when administered repeatedly
- Conceptualised as reproducibility or dependability
- Consider systematic and random error
- Methods to test reliability:
 - Test-retest
 - Rater (inter / intra)
 - Internal consistency
 - Other

Test-retest reliability

- Participants take same test on 2 different occasions
- High positive correlation if test reliable
- Problems include:
 - Memory of first test
 - Practice effects
- Analysed using
 - Nominal data – Kappa, ICC
 - Ordinal data – Spearman rho, ICC
 - Interval / ratio data – Pearson product moment coefficient of correlation

Test-retest reliability - example

For example, a group of respondents is tested for IQ scores: each respondent is tested twice - the two tests are a month apart. Then, the correlation coefficient between two sets of IQ-scores is a reasonable measure of the test-retest reliability of this test



Rater reliability

- Many clinical measures require human observers or raters to be part of the measurement system
- Raters must be consistent in application of criteria
- Rater reliability important in research involving testers
- Includes intra and inter rater reliability
- Analysed using:
 - ICC, Pearson's R, limits of agreement, standard error of measurement, Kappa

Inter-rater reliability

- Determines extent to which 2+ raters obtain same result when using same instrument to measure a construct
- Intra-rater reliability should be established for each individual rater before comparing raters to each other
- Strengthens generalisability of the research outcomes
- Problems include difficulty in completing simultaneous scoring

Inter-rater:
Description: Do different tool administrators get the same result when applying the tool to the same person?
Notes:
Measured using: ICC, Pearson's R, limits of agreement, standard error of measurement, Kappa

Intra-rater reliability - example

- In 2007 a study of inter and intra rater reliability was conducted on the Assisting Hand Assessment (AHA).
- 20 raters each assessed one videotaped AHA session twice with a 3-week interval.
- The intrarater ICC for sum score was 0.99 (0.98-0.99), indicating high intrarater reliability



Intra-rater reliability

- Same assessment completed by the same rater across two + trials
- Assessed using trials that follow each other with short intervals
- The different ratings are then compared by correlation
- Problems include rater bias

Intra-rater:
Description: Does the same person/rater get the same result when using the tool multiple times on the same person?
Notes:
Measured using: ICC, Pearson's R, limits of agreement, standard error of measurement, Kappa

Inter-rater reliability - example

- In 2007 a study of inter and intra rater reliability was conducted on the Assisting Hand Assessment (AHA).
- Interrater reliability test:
 - Two raters assessed videotaped AHA sessions with 18 children,
- The interrater ICC for 2-rater design was 0.98 indicating high interrater reliability



Internal consistency

- Extent to which items measure various aspects of the same characteristic and nothing else
- Scale should be grounded in theory that defines the construct
- Usefulness of subscales to maintain homogeneity
- Analysed using:
 - Cronbach's alpha

Internal consistency
Description: How well do the items within a instrument measure the same trait
Notes: For multi-item instruments
Measured using: Cronbach's alpha.

Internal consistency - example

- Professor gives an exam to assess students' knowledge of research design
- Items should reflect summary of that knowledge
- Test should not include items on anthropology or health policy



Other

- Alternate forms reliability – measurement instruments in two or more versions
 - Analysed using correlation coefficients, limits of agreement
- Population specific reliability – consider the characteristics of those involved in establishing reliability

Other

Other - example

- Study of alternate form reliability of the Dementia Rating Scale 2 Alternate Form (DRS-2AF)
- Results showed strong correlations between the two forms, and no significant differences between total scale and subscale scores



Validity

- The degree to which a tool measures what it is supposed to measure
- Measurements of validity include:
 - Criterion related validity
 - Construct validity
 - Content validity

Criterion related validity

- Ability of one test (target test) to predict results obtained on an external criterion (gold standard)
- High correlation = valid predictor of the criterion
- Problems include:
 - Limited or no choice of gold standard for more abstract constructs – consider reference standard
- Two components of criterion related validity are:
 - Concurrent validity
 - Predictive validity

Criterion related validity - concurrent

- Measurement to be validated and the criterion measure are taken concurrently
- Useful when a new tool is being proposed as an alternative to an established method / tool

Concurrent
Description: Does the instrument provide the same results as another tool used to measure the same construct? Are they interchangeable?
Notes: If the measures being compared were taken at the same time

Concurrent validity - example

- Perkins et al demonstrated that 4 simple sensory screens were accurate in the diagnosis of diabetic polyneuropathy, as compared with standardized electrophysiological tests



Criterion related validity - predictive

- Measure is a valid predictor of some future criterion score
- Target test is given at one session. After a period of time, the criterion score is obtained
- Essential in screening procedures that assess future risk

Predictive
Description: How well does this instrument predict future events or a future score for the same / related construct?

Notes: If the measure of interest was taken well before the comparison measure or the outcome observed

Predictive validity - example

- Lombardino et al tested 149 kindergarten children with the Early Reading Screening Instrument (ERSI)
- Follow-up in 1 year showed a correlation between ERSI score and reading skills
- ERSI can be used to predict future reading difficulties



Construct validity

- Ability of an instrument to measure abstract construct
- Requires constructs to be defined according to the underlying theoretical context
- Measures of construct validity include:
 - Known groups method
 - Convergence and discrimination

Construct validity - known groups

- Known groups method - measure can discriminate between individuals who are known to have the trait and those who do not

Known groups
Description: How well does this instrument discriminate between different groups that are expected to behave differently on this construct?

Notes:

Known groups test - example

- A group of individuals known to be not depressed should have lower scores on a depression scale than the group known to be depressed



Construct validity - convergence & discrimination

- Convergent validity - 2 measures based on same underlying phenomenon will correlate highly
- Discriminant validity - low correlations are expected from measures that assess different constructs

Convergent
Description: Does the instrument provide similar results as another tool used to measure a similar/related construct? Are they related?

Discriminant
Description: How different are the results produced by this instrument to results produced by other instruments designed to measure different constructs?

Convergence & discrimination validity - example

- Sickness impact scale (SIP) measures changes in a person's behaviour due to sickness
- Convergent validity supported by high correlation between physical dimensions of the SIP scale and the SF-36 health survey questionnaire
- Discriminant validity supported by lower correlation between the physical SIP scale and the Carroll Rating Scale for Depression



Measurement properties – Minimal detectable difference

Minimal detectable difference
Description: How big does change in this measure need to be in order to be confident that it is not just background variability being observed?

Notes:

Measure used: 95% confidence interval change outside this range represents "real" change

Measurement properties – Minimally clinically importance difference

Minimally clinically important difference
Definition: How big does a change measured using this scale need to be before it is considered important from a clinical perspective? This may be from patient, clinician, or another perspective.
Notes:
Measure used: May be expressed in many ways, usually in units of the measurement scale

Practice

- Use the reporting matrix to analyse one of your articles

Reference List

- McGill Faculty of Medicine. (2010, June 22). *Strokengine Assess*. Retrieved July 7, 2010, from <http://www.medicine.mcgill.ca/strokengine-assess/definitions-en.html>
- Portney, L.G., & Watkins, M. P. (2009). *Foundations of clinical research* (3rd ed.). New Jersey, America: Pearson Education Inc.

ENGAGING ALLIED HEALTH PROFESSIONALS TO ENHANCE THE UPTAKE OF EVIDENCE BASED PRACTICE

Phase 2 – Mentorship Groups
Day 3 Lecture Series – Reporting the Evidence
Presenters: Associate Professor Terry Haines and Marlena Klacik

Overview

- Progress with literature search and analysis
- Reporting template for the CRGs
- Next step(s)
- Questions

Progress

Group discussion

Reporting Template

- Process for reporting to CRG
 - Chief investigator presentation
 - Brief overview of research terminology and process
 - Mentee presentation
 - Report
 - Circulated to CRG members prior to meeting
 - Delphi process for selection

SEARCH STRATEGY	
Specify and justify basic strategy e.g. Manual search, automated search or mixed	Mixed search to ensure comprehensive search of all available literature, information
Specify search terms and any compounds of these e.g. outcome measure, outcome scales, measurement s, measure"	Keywords used with all search engines: outcome measure, "outcome scale", rehabilitation, "wound management", "wound treatment", validity, reliability, MeSH searching was also used for 3 concepts: wound management, outcome measures and rehabilitation
Identify resources used for search e.g. CINAHL, Identify any ancillary search procedures e.g. asking leading researchers or research groups, checking reference lists of primary studies	MedLine, CINAHL, Google Scholar, Cochrane, JBI
Specify the time period covered by the review and any reasons for your choice	Discuss with senior clinicians, reference lists from current studies, discussion with researcher in Allied Health Research Unit
Search results n=98	Open time period in order to obtain seminal articles
SELECTION CRITERIA	
Identify the inclusion criteria for primary studies e.g. rehabilitation population, adults	All adults, rehabilitation, measure able to be used within 1 month time frame
Identify the exclusion criteria e.g. acute settings, diagnostic specific, non-English publications	
Search results n=31	
Identify reasons why articles screened on basis of title and abstract were not included e.g. insufficient information on validity, irrelevant data	No statistical information on validity and/or reliability
Articles included for further review n=23	
DATA EXTRACTION	
Identify data extraction tool / form e.g. reporting matrix	Reporting matrix as supplied by the Southern Health Allied Health Research Unit
Specify strategy for extracting the data and the form e.g. paper, on-line	by computer into a spreadsheet

Measure	Scale	Context	No. of items / domains	Response format	Method of administration	Time for administration	Primary scale outputs	Validated populations	Psychometric properties		
									Reliability	Validity	Measurement Properties
Burden Index		Functional independence and need for assistance in self-care/basic ADL	Original 10 Modified versions 5, 10, 15	Unable, needs help, independent (with same variation)	Observer: from medical records or interview (in person or telephone) Self administered	Observer: less than 5 minutes Self: less than 10 minutes	Overall score of dependence in ADL	Rehabilitation patients with stroke and other neuro-muscular or musculo-skeletal disorders	High Test-retest: Kw33 Inter-rater: r=88 Internal Cronbach's alpha: .93	High Convergence with FIM-35 Encompassment with SPIDER-14 Known groups: p<.0001 stroke vs TIA vs asymptomatic	Moderate Cw35
Katz Index of ADL		Independence in ADL	8	3 point scale of independence	Observer scored	Not reported	Overall score of dependence in ADL. Scored from A 6 or from D 6	Elderly adults and individuals with chronic disease	Little research on reliability	High predictive validity	Unknown

Next Step

- Reporting matrix to be e-mailed to chief investigators
 - Friday 14th August
- Report for CRGs to be e-mailed to chief investigators
 - Friday 14th August
- CRG meeting
 - September – best days / times
- Member recruitment
 - Discipline specific meetings
 - Minimum numbers

Next Step

- Pilot of evidence-based project
 - Selection by CRG
 - Date to be decided by CRG
- Data collection
- Final CRG meeting
 - Date to be decided by CRG
- Publication
 - Discipline specific
 - Focus on knowledge translation

Questions

- Any questions?
- Contact details:

Allied Health Research Unit Ph. No [REDACTED]

Marlena Klaic [REDACTED]

Terry Haines [REDACTED]

Or [REDACTED]



MONASH University
Medicine, Nursing and Health Sciences

Southern Health

ENHANCING UPTAKE OF EVIDENCE BASED PRACTICE BY ALLIED HEALTH PROFESSIONALS: A MULTI-SITE PROJECT

SITE QUESTIONNAIRE

• BACKGROUND

This study aims to document EBP attitudes and behaviours amongst allied health professionals working in public health care settings, and how these change over 3 consecutive years. This will permit contrasts between professional groups and work areas to give insight into specific areas of need for development of future strategies to enhance uptake of EBP philosophy amongst allied health professionals. It will also investigate how the amount of resources invested in EBP training / activities / research by health services affect the EBP outcomes being investigated

• QUESTIONNAIRE PURPOSE/AIMS

- To establish understanding of current EBP activities from organisational perspective
- To identify organisational predictors for EBP with allied health clinicians
- To identify factors contributing to EBP culture and practices

• QUESTIONNAIRE RESPONDENT(S)

This questionnaire should be completed by the site specific chief investigator in conjunction with other relevant parties, including research department and allied health directors/leaders.

• QUESTIONNAIRE

In the last 12 months, has this organisation been involved in any of the following EBP activities?

1. Introducing and/or reinforcing any policy which formally recognizes research as a priority area?

No ☐

Yes ☐ Please provide brief description

2. Introducing / adding resources specifically for the purpose of research or EBP? E.g. organization based research department, research hub, additional computers for research, additional funding for education

No ☐

Yes ☐ Please provide brief description

3. Introducing clinical practice protocol(s)/guideline(s) which involved/affected allied health clinicians?

No ☐

Yes ☐ Please provide brief description

4. Any quality assurance projects which involved/affected allied health clinicians?

No ☐

Yes ☐ Please provide brief description

5. Any research project(s) which involved participation from allied health clinicians?

No ☐

Yes ☐ Please provide brief description

6. Organisation based conference or seminar which was open for attendance to allied health clinicians?

No ☐

Yes ☐ Please provide brief description

7. Education session(s) open to allied health professionals for attendance?

No ☐

Yes ☐ Please provide brief description

_____ Department or discipline specific journal clubs open to allied health clinicians for attendance?

No ☐

Yes ☐ Please provide brief description

_____ In the past 12 months has this organisation been involved in any other EBP activities? Please specify.

No ☐

Yes ☐ Please provide brief description

- **PROJECT TEAM**

Principal Researchers: Associate Professor Terry Haines, Ms Leonie Steindl, Ms Marlena Klaic

- **CONTACTS**

Associate Professor Terry Haines

E-mail: _____ or telephone _____

Marlena Klaic, PhD candidate

E-mail: _____ or telephone _____

Appendix 18 Ethics approval

COPY

MEMORANDUM

HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK



MINIMAL RISK ETHICS APPLICATION APPROVAL

16 September 2009

Dr Terence Haines
Allied Health Clinical Research Unit,
Kingston Centre
Kingston Road
Cheltenham, VIC 3192

Ethics Reference: H10827.

Enhancing uptake of evidence based practice by allied health professionals - a multi-site project.

PhD Candidate: Marlana Klac

Dear Dr Haines

Acting on a mandate from the Tasmania Social Sciences HREC, the Chair of the Committee considered and approved the above project on 13 September 2009.

All committees operating under the Human Research Ethics Committee (Tasmania) Network are registered and required to comply with the *National Statement on Ethical Conduct in Human Research* (NHMRC, 2007).

Therefore, the Chief Investigator's responsibility is to ensure that:

- 1) All researchers listed on the application comply with HREC approved application.
- 2) Modifications to the application do not proceed until approval is obtained in writing from the HREC.
- 3) The confidentiality and anonymity of all research subjects is maintained at all times, except as required by law.
- 4) Statement 5.5.3 of the National Statement states:

Researchers have a significant responsibility in monitoring approved research as they are in the best position to observe any adverse events or unexpected outcomes. They should report such events or outcomes promptly to the relevant institution's and ethical review body/ies and take prompt steps to deal with any unexpected risks.

- 5) All participants must be provided with the current Information Sheet and Consent form as approved by the Ethics Committee.

A PARTNERSHIP PROGRAM IN CONJUNCTION WITH THE DEPARTMENT OF HEALTH AND HUMAN SERVICES

Private Bag 31 Hobart

MEMORANDUM

HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK



AMENDMENT TO EXISTING APPLICATION APPROVAL

23 October 2009

Dr Terry Haines
Allied Health Clinical Research Unit
Kingston Centre
Kingston Road
CHELTENHAM Vic 3192

Ethics reference: H10827

Enhancing uptake of evidence based practice by allied health professionals - a multi-site project.

PhD candidate: Mariena Klacik

Dear Dr Haines

The Chair of the Tasmania Social Sciences Human Research Ethics Committee approved the Amendment to the above project on 17 October 2009.

Amendment description:

Request to offer allied health clinicians who fully complete the survey a chance to win a \$100 voucher of choice from Myer/Cinemas/Bunnings.
Full details as per formal ethics amendment submitted for ethics approval.

Yours sincerely

Ethics Executive Officer

A PARTNERSHIP PROGRAM IN CONJUNCTION WITH THE DEPARTMENT OF HEALTH AND HUMAN SERVICES

**HUMAN RESEARCH ETHICS COMMITTEE A
CERTIFICATE OF APPROVAL**

DATE 12 January 2009

PROJECT NO. 06202A

PROJECT TITLE A stakeholder-driven approach to development of a core allied health outcome dataset in adult and aged rehabilitation services.

INVESTIGATOR(S) Dr Terry Heines

HREC MEETING DATE 4/12/2009

APPROVAL 12.01.2009 – 12.01.2012

The Principal Investigator is required to notify the Manager of Research Directorate of:

1. Any change in protocol and the reasons for that change together with an indication of ethical implications (if any)
2. Serious or unexpected adverse effects of project on subjects and steps taken to deal with them
3. Any unforeseen events that might affect continued ethical acceptability of the project
4. Any expiry of the insurance coverage provided in respect of sponsored trials
5. Discontinuation of the project before the expected date of completion, giving reasons
6. Any change in personnel involved in the research project including any study member resigning from Southern Health &/or the study team.

At the conclusion of the project or every twelve months if the project continues, the Principal Investigator is required to complete and forward an annual report to the Committee.

Annual report forms will be forwarded to the researcher.

SIGNED  **DATE** 12 January 2009
Committee Representative

Please quote Project No. and Title for all correspondence

Appendix 19 Paper 1 PDF Evidence-based practice and allied health professionals: Differences in perspectives across disciplines and settings

International Journal of Therapy and Rehabilitation
Evidence based practice and allied health professionals: Differences in perspectives across disciplines and settings
 --Manuscript Draft--

Manuscript Number:	
Article Type:	Original research
Keywords:	evidence-based practice, research utilisation, allied health, education, training
Corresponding Author:	Marlena Klaic, BOccTher(Hons) Royal Melbourne Hospital Parkville, VIC AUSTRALIA
First Author:	Marlena Klaic, BOccTher(Hons)
Order of Authors:	Marlena Klaic, BOccTher(Hons) Fiona McDermott, PhD Terrence Haines, PhD
Abstract:	<p>Objective</p> <p>To explore and compare beliefs, attitudes, confidence, sources of information guiding clinical decisions and behaviour related to evidence-based practice (EBP), across allied health professional groups and different healthcare settings.</p> <p>Design</p> <p>Cross-sectional survey.</p> <p>Setting</p> <p>Two Australian metropolitan health services based in Victoria and Tasmania.</p> <p>Participants</p> <p>Allied health professionals from dietetics / nutrition, occupational therapy, physiotherapy, psychology, social work, speech pathology and other were invited to complete an on-line survey (N=496). A total of 288 clinicians completed the survey, indicating a response rate of 58%.</p> <p>Outcome Measures</p> <p>The survey measured EBP beliefs, attitudes, confidence, sources of information guiding clinical decisions and behaviour related to EBP.</p> <p>Results</p> <p>There were differences between individual professional groups, workplace settings and demographic factors across most factors measured including attitudes, confidence and participation in EBP activities. Social workers were less likely to seek evidence from scientific studies when making clinical decisions. By contrast, dietitians were more confident in critically appraising literature for reliability and relevance. Respondents who worked in the acute sector were more likely to use clinical practice guidelines and results from randomized trials than their colleagues in the community health setting. Younger respondents were more likely to use the results of a randomized trial to guide clinical decisions whilst older respondents relied more on their own clinical experience.</p> <p>Conclusions</p> <p>This study identified important differences across allied health professional groups and healthcare settings related to EBP attitudes, confidence, beliefs and activities. This has implications for EBP training and suggests that a "one size fits all" model may not be</p>

INTRODUCTION

The concept of EBP is not new to allied health with studies on this topic appearing in the literature more than 30 years ago (Jette et al. 2003). A scan of published literature would suggest that most allied health professional groups think that EBP is a 'good idea' and that research evidence can improve patient care (Kamwendo 2002, Bennett et al. 2003, Jette et al. 2003, McCluskey 2003, Powell and Case-Smith 2003, Iles and Davidson 2006, Salbach et al. 2007, Salbach et al. 2009, Powell and Case-Smith 2010). However, much of this literature has failed to account for the potential influence of factors such as where the clinician works, age, gender and characteristics of the specific discipline.

One of the earliest studies exploring physiotherapists' attitudes towards, knowledge of and engagement in EBP activities found that more than 90% of the respondents (n=488) held positive beliefs about EBP (Jette et al. 2003). However, more than 60% of the sample had higher qualifications and almost 60% worked in an outpatient setting. The authors of this study did not analyse if there were differences between clinicians working in different settings or those with entry level degrees. In a similar study conducted with occupational therapists, Bennett et al found that 96% of respondents (n=649) held positive attitudes and beliefs regarding EBP (Bennett et al. 2003). Although the authors found an association between metropolitan settings and higher qualifications and EBP training, they did not analyse workplace setting or years since initial qualification. Similar studies can be found across most of the allied health professional groups (Byham-Gray et al. 2005, Zipoli and Kennedy 2005, Wilkinson et al. 2012), however, the samples often include high numbers of respondents with post-graduate qualifications and/or do not explore if there are associations between other demographic characteristics and EBP attitudes, beliefs, confidence and behaviours. The studies to date appear to assume that allied health professionals are homogenous in their experience of EBP i.e. that respondents working in the acute setting will have similar views to respondents working in community setting, or that respondents who work part-time will experience similar barriers to those who work full-time.

Understanding if allied health professionals are different in their experience of EBP is critical in developing appropriate interventions to enhance the uptake of EBP. There have been a number of international studies comparing EBP attitudes, beliefs, skills, knowledge and confidence across a variety of allied health professional groups. Heiwe et al surveyed 227 Swedish allied health professionals and found that all of the disciplines held a positive attitude towards EBP but some disciplines were more interested in increasing the use of evidence in daily practice (Heiwe et al. 2011). However, the sample was only drawn from a university hospital and previous research has shown a correlation between affiliation with a tertiary institution and EBP attitudes, beliefs, skills and behaviours (Barnard and Wiles 2001, Kamwendo 2002, Salbach et al. 2007). Furthermore, this study did not account for the influence of higher qualifications. More than 56% of the sample were physiotherapists and nearly 50% of these respondents had higher qualifications. It is possible that this influenced the results of the study as previous research has also shown a correlation between post-graduate qualifications and propensity to engage in EBP behaviours (Byham-Gray et al. 2005, Zipoli and Kennedy 2005, Hadley et al. 2008, Brown et al. 2010, Bernhardsson and Larsson 2013, Scurlock-Evans et al. 2014, Upton et al. 2014). A similar study in the United Kingdom found differences between dietitians, occupational therapists, physiotherapists and speech / language therapists (n=572) in relation to perceived importance of research and barriers (Metcalf et al. 2001). However, the authors did not explore if these differences may have been influenced by workplace setting, higher level qualifications or any other demographic information.

To date, the published studies comparing the experiences and perceptions of EBP across different allied health professional groups provide limited information regarding the impact of factors such as workplace setting, professional group and demographic characteristics on EBP. Only one published study tested for differences in clinician's experience of EBP against the size (small, medium and large) and location (urban or small urban/rural) of the work setting and found no statistically significant differences related to those variables. However, there was no information on whether the clinician was primarily based in an acute setting, rehabilitation ward or community facility.

The aim of this study was to compare EBP beliefs, attitudes, confidence, sources of information guiding clinical decisions and behaviour across a range of Australian allied health disciplines and across a range of workplace settings.

METHODS

Study design

Analytical cross-sectional survey

Participants and setting

All allied health professionals from two major metropolitan health services in Victoria and Tasmania were considered eligible to participate in the study. The allied health disciplines included audiology, exercise physiology, nutrition / dietetics, occupational therapy, podiatry, physiotherapy, psychology (clinical and neuropsychology), speech pathology, social work and radiation therapy. The total sample size was 496 allied health professionals.

Instrument

Allied health professionals' beliefs, attitudes, confidence, sources of information to guide clinical decisions and behaviour relating to EBP were evaluated using a composite instrument developed for this study. The instrument consisted of a total of 56 questions grouped into five sections to measure the specific components of EBP. The four sections related to beliefs, attitudes, sources of information to guide clinical decisions and participation in EBP activities were based on a survey developed and validated by Jette et al for use with allied health professionals (Jette et al. 2003). Respondents were asked to rate their attitudes and beliefs using a six-point Likert Scale from strongly agree to strongly disagree. Sources of information for clinical decision making was measured using a five-point Likert Scale from always to never whilst participation in EBP activities was measured using a yes/no response. The fifth section measured confidence to conduct EBP activities and was based on EPIC - the evidence-based practice confidence scale (Salbach and Jaglal 2011). This scale consists of questions related to the steps considered necessary for EBP, such as critically appraising the literature for reliability and relevance. Respondents are asked to rate their level of confidence on an 11-point scale from 0% (cannot do at all) to 100% (certain can do). EPIC has excellent reliability and validity

and has been used in a number of studies exploring allied health clinicians' self-efficacy to conduct EBP activities (Salbach and Jaglal 2011, Salbach et al. 2013, DeCleene Huber et al. 2015, Clyde et al. 2016).

Information regarding respondents' age, gender, years practicing, level of qualification and work setting were all collected on the first page of the instrument.

Procedure

Email contact was made with the managers of each allied health professional group explaining the study and inviting participation from all their qualified staff members. A web-based link was included in the email along with a PDF of the survey to ensure that computer access was not a barrier to participation. Pre-paid return envelopes were provided to both sites and all disciplines for those clinicians who completed a hard copy of the survey. These were then manually entered by a research assistant. All respondents who completed the survey, either online or hardcopy, were eligible to go into a drawer to win a \$100 gift voucher. Implied consent was assumed for all respondents who submitted a completed survey.

Ethics

The study was approved by the Human Research Ethics Committee (HREC) at each site. All procedures were performed in compliance with the guidelines set by each institutions HREC.

Data Analysis

All data analysis was undertaken using STATA Version 13.0. Ordered logistic regression was used to identify relationships between EBP beliefs, attitudes, confidence, sources of information guiding clinical decisions and behaviour (dependent variables) and respondents' demographic information such as professional group, workplace setting, age, gender, highest qualification, years practicing and prior exposure to research (independent variables). The ordered logit model is appropriate for analysis of outcome variables that are ordinal in nature, such as the Likert scale responses used in the instrument in this study. Statistically significant results were set at p value of $<.05$ with 95% confidence intervals.

Results

The survey was completed by 288 clinicians, indicating a response rate of 58%. Demographics of the sample are presented in Table 1. Respondents were primarily female (88.2%), under the age of 30 (43.7 %) and working full-time (53.8%). Half (49.3%) of the respondents had a bachelor's degree as their highest qualification and nearly 60% had been working for less than 10 years. Table 2 presents the associations between the specific allied health professional groups and EBP constructs measured, whilst Table 3 presents the associations between the workplace settings and EBP. Table 4 explores the influence of a number of demographic variables on EBP skills, confidence and sources of information for clinical decision making. Comparison of responses for questions revealed significant differences between specific professional groups, workplace setting and demographics.

ASSOCIATIONS BETWEEN PROFESSIONAL GROUPS AND EBP.

There were differences between professional groups related to all of the EBP constructs measured. Social workers were the least likely to agree that EBP principles were necessary for their clinical practice ($p=0.02$), or that they should be responsible for interpreting whether research findings apply to their individual patients ($p<0.01$). Surprisingly, they did not report a lack of confidence with EBP skills such as interpreting statistical data, despite the fact that they did not agree that patient care should be based on scientific studies ($p<0.01$). By contrast, the majority of occupational therapists felt that EBP principles were important in clinical practice but they consistently identified a lack of confidence with EBP skills including critically appraising literature ($p<0.01$), interpreting statistical procedures ($p=0.01$), applying evidence ($p<0.01$) and evaluating practice ($p<0.01$). This was also reflected in the sources of information this group used for clinical decision making, as they were less likely to use clinical practice guidelines ($p=0.01$) or research studies ($p<0.01$) in comparison to all other allied health professional groups.

Dietitians consistently reported high levels of self-efficacy related to EBP and were the least likely to identify a divide between research and practice ($p<0.01$) and the most likely to use clinical practice guidelines ($p<0.01$). This professional group were also more likely to report

recent engagement in EBP activities such as collecting data/information for protocols and/or guidelines ($p<0.01$).

ASSOCIATION BETWEEN WORKPLACE SETTING AND EBP.

There were also differences found across the variety of workplace settings in relation to all of the EBP constructs. Clinicians from sub-acute outpatient settings were more likely to believe they should conduct their own literature reviews ($p=0.03$) and critically evaluate the evidence ($p=0.05$). Community based allied health professionals had lower self-efficacy in relation to identifying the strengths and weaknesses of study designs ($p=0.02$) and interpreting statistical data ($p=0.04$). This was also reflected in the sources of information for clinical decision making with community based clinicians being the least likely to use research studies ($p<0.01$) in comparison to all other settings. By contrast, clinicians from the acute setting were more likely to use clinical practice guidelines ($p<0.01$), case studies ($p<0.01$) and internet resources ($p<0.01$).

ASSOCIATION BETWEEN DEMOGRAPHIC FACTORS AND EBP.

A number of demographic variables were associated with the constructs measured. Age was strongly associated with sources used for clinical decision making with younger respondents more likely to use the results from a randomized controlled trial ($p=0.04$) while older respondents were more likely to rely on their own clinical experience ($p=0.02$). The greatest differences were seen for years worked, grade of the clinician, year of graduation and highest qualification across all EBP constructs measured. Respondents with less clinical experience were less likely to perceive a divide between research and clinical practice ($p<0.01$) and more confident in their ability to interpret the strengths and weaknesses of study designs ($p=0.02$). Respondents with higher qualifications were more confident in their ability to interpret statistical data ($p<0.01$) and more likely to use the results of a meta-analysis of randomized controlled trials ($p<0.01$) to inform their clinical decisions.

DISCUSSION

The findings from this study have highlighted significant differences in attitudes, skills, confidence and behaviours related to EBP, both across allied health professional groups and workplace settings. A notable finding was that social workers' beliefs about and attitudes

towards EBP were significantly different to the other allied health professional groups. For example, social workers did not believe that EBP principles were important in their practice, or that patient care should be based on research rather than opinions of colleagues. There are a number of reasons that may account for this finding, including the reported tension between the philosophy of EBP and the epistemological perspectives of social workers i.e. the nature of knowledge and truth (Simmons 2012). It has been suggested that "... many interpretations of EBP do not adequately account for the needs of the individual within the context of his or her environment and the socially structured aspects of problems." (Simmons 2012, p.14). There is also a body of literature within social work arguing for evidence-informed practice as a more appropriate title for the model of care delivered by health professionals (Shlonsky et al. 2011). The results from this study may reflect a move away from the term evidence-based practice and towards evidence-informed practice. A recent study with social workers found that 82% of respondents (n=364) agreed research could be useful in their daily activities (Gray et al. 2013), however, more than 50% of the respondents were in non-clinical positions i.e. management, coordination and service development. Less than 16% of the respondents in this study were in positions with a substantial non-clinical component i.e. Gd.4 and above. It is possible that social workers in a "front-line" position may have different attitudes towards evidence-based practice or evidence-informed practice in comparison to those working in non-clinical roles. This may be influenced by the well-documented barriers that clinical allied health professionals report in relation to EBP i.e. lack of time and competing priorities.

Previous research has found that allied health clinicians in general experience low levels of self-efficacy with EBP skills such as critically appraising literature and then applying in practice (Upton 1999, Delany and Bailocerkowski 2011, Bakar et al. 2016, Verloo et al. 2017). However, this study found that occupational therapists in particular were less confident in their ability to undertake EBP activities, and they were also more likely to perceive that EBP activities placed an unreasonable demand on their time. Lack of time is one of the most frequently cited barriers to implementing EBP in clinical practice, and it is possible that occupational therapists perceive this to be a greater barrier than the other allied health professional groups (Upton 1999, Kamwendo 2002, Jette et al. 2003, Thomas et al. 2003, Gosling and Westbrook 2004, Byham-

Gray et al. 2005, McKenna et al. 2005, Zipoli and Kennedy 2005, Upton and Upton 2006, Grimmer-Somers et al. 2007, Salbach et al. 2007, Schreiber et al. 2008, O'Connor and Pettigrew 2009, Salls et al. 2009, Fruth et al. 2010, Lai et al. 2010, Delany and Bialocerkowski 2011, Heiwe et al. 2011, Döpp et al. 2012, McCurtin and Roddam 2012, Swedlove and Etcheverry 2012, Valdes and von der Heyde 2012, Vogt et al. 2012, McCluskey et al. 2013, Pighills et al. 2013, Robertson et al. 2013, Mota da Silva et al. 2014, Scurlock-Evans et al. 2014). By contrast, dietitians had the highest levels of self-efficacy related to EBP skills. This may be related to the level of education dietitians receive and potential exposure to research as a component of a higher research degree. In Australia, there are currently 15 education programs accredited with the Dietitians Association of Australia (Dietitians Association of Australia 2018). Of these 15 programs, 11 are provided at a post-graduate level i.e. Master's courses. Previous research has shown there is a positive correlation between higher qualifications and EBP attitudes, skills, confidence and behaviours (Bennett et al. 2003, Jette et al. 2003, Salbach et al. 2007, Perraton et al. 2017).

There were also differences found in relation to the workplace setting with subacute inpatient and community based clinicians reporting significantly lower levels of confidence in appropriately applying evidence from the literature to their individual patient(s). The organisations in which clinicians work play a critical role in supporting EBP. Organisational features which have been identified in the literature as facilitators or barriers to EBP include site location / type / size / affiliations, availability of EBP resources and culture (Salbach et al. 2007). Acute health services typically have a higher FTE than community and subacute services at a single location, and research has found a positive correlation between the number of colleagues in the workplace and the clinician's perception of ability to implement research evidence in practice (Pain et al. 2004, Döpp et al. 2012). This may in part explain the differences we observed between work settings.

A systematic literature review completed by Dizon & Grimmer-Somers (2011) on training allied health professionals in EBP indicated that there is currently no strong evidence for any particular training approach to support allied health clinicians in EBP and research utilisation (Dizon and Lizarondo 2010). It is possible this is due to the variability in perceptions and

experiences of EBP across allied health professional groups. Consequently, a "one-size fits all" approach to EBP training may not be successful.

LIMITATIONS

Participation in the study was voluntary and although all clinicians were eligible to win a gift voucher, it is possible that respondents were already interested in EBP. As such, this may skew the results more towards a positive attitude and interest in EBP than is actually present within the broader allied health population. Both study sites are located in metropolitan regions, albeit different size cities. It is therefore difficult to generalise the results from this study to rural or regional areas. Prior research on this topic suggests that allied health clinicians in smaller and/or rural worksites experience additional challenges related to EBP including as access to resources such as journals, EBP workshops, libraries and the internet (Barnard and Wiles 2001, Salbach et al. 2007).

FUTURE RESEARCH DIRECTIONS

This study has identified associations between professional allied health groups, workplace settings and EBP attitudes, behaviours and self-efficacy. It is unclear why specific groups, such as occupational therapy, have lower self-efficacy. It is also unclear why certain workplaces, such as the acute setting, are more likely to use evidence-based resources within their clinical practice. Any interventions to enhance the uptake of EBP should not assume that allied health professionals are a homogenous group.

Appendix 20 Paper 2 PDF How soon do allied health professionals lose confidence to perform EBP activities? A cross-sectional study.

Journal of Evaluation in Clinical Practice



How soon do allied health professionals lose confidence to perform EBP activities? A cross-sectional study.

Journal:	<i>Journal of Evaluation in Clinical Practice</i>
Manuscript ID:	Draft
Wiley - Manuscript type:	Original Article
Date Submitted by the Author:	n/a
Complete List of Authors:	Klaic, Marlena; Monash University - Peninsula Campus, School of primary and allied health care; Royal Melbourne Hospital, Allied Health Haines, Terry McDermott, Fiona; Monash University - Peninsula Campus, School of primary and allied health care
Keywords:	evidence-based medicine, clinical guidelines, experience, healthcare, medical education
Abstract:	<p>Abstract</p> <p>Objective</p> <p>To explore if there is a relationship between allied health professionals' confidence to perform a range of evidence based practice (EBP) activities and the time since they graduated from their entry level degree and the presence of post-graduate qualifications.</p> <p>Design</p> <p>Cross-sectional survey</p> <p>Setting</p> <p>Allied health professionals from two Australian public metropolitan health services, including acute, sub-acute and community settings.</p> <p>Participants</p> <p>Sample of 288 (n=288) allied health professionals from the disciplines of physiotherapy, occupational therapy, speech pathology, social work, dietetics / nutrition and other.</p> <p>Main outcome measure</p> <p>Cross-sectional survey including 12 questions measuring respondents' confidence to conduct a range of EBP activities</p> <p>Results</p> <p>Allied health professionals begin to lose confidence related to EBP activities within the first five years of clinical practice, particularly for those activities involving critical analysis of published studies. Respondents with post-graduate qualifications were more likely to report greater confidence with EBP activities, suggesting that higher level qualifications protect against the effect of degradation of EBP skills and confidence over time.</p> <p>Conclusions</p> <p>Allied health professionals' confidence to perform EBP activities degrades over time, particularly for those individuals with no post-graduate qualifications. Registration and accreditation bodies along with allied health</p>

Introduction

Contemporary definitions of evidence based practice (EBP) include a synthesis of current best evidence and clinical expertise with consideration to the patient's values and preferences [1]. EBP is both a philosophical approach to healthcare and a set of behaviours when applied in practice. These behaviours include: 1) Formulation of a research question; 2) Retrieval of best available evidence; 3) Critical appraisal of evidence; 4) Application of evidence to practice and; 5) Evaluation of practice [2]. EBP has the potential to meet numerous healthcare aims including improved patient outcomes, decreased variation in care and reduction in per capita healthcare costs.

EBP is more than just a philosophical approach to health care. It needs to be implemented and supported by a range of activities, policies and procedures within health service organisations. A parallel cohort comparison study published in 2015 compared two models of care over a period of 7 years; one model included EBP skill building activities (such as training for staff in critical appraisal of literature), and accompanying policies (such as protected staff time to engage in these activities). The comparison model was standard practice and as such, did not include structured EBP activities or related policies [3]. The results from this longitudinal study found that patients treated under the EBP model experienced significantly reduced rates of mortality and decreased length of stay. This is one of numerous studies that have demonstrated strong associations between EBP and improvements in the quality and safety of healthcare delivery [4-6]

Allied health professionals make up almost 25% of the health workforce in Australia [7] and should justifiably be the subject of training and support to implement EBP. Published literature on EBP within allied health spans more than 20 years and includes topics such as barriers and facilitators to the provision of EBP, tension between the concept of client

centred practice and the use of research studies and strategies to enhance the uptake of EBP. There appears to be broad agreement across most allied health professional groups that EBP is a 'good idea' and that research evidence can improve patient care [8-18]. However, there is a large body of evidence suggesting that implementation of EBP behaviours in every day clinical decision making remains low. There are numerous reasons cited for this including lack of time and lack of skills in understanding and applying research [8, 12, 13, 18-42]. In an attempt to address cited barriers, a number of studies have reported on strategies to enhance the uptake of EBP including changing curricular content within academic institutions. Ensuring that education providers include EBP skills as a core component of their training was the first recommendation made by the Sicily Statement - an internationally accepted consensus statement that describes the minimum requirements for EBP educational training programs [2]. From an Australian perspective, this recommendation appears to have been addressed for many allied health professional groups through the process of accreditation. For example, a new graduate Australian occupational therapist (OT) must first complete their training program with an educational provider that has been accredited by the Occupational Therapy Council (Australia & New Zealand) Ltd. The OT must then maintain registration with the Australian Health Practitioner Regulation Agency (AHPRA). This body is responsible for ensuring registered health professionals are competent and ethical, and that education and training is high quality. To fulfil this objective, a number of professions regulated by AHPRA have guidelines for accreditation of entry level clinicians that mandate training in EBP skills. These include physiotherapy, medicine, nursing and midwifery, podiatry, occupational therapy and radiography. Other allied health professional groups that are not included under AHPRA may still have a focus on EBP. For example, Speech Pathology Australia require that

practicing clinicians are aware of current research and participate in research activities as part of their competency based standards [43].

It is likely that recent Australian graduates from the allied health professions will have been exposed to education and training aimed at enhancing skills in EBP. It is therefore surprising that previous research has found that clinicians report a lack of skills as a significant barrier to EBP, despite the commitment of education providers, registration bodies and peak consensus groups to facilitate this. If we assume that the university-based training has assisted allied health professionals to become competent and confident in using EBP, then somewhere between graduation and participation in the earlier research just mentioned, allied health professionals have lost the confidence in their skills.

There have so far only been two studies that have explored this potential loss of confidence. Jette et al surveyed 488 physiotherapists and found that search skills and confidence to perform critical appraisal of research was lower in respondents who had graduated more than 15 years ago from their entry level degree, compared to those who graduated less than 5 years ago [8]. Similarly, Salbach et al reported that physiotherapists' working in stroke services (n=270) confidence to perform EBP activities was lower in respondents more than 15 years since graduation compared to those who were less than 5 years, between 5-10 years and 11-15 years. These findings would give the impression that there is potentially a problem amongst physiotherapy practitioners who have worked clinically for more than 15 years, however, the collapsing of data into 5-year intervals may have actually obscured a loss of confidence that takes place much earlier. Further, these papers both reported that higher levels of formal training created greater levels of confidence, yet did not adjust for this potential confounder in their analyses.

This study aims to examine the relationship between allied health professionals' confidence to perform a range of EBP activities and the number of years worked clinically and highest level of qualification received.

Methods

Study design

Analytical cross-sectional survey

Participants and setting

All allied health professionals from two major metropolitan health services in Victoria and Tasmania were considered eligible to participate in the study. The allied health disciplines included audiology, exercise physiology, nutrition / dietetics, occupational therapy, podiatry, physiotherapy, psychology (clinical and neuropsychology), speech pathology, social work and radiation therapy. The size of the potential target population in these organisations was 496 allied health professionals.

Instrument

Allied health professionals beliefs, attitudes, interest and behaviour relating to EBP, were evaluated using a composite instrument developed for this study. The instrument consisted of a total of 56 questions grouped into four sections to measure specific components of EBP. The 12 items measuring respondents' confidence to conduct EBP activities was based on EPIC – the evidence-based practice confidence scale [44]. This scale consists of questions related to the steps considered necessary for EBP, such as critically appraising the literature for reliability and relevance. Respondents are asked to rate their level of confidence on an 11-point scale from 0% (cannot do at all) to 100% (certain can do). EPIC has excellent reliability and validity and has been used in a number of studies exploring allied health clinicians' self-efficacy to conduct EBP activities [44-47].

Information regarding respondents' age, gender, years worked clinically post-graduation, level of qualification and work setting were all collected on the first page of the instrument. We used the response scaling of 1 year, 2 years, 3 years, 4 years, 5-10 years, 10-15 years, 15-20 years, and >20 years for the years worked clinically post-graduation item rather than a numeric response scaling approach due to the risk of the survey becoming identifiable. The employment profile in the participating organisations indicated that there were far fewer potential respondents in the higher years of experience categories, thus if the exact number of years was cross-referenced against their professional background, the identity of the respondent could have become known.

Procedure

Email contact was made with the managers of each allied health discipline explaining the study and inviting participation from all their qualified staff members. A web-based link was included in the email along with a PDF of the survey to ensure that computer access was not a barrier to participation. Pre-paid return envelopes were provided to both sites and all disciplines for those clinicians who completed a hard copy of the survey. These were then manually entered by a research assistant. All respondents who completed the survey, either online or hardcopy, were eligible to go into a drawer to win a \$100 gift voucher. Implied consent was assumed for all respondents who submitted a completed survey.

Ethics

The study was approved by the Human Research Ethics Committee (HREC) at each site.

Analysis

Analysis commenced by examining box plots illustrating the relationship between confidence to conduct EBP activities and years worked clinically, using only respondents whose highest academic degree was at Bachelor level. This qualification was chosen as

Bachelor level of degrees typically have less emphasis on research training than honours, masters and PhD level degrees. A box plot panel was constructed to illustrate these results for each of the 12-items included in the EPIC scale.

A multivariable regression was then performed on the whole dataset with adjustment for the highest level of qualification attained by the respondent to account for the potentially confounding affect that higher levels of training may have. A separate multivariable regression analyses for each of the 12-items on the EPIC scale was undertaken using highest level of qualification treated as categorical covariate with the bachelor degree serving as the reference value. Years of clinical experience was also entered into these models as a categorical variable with 1 year of experience serving as the reference value. Statistically significant results were set at p value of $<.05$ with 95% confidence intervals and all analyses were undertaken using STATA SE Version 13.0.

Results

A total of 288 ($n=288$) surveys were completed, representing a 58% response rate.

Participant demographics are displayed in Table 1 and show that the majority of respondents were female (88.2%) and below the age of 40 (71.5%). More than half were employed in permanent full-time positions (53.8%) at a Grade 2 level or below (53.4%) and had graduated from their entry level health degree (56.5%) within 10 years prior to participating in the study. The highest level of qualification obtained was primarily a Bachelor's degree (49.3%) with relatively few respondents currently enrolled in post-graduate studies (8%).

Figure 1 illustrates the relationship between confidence to conduct EBP activities and years worked clinically, using only respondents whose highest academic degree was at Bachelor

level (n=142). Visual analysis of the boxplots suggest there is a negative correlation between EBP confidence and years of clinical practice. This is particularly apparent for tasks relating to critical analysis of research studies e.g. interpreting results of statistical procedures. It would appear that new graduates initially report a moderate to high level of confidence with EBP activities but this begins to deteriorate between the second and fourth years of clinical practice. The data from the boxplots indicates that allied health professionals with no post-graduate qualifications lose confidence to conduct some EBP activities over time.

The results of the multivariable regression analysis are displayed in Table 2 **Error! Reference source not found.** The two independent variables, level of qualification and years worked clinically, were significant predictors of confidence to undertake a variety of EBP activities. Allied health professionals with post-graduate qualifications, particularly at Master's and PhD levels, did not experience a decrease in their confidence with EBP activities over time. The data from the multivariable regression analysis supports the findings from the boxplots i.e. allied health professionals gradually lose confidence with EBP activities over time. This appears to begin in the fourth year of practice for tasks such as interpreting results of statistical procedures, and from the fifth year of practice for searching and critically appraising the literature.

Discussion

This study has found allied health professionals lose confidence in their EBP skills in under 5 years of clinical work, after controlling for highest level of qualification attained. It is possible that a meaningful loss of confidence begins sooner than this, but that our study was insufficiently powered to detect these changes across the smaller year categories. Despite this, our finding of a loss of confidence in under 5 years is important as previous

research has not identified that EBP confidence degrades so quickly following graduation. Only two previous studies had identified when EBP skills and confidence begin to deteriorate. Jette et al and Salbach et al both found that EBP confidence was lower in respondents who had graduated more than 15 years ago, in comparison to those who graduated less than 5 years ago. However, both of these studies analysed age as a predictor variable in 5-year intervals which makes it difficult to determine at what point following graduation allied health professionals begin to lose confidence in EBP skills. Furthermore, these studies did not adjust their analyses for higher levels of qualifications despite reporting that there was a correlation between EBP confidence and higher degrees.

It is important to consider why EBP confidence may degrade so quickly in allied health professionals. It is possible that this may be due to early career allied health professionals being predominantly focused on clinical work. The demographics of the respondents support this theory with more than half of the allied health professionals (59.4%) having worked clinically for less than 10 years and employed at a level of Grade 2 or below (53.4%). In the Australian context, the grading system typically reflects the amount of clinical work expected of the allied health professional. Position descriptions for Grade 1 roles are strongly focused on clinical work whilst Grade 3 roles include a minimum of 35% of non-clinical activities such as quality, research and supervision [48]. It is possible that recently graduated allied health professionals lose their confidence to conduct EBP activities due to a lack of opportunity to practice these skills. Exposure to higher qualifications is a protective factor against the degradation of these skills most likely due to a greater level of training in EBP activities such as critical appraisals.

Limitations

Limitations to this study include the nature of a cross-section study design. It cannot be assumed that the relationship between the dependent variable i.e. confidence to conduct EBP and independent variables i.e. years worked clinically and qualification received are cause-and-effect. The respondents who participated were drawn from two metropolitan hospitals, indicating that the perspectives and experiences of allied health professionals from regional areas may not be represented.

Future research directions

Recently graduated allied health professionals are typically equipped with the knowledge and skills to confidently participate in EBP activities. However, these skills degrade quickly, particularly for the professionals with no post-graduate qualifications. If allied health professionals are to provide a practice that is evidence based, there must be investment in strategies which ensure maintenance of EBP skills, confidence and behaviours. Further research determining the timing, frequency and format of these strategies is important.

**Appendix 21 Paper 3 PDF Can the theory of planned behaviour explain allied health professionals' EBP behaviours?
A focus group study.**

TITLE

Can the theory of planned behaviour explain allied health professionals' EBP behaviours? A focus group study.

ABSTRACT

Background

Research suggests that allied health professionals agree with evidence based practice (EBP), however, implementation of research findings into clinical practice is poor. Interventions aimed at improving EBP have been largely unsuccessful. Implementation science research suggests that a theory driven approach is critical when attempting to modify behaviour of healthcare professionals.

Purpose

To explain allied health professionals' EBP behaviours utilising the theory of planned behaviour.

Methods

Focus groups.

Results

Ten focus groups with a total of 49 participants were conducted and consisted of discipline specific and multidisciplinary teams. Participants had positive attitudinal beliefs but low normative beliefs, particularly in relation to the perception that the workplace did not value engagement in EBP activities. The organisational context was a strong moderator of perceived behavioural control, more so than internal variables such as skills. An additional theme was identified and related to the sense of dissonance participants experienced due to their awareness of the knowledge-behaviour gap.

BACKGROUND

Evidence based practice (EBP) is a term used to describe the judicious use of the best available evidence when making clinical decisions (1). It is both a philosophical approach to health care and a set of behaviours when applied in practice. The process of EBP involves integrating individual clinical expertise with the best available external clinical evidence derived from systematic research, whilst also incorporating client preferences and values (2). There appears to be broad agreement across most allied health professional groups that EBP is a 'good idea' and that research evidence can improve patient care (3-13). However, there is a large body of evidence suggesting that implementation of EBP behaviours in every day clinical decision making remains low. There are numerous reasons cited for this including lack of time and lack of skills in understanding and applying research (3, 7, 8, 13-37). In an attempt to address cited barriers, a number of studies have reported on interventions which may enhance the uptake of EBP with allied health professionals (38-48). Most of these studies have resulted in an improvement in knowledge and skills but only two have succeeded in changing the behaviours of the participants (42, 49). It is possible that interventions aimed at changing allied health professionals' EBP behaviours have been largely unsuccessful due to a lack of an explicit theoretical framework guiding the implementation. Researchers from the field of implementation science argue that a theoretical rationale is critical to understanding the nature of the problem being examined and ensuring selection of the most appropriate intervention (50).

A theory can be described as a coherent set of ideas that aim to predict behaviour or other variables (51). A recently published review examined which social cognitive theories best explained healthcare professionals' intention to undertake evidence based behaviours (52).

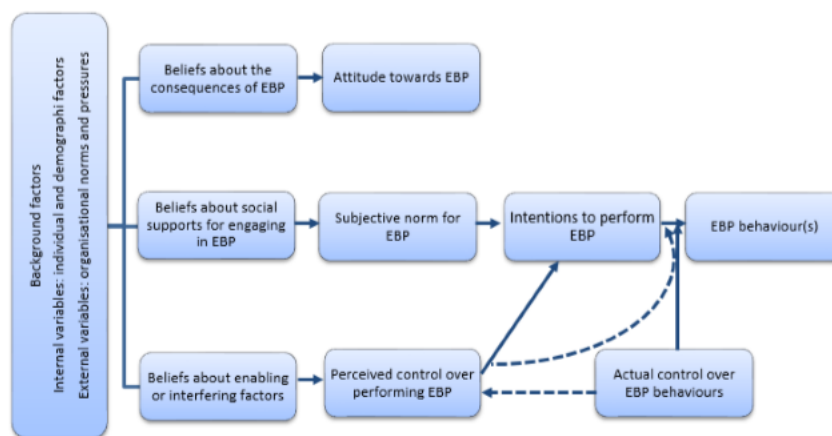
The authors reviewed 78 papers, of which 9 specifically included allied health professionals primarily from pharmacy. Findings from the review suggest that the theory of planned behaviour demonstrated strong efficacy in predicting behaviour of healthcare professionals.

The theory of planned behaviour is one of the most widely utilised and researched theoretical frameworks for explaining human behaviour (53). First proposed in 1985, the theory of planned behaviour suggests that an individual's behaviour is determined by his/her intention to perform that behaviour. The strength of the intention is directly influenced by three variables: i) Attitude towards the behaviour i.e. an individual's beliefs about the consequences of the behaviour and how much they value those consequences e.g. "I think implementing research findings in my clinical work is important because my patients will benefit"; ii) Subjective norm about the behaviour i.e. an individual's beliefs about how their peers or important people (known as referents) will view the behaviour in question and how much the individual wishes to gain approval from these people e.g. "My supervisor expects me to critique that journal article and present it at the multidisciplinary team meeting"; and iii) Perceived behavioural control regarding the behaviour i.e. an individual's perception of his/her ability to perform a given behaviour and how much control they have over the change e.g. "I know how to critique that article and I'm sure I can apply the findings to my practice." More recently, background factors related to both internal and external variables have been incorporated into a revised version of the model (Figure 1). Ajzen et al suggest that contextual factors, including institutional policies, may influence intentions due to their effect on the individual's perceived behavioural control (54). It has been suggested that perceived behavioural control may be particularly important

in explaining workplace behaviours due to the influence of factors such as policies, protocols and organisation driven key performance indicators (55).

A recent meta-analysis on the theory of planned behaviour included 237 studies and found that this theoretical model demonstrated a strong ability to forecast intentions and subsequent behaviours (53).

Figure 1 Theory of planned behaviour (54)



To date, most studies utilising the theory of planned behaviour to explain EBP behaviours have primarily focused on medical and nursing participants. Only two published studies have specifically explored allied health professionals' EBP behaviours utilising the theory of planned behaviour. Scholten-Peeters et al (2013) surveyed 165 physical therapy students, teachers, supervisors and therapists on their attitude, knowledge, EBP behaviours and intention to participate in research (56). The authors of this study analysed the data

obtained from the cross-sectional survey utilising the theory of planned behaviour and not surprisingly, found that teachers had the strongest intention to utilise research. However, the authors failed to account for the impact of the workplace setting on the individuals' intention to participate in EBP behaviours. One could argue that a significant component of a university teacher's role is to participate in research, certainly more so than a clinician. A second significant limitation in this study was the tool used to measure the constructs of the theory of planned behaviour. The DOERAK is not a validated questionnaire but furthermore, it does not provide any information on participants' underlying beliefs. One of the major determinants of intentions are the underlying beliefs, and identifying these beliefs assists in understanding the behaviour in question (54).

The second study utilised the theory of planned behaviour to explore which factors predicted health professionals' intention to use clinical guidelines (57). The authors surveyed a large (n=2252) group of health professionals including doctors, nurses and 'others' such as physiotherapists and occupational therapists. They found there was a correlation between the individual's professional group and the most influential construct affecting intention to use clinical guidelines. Doctors were more affected by perceived behavioural control while nurses and allied health were more affected by subjective norms. As in the previous study, the survey instrument was not validated and nor did it provide any information on participants' underlying beliefs. Furthermore, this study had a low response rate from the 'other' category of health professionals, thus limiting generalisability of the findings. Both studies were conducted in Europe. To date, there have been no published Australian studies that have utilised the theory of planned behaviour to explain allied health professionals' experience of EBP.

This study aims to use the theory of planned behaviour to understand and explain allied health professionals behaviours related to EBP.

METHODS

Study design

Focus group design was selected as the methodology so that we could better understand the participants' experience of EBP in their specific context(s). We anticipated that a group discussion may assist in revealing subjective norms related to professional groups and/or the workplace setting. Focus groups are considered to be one of the strongest methods of data collection for exploring attitudes, beliefs and needs within the social network of a group context (58).

Participants and setting

This study was conducted at a large metropolitan health service located in Australia, which employs nearly 1,000 allied health professionals in a range of settings including acute hospitals, sub-acute rehabilitation hospital and community health centres.

Allied health professionals from all of the major professional groups were targeted for participation in the study. Multidisciplinary teams from the community and acute sectors were also invited to participate. Purposive sampling was used to ensure adequate numbers of discipline specific participants and also representative of all of the workplace settings, levels of experience, gender and age. A maximum number of 8 participants for each group was deemed to be adequate given the complexity of the topic being examined and the aim being to obtain a deeper understanding of the participants' experience of EBP (59).

Instrument

Questions guiding the focus group discussion (Table 1) were developed according to the manual for "Constructing questions based on the theory of planned behaviour" (60). Each focus group commenced with introductions and an opening question asking participants "what does EBP mean to you?" Attitudes towards EBP were elicited by further asking how the participants felt about EBP and their perception of what was good/bad about it. Subjective norms were explored by asking whether they considered EBP important and the reasons why they should or should not be engaging in EBP. Behavioural control involved identifying barriers and facilitators to EBP.

Procedure

Managers from each allied health professional group and multidisciplinary teams were contacted by email and informed of the study details. Participation from allied health professionals from a variety of settings, gender, level of experience and age were requested in order for the sample to be representative.

Each focus group was scheduled to last for 60 minutes and was facilitated by a researcher experienced in focus group methodology. All groups were audio taped and observations of facial expressions, gestures or other non-verbal forms of communication were noted in a research journal. The audio recordings were transcribed and the notes from the research journal supplemented the findings.

Analysis

The data obtained from the focus groups were analysed using NVivo 11 Software. Two coders initially analysed the transcripts for frequency of words and/or statements. The data were then coded according to the constructs of the theory of planned behaviour i.e.

attitudinal beliefs towards about EBP, normative beliefs for EBP and control beliefs regarding EBP. The transcripts were reviewed again to further refine the code structure developed from the initial analysis. The most frequently mentioned beliefs underlying each construct were considered to be significant contributors to behavioural intentions and eventual behaviour. As per recommendations in the manual on utilising the theory of planned behaviour in health services research (60), a second researcher involved in the study but not in the focus groups, reviewed the transcripts and analysis in order to increase validity. Any additional themes related to the topic of EBP but not specifically the constructs related to the theory of planned behaviour were identified and analysed by two of the authors of this paper.

Ethics

The study was approved by the Human Research Ethics Committee (HREC) at each site.

Results

Ten focus group with a total of 49 participants were conducted and included both discipline specific and multidisciplinary teams. The following allied health professional groups were represented: dietetics / nutrition, occupational therapy, physiotherapy, podiatry, psychology (clinical and neuropsychology), social work and speech pathology. Three multidisciplinary groups from community health, the acute stroke unit and a mentorship program also participated. The mentorship program comprised a targeted multidisciplinary group of clinicians who would also be participating in the intervention phase of this study.

Most of the participants were women (94%) and equally distributed across the workplace settings with 29% from the acute sector, 35% from the sub-acute campus and 36% from community health/rehabilitation centres (Table 2). The majority of participants had

substantive clinical loads with only two managers present in the dietetics group. Less than 27% had post-graduate qualifications.

A total of four major themes were identified including the three constructs from the theory of planned behaviour i.e. attitudinal beliefs about EBP, normative beliefs about EBP and control beliefs about EBP. A number of sub-themes arose from the normative beliefs including the organisation, consumers and students. Similarly, three sub-themes were identified for behavioural beliefs and related to either the individual clinician, the evidence or the organisation.

The fourth major theme identified from the data related to the experience of dissonance participants described due to their acute awareness of the knowledge-behaviour gap. Although this is not a separate construct contained within the theory of planned behaviour, it appeared to be a fall-out due to the inability of participants to achieve the behavioural outcome in question i.e. EBP.

The opening question asked participants what EBP meant to them and revealed an inconsistent understanding of the term. Most participants focused only on the research component and described it as a quality assurance process. Surprisingly, a number of participants voiced concerns about the lack of instruction on how to use EBP clinically.

Everybody goes "oh we have to use EBP" but no one really exactly explains what it is and how to translate that into everyday practice (FG6)

All participants reported exposure to EBP either at undergraduate level or through their specific professional groups.

I think if you've come through a science degree basis, which all of us have, one way or another, we're sort of taught it to a point (FG3)

Theme 1: Attitude towards EBP

The theory of planned behaviour suggests that behavioural beliefs link the studied behaviour to a particular outcome and each outcome has a value e.g. good or bad. The participants reported a number of advantages related to EBP including improved patient outcomes, strengthened practice and a sense of being able to 'hold their own' when working in a multidisciplinary team.

It's (EBP) really about consistency of processes leading to better outcomes... better outcomes, reduced variation, reduced waste (FG1)

In some ways the evidence, with time, has potential to strengthen our practice (FG3)

I actually quite like it when there's hard scientific evidence for some aspect of our practice. If you're working in a hospital it counts for a lot more than softer evidence (FG10)

There were fewer disadvantages reported and these primarily centred on the perception that EBP could constrain clinical practice and that patient centred care should address the needs of the patient rather than simply fulfilling the requirements of EBP.

As a clinician, my goal is not just to fulfil EBP...my goal is to achieve best patient outcome and I don't always necessarily have to follow EBP (FG6)

Summary of findings for attitude towards EBP

The results of this analysis suggest that participants have a strong overall positive attitude towards EBP, despite some frustrations regarding the model and its fit within clinical practice.

Theme 2: Subjective norm for EBP

A subjective norm is determined by the normative beliefs the individual holds in relation to referents. The analysis identified four referent groups who the participants' identified as either approving or disapproving of EBP.

Referent Group1: Patients and Family / Carers

A number of participants identified patients and their family/carers as an important referent group in relation to EBP. Participants described an increase in consumer knowledge regarding therapeutic interventions and there was a sense that allied health professionals should be able to describe their selection of treatment from an evidence base.

If you're going to talk to the family, or patients that want to know what you're doing and why, then I want to be able to say "look, the research shows this is going to be the most effective treatment for you" (FG2)

The patient's families go home and google (FG2)

Referent Group 2: Students

Many of the participants provide regular supervision for students on clinical placements at their workplace. They described a sense of responsibility for being able to explain their clinical practice through an EBP framework. They also recognised that supervision of students could provide opportunities to be more evidence-based by utilising the students' EBP skills.

There's also the idea of responsibility of when you're a clinical supervisor and what you're teaching students as evidence based (FG10)

The students who are coming through now are very well practiced...I mean they can show us how to search (literature) better than we can, I'm sure (FG2)

Referent Group 3: Workplace

Participants identified the workplace, including direct supervisors, as either ambiguous or disapproving of EBP behaviours. There was limited or no support from the organisation to pursue EBP. This was demonstrated by providing no protected time to pursue non-clinical activities and limited or no funding to attend continuing professional development activities. A number of participants described situations where they invested their own time and effort into EBP activities but felt the organisation as a whole didn't value this effort.

Another factor is the culture of the place that you work in. Some places I've worked in, they really encourage you to push and get evidence and find out if you're doing the right thing. Some places don't (FG6)

You bust a gut to do the evidence based project, it doesn't get you anything. Like it's not like you get recognition, or you get time allocated to it, or that you get supported to then take what you've done and present it at a conference (FG2)

As soon as there are budgetary restrictions, research...anything that isn't core clinical business falls off the radar (FG7)

Well I don't do it (EBP) because my supervisor would tell me that's less of a priority than going and meeting the new patients (FG2)

Some respondents expressed frustration at the ambiguous messaging from the organisation in relation to EBP. They felt the organisation promoted their services as being evidence-based but their actions did not support this premise.

If we spent the time working on our EBP practice then perhaps our work could become more efficient or our outcomes would improve in the longer term. However, in the short term, they want us to keep length of stay to a reasonable length (FG6)

The disappointing thing is you work for a big organisation that's flying the banner for excellence and saying we want you to be doing things but for allied health... we're not seen as a huge priority (FG9)

As an organisation, I think people would like to view (us) as being evidence-based... but at the ground level, on the clinical base, it's unfortunately a lot further from the truth... (FG2)

Referent Group 4: Professional Bodies & Organisations

Participants described their own professional groups as approving of and facilitating EBP.

This referent group was perceived of as a significant resource in relation to EBP and many participants sought out this support in their own time.

We've got interest groups (profession specific) that are a really good resource (FG2)

I convene the (profession specific) special interest group and I'm getting people in that have got expertise (FG9)

To attend a lot of education stuff with (profession specific association), they tend to be in the evenings, outside of work hours (FG5)

Summary of findings for subjective norm towards EBP

The theory of planned behaviour suggests that the strength of the normative beliefs is determined by motivation to comply with the referents. The results of this analysis suggest that the participants are experiencing low subjective norm for EBP due to the perceived disapproval from the organisation.

Theme 3: Perceived behavioural control over EBP

Control beliefs include both internal and external variables that impact how easy or difficult the participant believes EBP will be. Analysis of the data revealed one group of internal variables related to skills and knowledge and two groups of external variables related to the workplace and the nature of the evidence.

Internal variables: The clinician and EBP

Although most clinicians reported receiving some training in the steps related to EBP, all described degradation of these skills over time and with lack of practice. This in turn resulted in inefficiencies as when clinicians attempted to look for evidence, they found the process time consuming and unfamiliar.

If you're not using those skills for two years or something, which is general, then you lose it...you just lose it (FG4)

I wouldn't be confident that what I'm reading is... that I understand it's a good study (FG1)

It's examining the statistics, the methods have changed. There are new statistical methods that I haven't learned (FG3)

You actually have to be reasonably good at it (research) to do it fast enough to actually then employ it clinically (FG4)

External variables: The workplace and EBP

Every participant in the study identified organisation specific factors as the greatest barrier to EBP behaviours. For those individuals who had been practicing longer, there was a sense that a decreasing length of stay for patients contributed to the lack of time to pursue anything other than clinical work. Participants described being unable to meet workload demands which in turn affected their capacity to participate in EBP activities. Lack of resources, both human and other, made even basic EBP activities difficult.

We've got 4 computers for 11 staff of which 2 are dedicated so that's 2 for 9 staff (FG3)

More and more they're pushing towards discharge you know, discharging patients quicker. And our workloads, like at the clinical ward level, are getting huger, like larger and larger (FG4)

If you're back to back with clients all day, that's when you get frustrated. I feel like I don't know what I'm doing here or I want some more information but I haven't got the time to get it (FG2)

I mean, we are time poor. Clinicians are being pulled in multiple different directions in this current environment (FG3)

Clinical always comes first (FG4)

External variables: The nature of the Evidence and EBP

The nature of the evidence itself sparked a great deal of discussion between participants.

There was frustration regarding lack of evidence to either support or refute practice or lack of detail in published studies to assist in applying the evidence.

We're always like "we need to use EBP" but there isn't evidence out there to support one way or another. Or there's not evidence to say that it's great, but there's also no evidence to say that it's causing any harm... so people continue to jog along using it, not having anything to support it (FG1)

They're just not giving you an example or a way to complete an intervention that's going to help you in your actual hands on practice (FG5)

In a study they restrict the inclusion and exclusion criteria so significantly that when you apply it to what you see in real life, they're not the same clients even though the diagnostic group might be the same (FG1)

Anything that's published as a best practice guideline generally assumes non-complex situations (FG6)

Summary of findings for perceived behavioural control in relation to EBP

Analysis of the data revealed that participants believe they do not have the skills or confidence to undertake EBP. Furthermore, numerous obstacles were identified within the workplace and the evidence itself, resulting in an overall low perceived behavioural control.

Theme 4: Awareness of the knowledge-behaviour gap

Participants in all of the focus groups were aware they were generally not working through an EBP framework. They described as knowing they should be participating in activities such as critiquing research and implementing new findings in practice. However, they believed that the numerous obstacles were difficult to overcome and prevented them from delivering an evidence based practice. The fallout from this awareness of the knowledge-behaviour gap ranged from feeling overwhelmed and stressed to a sense of guilt.

I'm feeling bad because I don't have enough time to go and look for more evidence. Sometimes it's not even more evidence. Sometimes I think from being a clinician for so long, is actually forgetting or kind of going "I'm doing that, I've kind of forgotten a little bit why" (FG10)

I know I want to do this but it's just another stressor in a stressful working day (FG9)

It's just too daunting... so you just don't do it (FG10)

It's demoralising (FG9)

Sometimes you get a bit tired... not burnt out but run down... that demoralising stuff where we're not encouraged to do things just leaves you really flat (FG9)

It's overwhelming knowing where to start. It's just too much (FG6)

DISCUSSION

This study found that allied health professionals have low subjective norms regarding EBP due to the belief that the organisation in which they work does not approve of EBP activities. Participants reported that taking time away from seeing patients was frowned on by numerous individuals in the organisation including supervisors and the multidisciplinary team. Only one other study has identified normative beliefs as a significant predictor of intention to use EBP. Kortteisto et al's large cross-sectional study on Finnish healthcare

professionals found that normative beliefs and social pressure strongly correlated with nurses and “other professionals” intentions to use clinical guidelines (57). However, it is unclear who exactly is included in the ‘other’ category.

The second important finding from this study was that the organisational context is a strong moderating influence on perceived behavioural control. Perceived behavioural control is comprised of factors internal to the individual such as knowledge and skills, and factors external to the individual such as time and resources. The theory of planned behaviour proposes that if an individual has adequate knowledge and skills with few obstacles then they will have an increased perception of control in relation to the behaviour (61). It was not surprising to find that the participants in this study reported a lack of skills in relation to EBP. Numerous studies have found that lack of EBP skills, knowledge and confidence are significant barriers to engagement in EBP (3-13). However, this study found that factors external to the participants and largely outside of their control are in fact greater predictors of the intention to participate in EBP. Increasing workloads and the expectation that patients must be discharged within a time-frame set as an organisational deliverable all acted as obstacles to EBP behaviours.

The final theme identified in this study related to the dissonance experienced by participants due to working in an inherently contradictory situation. On one hand participants believed that EBP would improve patient outcomes (attitude) and believed that numerous individuals and groups expected they be delivering their practice through an evidence based framework (norm). On the other hand, the organisational context presented seemingly insurmountable obstacles to the delivery of EBP (control) including difficult to achieve organisational goals and a significant lack of resources. Participants appeared to be

caught in a vicious cycle of being aware of what they 'should' be doing but having insufficient power to overcome the contextual factors. The result of this was profound and participants described the experience as stressful and overwhelming.

If you're back to back with clients all day, that's when you get frustrated. I feel like I don't know what I'm doing here, I want some more information but I haven't got time to get it(FG2)

Guilt sets in a little bit because of the... potentially knowing that I might not have done as much ongoing research to make sure that what I'm doing is always evidence based (FG10)

Another outcome for participants in this paradoxical situation was to revert to routines and habits. The effort to overcome the obstacles to EBP outweighed the benefits, particularly given the belief that the organisation did not value EBP.

To do something different requires a lot more effort... that blows out your time and makes it really hard. It's very uncomfortable to do that so it's much more comfortable to go back to how you're already doing it (FG10)

Incorporating evidence into practice requires more than awareness of the EBP model or knowledge of the steps set out in the Sicily Statement. Interventions targeting only these factors have typically failed. If allied health professionals are to be evidence based in their clinical work, a transformative cultural change across the organisation is necessary. This could include using principles from "learning organisations" research, such as rewarding learning and innovation (62).

CONCLUSION

This study has demonstrated that the theory of planned behaviour is a useful framework for explaining allied health professionals' experience of EBP. The results revealed that the organisational context has a strong moderating influence on perceived behavioural control,

more so than variables internal to the participant such as skills and knowledge. This finding suggests that interventions aimed at enhancing the uptake of EBP with allied health professionals should target the organisational context along with skills and knowledge.

LIMITATIONS

Focus group methodology relies on smaller numbers of participants in order to be able to adequately explore complex topics, such as EBP. However, this makes it difficult to generalise the findings to a broader population. There is also the potential of moderator bias as the focus group discussions were led by one of the primary investigators of the study. However, a third researcher who was not in attendance during the focus groups assisted with transcription and analysis to reduce the potential of moderator bias.

FUTURE RESEARCH DIRECTIONS

There is a growing interest in interventions that may support allied health professionals with the uptake of EBP in their clinical work. However, it is critical to utilise a theory based approach in order to target the behaviour and context specific barriers preventing EBP. Further studies on utilising social cognitive theories, such as the theory of planned behaviour, to enhance the uptake of EBP with allied health professionals would contribute to the growing field of implementation science. It is also recommended that interventions targeting EBP within allied health pay close attention to the organisational context and normative beliefs pertaining to organisational values.

Appendix 22 Paper 4 PDF Can a tailored intervention enhance the uptake of EBP with a large group of allied health professionals? A quasi-experimental study.

The Journal of Continuing Education in the Health Professions
Can a tailored intervention enhance the uptake of EBP with a large group of allied health professionals? A quasi-experimental study.
 --Manuscript Draft--

Manuscript Number:	
Full Title:	Can a tailored intervention enhance the uptake of EBP with a large group of allied health professionals? A quasi-experimental study.
Short Title:	A tailored intervention to enhance EBP with AHP
Article Type:	Original Research
Keywords:	Evidence-based practice; research-utilisation; continuing education; allied health; continuing professional development; theory of planned behaviour; tailored interventions
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Manuscript Region of Origin:	AUSTRALIA
Abstract:	<p>Introduction Allied health professionals generally have a positive attitude towards evidence-based practice (EBP), however, there remains a gap between the services and interventions that are currently being provided, and the evidence base of what should be provided. Studies suggest it is largely a result of the lack of knowledge and confidence of allied health professionals to undertake the steps required to translate evidence into clinical practice. This paper reports on a tailored intervention aimed at enhancing EBP skills and behaviours of allied health professionals.</p> <p>Methods This study utilised a pre-intervention - post-intervention design with two parallel control groups. The tailored intervention focused on building the capacity, opportunity and motivation of a smaller number of 'EBP champions' based in different clinical areas across the organisation. EBP attitudes, knowledge, skills and behaviours were measured using previously validated scales.</p> <p>Results A total of 568 allied health professionals completed both phases of the survey. Of these, 194 were from the target areas related to the EBP champions clinical role. Overall response rate across the organisation was 58%. Analysis of the data showed a positive change, primarily in EBP behaviours, such as reviewing literature for clinical practice.</p> <p>Conclusion This study found that a tailored intervention can enhance some EBP behaviours in a broad range of allied health professional groups. Further work is indicated to identify whether the intervention developed in this study is generalisable to other settings or whether it must be re-tailored according to the barriers specific to the respondents and context.</p>
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53 INTRODUCTION

54 Allied health professionals are 'tertiary qualified providers of mainstream healthcare'
 55 and include members of the following professional groups: audiology, dietetics,
 56 occupational therapy, physiotherapy, podiatry, social work and speech pathology ¹.
 57 More than 25% of the Australian healthcare workforce are allied health
 58 professionals, with an estimated 195,000 clinicians delivering 200 million episodes of
 59 care annually ^{1,2}. It is therefore not surprising that both consumers of healthcare and
 60 employers of allied health services, expect that allied health professionals will be
 61 evidence-based in their delivery of services and interventions ³⁻⁵. Evidence-based
 62 practice (EBP) is a term used to describe the "conscientious, explicit and judicious
 63 use of current best evidence in making decisions about the care of individual
 64 patients" ⁶. EBP involves integrating individual clinical expertise with the best
 65 available external clinical evidence derived from systematic research whilst
 66 incorporating client values and preferences.

67 Building the capacity of health professionals to use EBP has the potential to improve
 68 patient outcomes and reduce healthcare costs ⁷⁻¹¹. For example, a parallel cohort
 69 comparison study published in 2015 compared two models of care over a period of 7
 70 years; one model included EBP skill building activities (such as training staff in
 71 critical appraisal of literature) and accompanying policies (such as protected staff
 72 time to engage in these activities). The comparison model was standard practice and
 73 as such, did not include structured EBP activities or related policies ¹². The results
 74 from this longitudinal study found that patients treated under the EBP model
 75 experienced significantly reduced rates of mortality and decreased length of stay.
 76 This is one of several studies demonstrating the correlation between improved
 77 outcomes and interventions that aim to close the research-practice gap ¹²⁻¹⁴.

1 78 Despite the body of literature arguing that health professionals should make clinical
 2 79 decisions considering the best available evidence, implementation of this approach
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 4 80 remains problematic. Numerous authors have cited the significant period between
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 6 81 the publication and/or dissemination of evidence and subsequent practice change ¹⁵⁻
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 8 82 ¹⁸. It has been reported that it takes on average five years after being published
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 11 83 before clinical guidelines are implemented into routine practice, and even those
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 13 84 guidelines that are broadly accepted are often not routinely utilised ¹⁵. Published
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 15 85 literature on this topic has found that clinicians lack the skills to interpret studies
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 17 86 reporting on new knowledge and evidence, and then apply this evidence in clinical
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 19 87 practice ¹⁹⁻²⁶.
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 24 88 Recognition of the significant research-practice gap in allied health has led to an
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 26 89 interest in interventions which have the potential to improve their uptake of EBP.
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 28 90 Implementation strategies designed to enhance healthcare professionals'
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 30 91 engagement with the evidence includes ²⁷, the following categories: (1) audit and
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 32 92 feedback; (2) education strategies; (3) tailored interventions; (4) local opinion
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 34 93 leaders, and; (5) clinical practice guidelines. Studies evaluating the impact of these
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 36 94 interventions with allied health professionals have typically resulted in a change in
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 38 95 attitudes and knowledge but not a change in behaviours that would indicate greater
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 40 96 use of evidence in decision making ²⁸⁻³⁸. Studies that have reported a change in
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 42 97 behaviours have either had small sample sizes, high drop-outs ³⁹ or intervention
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 44 98 impacts that ceased once the study ended, suggesting only short-term benefits ³².
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 47 99 The aim of this study is to evaluate the effect of an intervention designed to have a
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 49 100 sustained effect on the capacity of allied health professionals to use evidence in
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 52 101 decision making and behaviours related to implementation of EBP.
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METHODS

Study design

This study utilised a quasi-experimental pre-intervention – post-intervention design with an intervention targeted at specific clinical areas within one health care organisation, and two control comparison groups. The first comparison group came from within the intervention organisation but in the non-targeted clinical areas, while the second comparison group came from the targeted clinical area but in a separate, non-intervention control organisation. Assessment of the outcomes occurred immediately prior to the intervention and 12 months post-intervention.

Participants and setting

The research took place across two health care organisations in Australia. The intervention organisation was a major metropolitan health service located in Victoria, Australia. The health service provides 260,000 episodes of hospital care and includes 40 locations across acute, sub-acute and community settings.

The control organisation was in Tasmania, Australia and provides more than 50,000 episodes of hospital care and includes rehabilitation services and community-based centres.

All allied health professionals from both the control and experimental organisations were invited to participate in the baseline and follow-up surveys. The clinical areas targeted for the intervention were aged and adult rehabilitation wards, community rehabilitation and domiciliary services. The allied health professional groups included audiology, exercise physiology, nutrition/dietetics, occupational therapy, podiatry, physiotherapy, psychology (clinical and neuropsychology), speech pathology and social work.

Instrument

Allied health professionals' beliefs, attitudes, confidence, sources of information to guide clinical decisions and behaviour relating to EBP were evaluated using a self-reported survey comprised of previously validated tools. The survey consisted of a total of 56 questions grouped into five sections to measure specific constructs of EBP. Four sections that measured beliefs, attitudes, sources of information and recent (prior 6 months) participation in EBP activities were based on a survey developed and validated by Jette et al for use with allied health professionals^{3,40}. Respondents were asked to rate their attitudes and beliefs using a six-point Likert Scale from strongly agree to strongly disagree. Sources of information for clinical decision making was measured using a five-point Likert Scale from always to never whilst participation in EBP activities was measured using a yes/no response. The fifth section measured confidence to conduct EBP activities and was based on the evidence-based practice confidence scale⁴¹. This scale consists of questions related to the steps considered necessary for EBP, such as critically appraising the literature for reliability and relevance. Respondents are asked to rate their level of confidence on an 11-point scale from 0% (cannot do at all) to 100% (certain can do). The evidence-based practice confidence scale has excellent reliability and validity and has been used in several studies exploring allied health clinicians' self-efficacy to conduct EBP activities⁴¹⁻⁴⁴.

Information regarding respondents' age, gender, years practicing, level of qualification and work setting were all collected on the first page of the survey. During the second phase of data collection, participants were also asked if they participated in the first phase survey.

Intervention

A tailored intervention approach was utilised, and the content was driven by the data obtained in the pre-implementation phase of this study, collected over a period of 12 months. Baseline data collection methods included a survey and focus group discussions with eight clinical reference groups at the intervention organisation. All data were analysed using the theory of planned behaviour (Figure 1), which enabled an in-depth understanding of the problem. The theory of planned behaviour proposes that an individual's behaviour is determined by their intention to perform the behaviour, which in turn is influenced by their attitudes towards the behaviour, normative beliefs about the behaviour and perceived behavioural control related to the behaviour. This model was selected for the study as it is one of the most widely researched and utilised theoretical frameworks for explaining human behaviour and supports knowledge translation interventions.

The tailored intervention was delivered over a 12-month period and was supported by a variety of implementation strategies, as described below:

Step 1: Stakeholder engagement

Clinical reference groups (CRG) for allied health professional groups and multidisciplinary teams working in subacute aged care, sub-acute rehabilitation, community rehabilitation and domiciliary services were established. The purpose of the clinical reference groups was to engage the broader team in identifying an area of clinical practice that they wished to address through an evidence-based project. A total of nine allied health professional groups or multidisciplinary teams were invited to participate including community rehabilitation, rehabilitation in the home (RITH) and discipline specific groups such as dietetics, occupational therapy, physiotherapy, podiatry, psychology, social work and speech pathology.

Step 2: Mentorship group

This phase of the intervention built on the concept of knowledge brokerage embedded within the organisation. Each CRG nominated an individual allied health professional to attend a mentorship program. Nominations involved a group discussion and identification of an individual who was motivated to participate in the program and able to leave their clinical caseload for a fixed period. Successful nominees will from hereon be referred to as mentees.

The role of the mentees was to become EBP champions for their specific professional group and/or team where they worked. It was conceived that this would happen in several ways. First, each mentee would need to deliver an evidence-based project that was selected by the CRG. This would also involve educating their colleagues on the methods they used to complete the project and ideas on implementation. Second, the mentees would become a reference point for their colleagues in relation to EBP skills and knowledge, including how to critically appraise literature.

Each mentee was seconded to the allied health research unit for a period of two weeks as part of the mentorship program. The program involved a combination of learning and support strategies, detailed below.

Skills-based workshop

The content of the 3-day workshop was based on the data collected in Phase 1 of the study and included the following topics:

1. How to formulate a question using PICO
2. How to effectively and efficiently search for literature
3. How to critically appraise literature

Mentees were able to directly apply the skills from these workshops to their evidence-based projects.

Academic support

Each mentee was matched with an academic mentor from the local university. There is a body of evidence to suggest that EBP skills, knowledge and behaviours can be enhanced when organisations are affiliated with academic institutions. The goal of this strategy was to create a longer-term link between the intervention organisation and the academic institution. The academic mentors would provide guidance to the mentees on completing the evidence-based project, including later implementation.

Delivery of an evidence-based project

Each CRG identified an area of clinical practice they were concerned with and/or wished to improve upon. However, they perceived they either didn't have the skills or time to be able to address the issue individually. The mentees goal was to deliver a report based on a critical analysis of the published research on the construct identified and selected by their relevant clinical reference group.

Step 3: Organisational culture

The culture of an organisation can have a significant effect on health professionals' experience of EBP⁴⁵⁻⁴⁸. A constructive culture is associated with more positive attitudes towards EBP and conversely, a negative and unsupportive culture is perceived to create significant barriers to all EBP related constructs. The elements of organisational culture which were addressed in this study included:

1. Managerial support for the research study. This included agreeing to release staff to attend CRG meetings and for the mentees to attend a 2-week mentorship program.

2. Development of a research hub with a drop-in design for all allied health professionals to use. Lack of computer resources was a frequently cited barrier in the literature. The research hub had dedicated computers in a quiet space for allied health professionals to use as they needed.
3. Launch of an organisation specific research web page with EBP resources.

Control Groups

The first parallel control group was derived from within the intervention organisation but from the clinical areas that had not been targeted as part of the intervention process. These clinical areas included acute care wards, hospital based outpatient department and community health services / centres. The EBP champions did not work in these areas or sites.

The second parallel control group was from the same target areas but a different organisation. This group did not participate in the previously described intervention. A site specific investigator provided from the control organisation provided annual information on any activities or initiatives that may impact on EBP skills, attitudes, belief and behaviours of allied health professionals.

Procedure

Email contact was made with the managers of each allied health professional group, across both sites, to explain the study and invite participation from all their qualified staff members. The survey was available online via a web-link to a SurveyMonkey page. Each respondent was allocated a unique identifier to maintain confidentiality. A hard-copy of the survey was also available for those respondents who preferred this method. Prepaid addresses were provided with all hardcopies of surveys in order to enhance likelihood of return. All surveys that were returned as a hard-copy were then manually entered by a research assistant. All respondents who completed the survey,

248 either online or hardcopy, were eligible to go into a drawer to win a \$100 gift voucher.

249 Implied consent was assumed for all respondents who submitted a completed survey.

250 **Ethics**

251 The study was approved by the Human Research Ethics Committee (HREC) at each
252 site. Voluntary completion of the survey was deemed as consent. Participants in the
253 intervention program provided written consent.

254 **DATA ANALYSIS**

255 Data from Survey Monkey was exported via excel and copied into STATA SE 13.0
256 (College Station, Texas). The primary focus of the analysis was to establish if the
257 intervention had any impact on EBP attitudes, beliefs, skills, knowledge and
258 behaviour. Regression analyses both within the organisation and between the
259 intervention and control organisations were completed, as follows:

- 260 1. Within intervention organisation: intervention target area vs non-intervention
261 target area. Data from respondents who worked in sub-acute rehabilitation
262 care ward, sub-acute aged care ward, community rehabilitation and
263 domiciliary services such as rehabilitation in the home were compared with
264 respondents who worked in all other areas of the health service i.e. acute
265 wards, outpatient department in a hospital and community health.
- 266 2. Within target area: between intervention and control organisations. Data
267 pertaining to allied health professionals who worked in subacute rehabilitation,
268 subacute aged care, community rehabilitation and domiciliary care were
269 compared between the two organisations.

270 Regression analyses were completed to measure the effect of the intervention on the
271 dependent variable i.e. EBP attitudes, beliefs, skills, knowledge and behaviour.

272 Statistically significant results were set at $p < .05$.

RESULTS

A total of 568 allied health professionals completed both phases of the survey. Of these, 194 were from the target areas related to the EBP champions clinical role. Pre-intervention baseline data included 103 respondents (n=71 intervention group and n=32 control group) while post-intervention data included 91 respondents (n=60 intervention group and n=31 control group). Overall response rate across the organisation was 58%.

At baseline, respondent demographics were comparable for gender, age groups, highest level of qualification received and employment status (Table 1). The primary difference between the groups related to the grade level of employment with a significantly higher number of senior staff (Gd.3 and above) in the control organisation (75%) in comparison to the intervention organisation (24%).

The results of the statistical analyses are displayed in Table 2. There were significant differences both within the intervention organisation and between the intervention and control organisations, in the target areas, primarily for EBP behaviours.

Respondents from the intervention organisation became more confident in formulating a research question ($p=0.005$), more likely to review literature for their own practice ($p=0.03$), more likely to use research studies to guide their clinical decision making ($p=0.05$) and write a manuscript for a journal ($p<0.01$). Respondents from the target areas within the intervention organisation also became more likely to collect information and/or lead a research project ($p=0.01$).

DISCUSSION

This study found that a tailored intervention improves attitudes, beliefs, skills and behaviours related to EBP with allied health professionals. To date, there have been no published studies demonstrating a change in EBP behaviours with a wide range

1 298 of allied health professionals in an Australian setting. The intervention delivered in
 2 299 this study was developed following an extensive data collection process to
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 4 300 prospectively identify the barriers to EBP. One of the criticisms of much of the prior
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 6 301 research in this field is both the lack of robust data collection processes to identify
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 8 302 the contextually specific barriers and the lack of a theoretical framework to guide
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 10 303 data collection and intervention efforts ⁴⁹. This study utilised the theory of planned
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 12 304 behaviour to obtain a better understanding of the participants' experience of EBP.
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 14 305 We found that allied health professionals' perceived behavioural control was
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 16 306 influenced by background factors related to the organisational context. This was a
 17
 18 307 novel finding and had not previously been reported in published literature on this
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 20 308 topic. We therefore ensured the intervention targeted multiple barriers that were
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 22 309 identified from both the survey data and clarified through the focus group discussions
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 24 310 held with the intervention organisation.
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 26 311 The mentorship group established as part of the intervention ensured that the skills
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 28 312 gained by the allied health EBP champions could be shared with their specific
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 30 313 professional groups and teams. We saw a change across all the target areas even
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 32 314 though the intervention focused on eight individuals. A similar study was conducted
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 34 315 by Russell et al and used knowledge brokers to facilitate the uptake of outcome
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 36 316 measurement tools with a group of physiotherapists ⁵⁰. The knowledge broker role
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 38 317 involved supporting participants to utilise specific outcome measurement tools over
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 40 318 the study period of 6 months. The outcomes of the study indicate that the initial
 41
 42 319 increase in using the outcome measurement tools was not sustained once the
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 44 320 knowledge broker role ceased. One of the major differences between the
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 46 321 intervention in this study and Russell et al's study was ensuring the EBP champions
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 48 322 were trained in all the EBP steps and ensuring the EBP champion role was not a
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323 separate concept. Rather, we envisioned the EBP champions to be 'regular'
 324 clinicians who would be nominated by their peers to complete a piece of evidence-
 325 based work and then become an embedded resource.
 326 It should be noted that greater changes were seen between the intervention and
 327 control organisations than between the target and non-target areas within the
 328 intervention organisation. This may be due to the EBP champions influencing areas
 329 other than their specific work groups / sites. This may have occurred through
 330 discipline specific meetings that cross sites and work areas, and through other
 331 collegial relationships.

332 **LIMITATIONS**

333 The sample size was underpowered due to the limited number of participants in the
 334 targeted intervention areas, potentially resulting in a type II error. A large number of
 335 statistical analyses were performed which may increase the risk of a type I error.
 336 However, this is not likely as the significant findings were primarily found in one EBP
 337 construct i.e. behaviours. It is not possible to determine which component of the
 338 tailored intervention was most influential in effecting the changes observed. Other
 339 limitations include potential confounding variables such as changes in staff between
 340 the assessment periods. The control site commenced a journal club intervention with
 341 their community based allied health professionals. It is possible we may have seen
 342 greater differences between the intervention group and control group if they did not
 343 participate in an evidence-based journal club. Both sites are based in metropolitan
 344 regions, albeit different size cities. It is therefore difficult to generalise the results
 345 from this study to rural or regional areas. It must also be noted that survey data has
 346 limitations as it is a proxy measurement of the constructs.

FUTURE RESEARCH DIRECTIONS

This study identified that a tailored intervention can improve EBP behaviours with a large group of allied health professionals. It would be useful to conduct a longitudinal study to determine if the changes observed were sustainable. Furthermore, data on usage of the research hub could provide important information for other health services aiming to establish a similar service.

LESSONS FOR PRACTICE

- Allied health professionals generally have a positive attitude towards EBP, however, implementation of evidence in practice is inconsistent.
- Interventions to enhance the uptake of EBP with allied health professionals have been largely unsuccessful, and this may be due to two factors: 1) not targeting the context specific barriers, and 2) lack of a theoretical framework to guide the intervention.
- Interventions to enhance the uptake of EBP may be more likely to succeed if context specific barriers are prospectively identified and interventions are tailored.
- A theoretical framework to identify and modify EBP behaviours is a critical component of the intervention process.