Supplementary table 1: Literature search in Pubmed (A) and Web of Science (B)

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| *A: Literature search Pubmed* | | | |
|  | **MeSH terms and key words in PubMed** | **Hits – December 2016** | **Hits – August 2017** |
| #1 | Parkinson[Title/Abstract] OR Parkinson disease[MeSH] | 62882 | 65259 |
| #2 | Turning[Title/Abstract] OR pivot[Title/Abstract] OR circumduct[Title/Abstract] | 19320 | 20148 |
| #3 | Freezing[Title/Abstract] OR freezing of gait[Title/Abstract] | 29482 | 30512 |
| #4 | #1 AND #2 | 284 | 298 |
| #5 | #1 AND #3 | 756 | 802 |
| #6 | #1 AND #2 AND #3 | 47 | 52 |

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| *B: Literature search Web of Science* | | | |
|  | **Key words in Web of Science** | **Hits – December 2016** | **Hits – March 2017** |
| #1 | Parkinson[Topic] OR Parkinson disease[Topic] | 93955 | 100159 |
| #2 | Turning[Topic] OR pivot[Topic] OR circumduct[Topic] | 465591 | 488955 |
| #3 | Freezing[Topic] OR freezing of gait[Topic] | 187961 | 196057 |
| #4 | #1 AND #2 | 1376 | 1467 |
| #5 | #1 AND #3 | 1237 | 1360 |
| #6 | #1 AND #2 AND #3 | 93 | 102 |

Supplementary table 2: Data extraction of the included articles. A significant difference between subject characteristics is indicated with \*.

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| Article | Participants | Protocol | Outcome and results |
| Arias P, et al., 2010 [38] | * 19 PD patients * FRs n=9 * NFRs: n=10 * Mean values: FRs vs NFRs * Age: 68.2-64.4 years * FOG-Q: 16.7-0\* * UPDRS III: ns | * Tests: in OFF-state of medication * Protocol: Walk down a corridor with a door in the middle 🡪 touch a button on the wall at the end 🡪 turn around 🡪 come back and touch the button on the other wall. * Equipment: footswitches | * *Turn time*: FRs > NFRs |
| Bengevoord A., et al., 2016 [31] | * 30 PD patients * FRs: n=16 * NFRs: n=14 * Mean values: FRs vs NFRs * Age: 68,8-65,3years * Gender(%male): 85,7-71,4% * DD: 9,6-7,8years * H&Y: 2,5-2,3 * MDS-UPDRS III: 37,9-34,5 * MMSE: 29,1-27,7 * NFOG-Q: 13,5-0\* * LED (mg/day): 567-472 | * Tests: in OFF-state of medication * Protocol: walk 5m and turn 180° 🡪 3 times to the left and 3 times to the right * The turn was divided in 4 quadrants (between 10°-170°) * Equipment: “Vicon Motion System with retroreflective markers | * *COM behaviour during turning quadrants:* * *Turn time*: FRs > NFRs * *COM distance:* no differences between groups * *COM velocity:* no differences between groups * *Step width:* FRs < NFRs * *Medial COM position*: no differences between groups * *Anterior COM position*: no differences between groups * *COM behaviour pre-FOG* * *Turn time*: increased * *COM distance*: no differences * *COM velocity*: no differences * *Step width*: decreased * *COM position*: more anteriorly, less medially * *FOG frequency*: 6 FRs had a total of 21 FOG episodes during turning |
| Bhatt H, et al., 2013 [35] | * 20 PD patients * FRs: n=10 * NFRs: n=10 * Mean values: FRs vs NFRs * Age: 74,4-72,3 years * UPDRS III: 33,8-33,4 | * Tests: in ON-state of medication * Protocol: walk 6m and turn randomly 90°, 120° and 180° to the right. Each 3 trials. * Equipment: 6 Optotrak Certus Motion Capture cameras; 9 IREDs (foot markers and pelvis markers); Video cameras to identify turn types and FOG episodes | * *Step length*: decreased while turning angle increased in both goups * *Step width*: * NFRs: increased step width during 180° turns * FRs: no change at all turning angles * *Step time variability*: increased while turning angle increased in FRs * *Turn types*: * During 90° turn: NFRs showed more crossover turns than FRs * During 120° turn: FRs and NFRs showed step out strategy * During 180° turn: FRs used the step out strategy or the mixed strategy (without preference) * *FOG episode*: 18 episodes in 4FRs 🡪 mainly at 120° and 180° |
| De Souza Fortaleza AC, et al. 2017 [41] | * 54 PD patients * FRs: n=26 * NFRs: n=30 * Mean values: FRs vs NFRs * Age: 69.2-68.6 years * Gender(%male): 56.5-70% * NFOG-Q: 14.3-0\* * DD: 8.3-6.3 years * MDS-UPDRS III: 43.1-38.7 * PIGD:6.8-4.5\* * MoCA: 24.9-25 * Mini-Best: 15.8-19.6\* * LED (mg/day): 875.5-711.1 | * Tests: in OFF-state of medication * Protocol: Walk 7m, turn 180° and walk back with and without a cognitive dual task * Equipment: 8 Opal inertial sensors (APDM, Inc) on the feet, shanks, wrists, chest and trunk | * No Group differences for *dual task costs* during turning * *Turn peak velocity*: FRs < nFRs |
| Fietzek UM, et al., 2017 [37] | * 40 PD patients * FRs: n=21 * NFRs: n=19 * Mean values: FRs vs NFRs * Age: 67.0-67.0 years * DD: 9.1-6.1 years\* * FOGQ: 13.1-4.0\* * MDS-UPDRS III: 34.4-25.7\* * H&Y:2.5-2.0 * LED (mg/day): 1037.5-616.5 * MoCA: 25.5-26.5 | * Tests: in ON-state of medication * Protocol: 360° turns in both directions on floor squares of 30x30cm, 40x40cm and 50x50cm. total of 6 trials * Equipment: two lightweight gyroscopes at the shanks and a 3D-magnetometer on the back | * *#steps*: FRs > nFRs in all conditions, differences increases with smaller floor squares * *Turn duration*: FRs > nFRs in all conditions, differences increases with smaller floor squares |
| Lohnes CA, et al., 2011 [40] | * 23 PD patients * FRs: n=8 * NFRs: n=14 * Mean values: FRs vs NFRs * DD: 8,6-6,7 years * MDS-UPDRS III: 40,1-40,1 | * Tests: in OFF-state of medication * Protocol: completion of in-place turns (90° and 180°) to the left and to the right (randomly ordered). At least 5 trials to each direction. * Equipment: Eight camera high-resolution motion capture system and retro-reflective markers. For oculomotor data: Head-mounted infrared binocular eye tracking system and EOG | * *Turn duration:* FRs > nFRs * *# steps:* FRs > nFRs * *# saccades and amplitude of initial saccade:* no group differences |
| Mancini M, et al., 2017 [39] | * 28 PD patients * FRs: n=16 * NFRs: n=12 * Mean values: FRs vs NFRs * Age: 67- 65 * UPDRS III: 36,9- 29,2\* * PIGD: 3,5- 1,8\* | * Tests: in OFF-state of medication * Protocol: 7m iTUG and 360° turn-in-place to the right and left side during for 2 min. * Equipment: 3 Opal inertial sensors (APDM, Inc) on shanks and trunk | * *#turns within 2 min:*   No group differences when corrected for disease severity (ANCOVA)   * *Average peak velocity:* * *Average jerkiness:* * *FOG-episode:* * 13 FRs experienced a FOG episode during 2min-turning * 2 FRs experienced a FOG episode during the iTUG |
| McNeely ME, et al., 2011 [43] | * 20 PD patients * FRs: n=10 * NFRs: n=10 * Mean values: FRs vs NFRs * Age: 75,3- 74 * DD: 11,5-9,1 * LED (mg/day): 1490,7-728,9\* * FOG-Q: 12,6- 4,8\* * UPDRS III: 28,4-45,0 | * Tests: in OFF and ON-state of medication * Protocol: in-place 180° turns, to the left and to the right. 10 times to each direction. * Equipment: An eight camera 3D motion capturing system | * *Turn duration:* FRs > nFRs (larger medication effect in FRs) * *# steps:* FRs > nFRs (Larger medication effect in FRs) |
| Nieuwboer A, et al., 2009 [27] | * 133 PD patients * 68 FRs * 65 NFRs * Mean values: FRs vs NFRs * Age: 67,3-66 * DD: 8,7-7,8 * FOGQ: 12,5-4,4\* * UPDRS-III: 35,2-32 * MMSE: 27,9-28,3 * LED: 526,2-405,2 | * Tests: in ON state of medication * Protocol: walk to a chair placed 6 m away 🡪 pick up a tray with 2 cups 🡪 turn around 180° 🡪carry the tray back to the start position * Equipment: The vitaport activity monitor and 5 accelerometers placed on the body. | * *FOG episode:* 31 episodes in 8 FRs * *Turn duration:* FRs > nFRs |
| Peterson DS, et al., 2012 [42] | * 31 PD patients   + FRs: n=12   + NFRs: n=19 * Mean values: FRs vs NFRs * Age: 72-69 years * DD: 8,0-6,6 years * MDS-UPDRS III: 45,5-41,6 * H&Y: 2,63-2,37 * FOG-Q: 12,6-4,2\* | * Tests: in OFF state of medication * Protocol: * Turning to the left and right in a small radius circle (0,6m) * Turning to the left and right in a large radius circle (3m) * Equipment: 6 footswitches on the sole of each shoe (3 near the toes, 3 near the heel) and digital video. | * FOG-episodes in 7 FRs: most frequently during small radius circles * PCI: FRs > nFRs and large radius turn< small radius turn |
| Sijobert B, et al., 2016 [36] | * 13 PD patients * FRs n=9 * NFRs: n=4 * Mean values: FRs vs NFRs * No information | * Medication: No information * Protocol: Started from standing in the middle of a gait carpet 🡪 walk towards a line 🡪 make U-turn 🡪 walk 5 meters 🡪 walk around a cone and keep walking to the start line * Equipment: * An electrical stimulator and a foot mounted inertial measurement unit (as a cueing method) | * No statistical comparisons between FR and nFR |
| Spildooren J, et al., 2010 [28] | * 28 PD patients * FRs n=14 * nFRs n=14 * Mean values: FRs vs NFRs * Age: 68.6-66.7 years * DD: 9.0-7.8 years * UPDRS-III: 37.9-34.4 * H&Y: 2.5-2.4 * MMSE: 27.7-28.7\* | * Tests: in OFF state of medication * Protocol: Walk along a walkway of 5m between two retroreflective markers placed 0,5m away from each other 🡪 make a left or right turn of varying angles (180° or 360°) around the marker before walking further * with and without a verbal cognitive DT * Equipment: An eight camera VICON data capturing system with retroreflective markers placed on the body | * *Turn duration:* FRs > nFRs while turning 360° * *#steps:* FRs > nFRs while turning 360° * *Cadence:* increases for FRs during turning (180° and 360°) but decreases in non-freezers during turning * *Freezing episodes:* in 10 FRs * During DT: 360° turn> 180° turn * *Secondary task performance*: decreases in FRs when increasing the turning angle * Errors on DT: FRs > NFRs |
| Spildooren J, et al., 2012 [32] | * 30 PD patients * FRs: n=16 * NFRs: n=14 * Mean values: FRs vs NFRs * Age: 67,9- 68,3 years * DD: 9,3- 8 years * H&Y: 2- 2,3 * UPDRS-III: 42,4- 37,4 * MMSE: 28 vs 29 | * Tests: in OFF state of medication * Protocol: walk 5m 🡪 turn 180° 🡪 walk back to start position   Turning: towards disease dominant and non-dominant side, each condition was executed 3 times.   * Equipment: Eight camera VICON data capturing system | * *Cadence:* FRs > nFRs, * Higher when turning toward disease-dominant side in FRs and NFRs * *#steps:* FRs > nFRs * more steps needed while turning to disease dominant side * *Turn duration:* * Increased when turning towards the disease dominant side * *#FOG episodes:* 94 were detected in 7 FRs * No influence of turn direction * more FOG at the inner side of the turning cycle * *Effect of cueing the disease dominant or non-dominant side:* * No interaction effect or main effect |
| Spildooren J, et al., 2013 [33] | * 27 PD patients * FRs: n=13 * NFRs: n=14 * Means FRs vs NFRs: * Age: 68,1-65,2 years * DD: 9-7,8 years * H&Y: 2,5-2,4 * UPDRS-III: 38,7-34,4 * NFOG-Q: 14-0\* | * Tests: in OFF-state of medication * Protocol: 5m walk towards retroreflective makers 🡪 turn 180° around the turning markers (to the left and tot the right). Each condition was executed 3 times * Equipment: A Vicon data-capturing system and retroreflective markers applied to the body | * *Turn depth:* no differences 🡪 good standardization * No *interaction effect of group-DT* for head, trunk, and pelvis kinematic data 🡪 data pooled * *FOG episodes:* 29 episodes in 5 FRs 🡪 mainly at the end of a turn * *Turn preparation:* * NFRs earlier head rotation compared to FRs * In FOG-trials: head rotation did not precede thorax and pelvic rotation (lack of axial preparation) * *Supplementary analysis of footstep pattern pre-FOG*: no differences in cadence, step length, step time, step width between trials with and without FOG * *Max head*-pelvis separation: No group differences or differences between trials with and without FOG * *Timing max head-pelvis separation*: nFRs < FRs * *Neck rigidity*: FRs > nFRS |
| Vervoort G, et al., 2016 [34] | * 73 PD patients * FRs: n=13 * NFRs: n=60 * Means FRs vs NFRs: * Age: 65,8 -57,7years\* * DD: 7,9-5,8 years * H&Y: 2,2-2 * MDS-UPDRS-III: 38.3-25,9\* * MMSE: 28,5-28 * NFOG-Q: 15,8-0\* * LED (mg/day): 604,8-409,7 | * Tests: in OFF state of medication * Protocol: Turn (360° to the left and to the right) 6 times * Random application of single task and dual task conditions (auditory Stroop task as dual task) * Equipment: VICON 3D motion analysis system | * *Turn duration:* FRs > nFRs with and without DT * *#steps:* FRs > nFRs while DT |
| Willems AM, et al., 2007 [22] | * 19 PD patients * 9 freezers * 10 non-freezers * Means FRs vs NFRs: * Age: 68,1-60,6 years\* * DD: 11,5-6,2 years\* * UPDRS-III: 27,9-24,7 * H&Y: 2,8-2,6 * FOGQ: 15,6-5,5\* * MMSE: 26,9-28,5 | * Tests: in ON state of medication * Protocol: Walk along a walkway (with obstacle at standard distance of 5m)🡪 make a left turn (180°) around it 🡪 return to starting position * The condition was repeated 3 times * Equipment: An eight camera VICON data capturing system | * *FOG episodes:* 1 trial in 1 FR * *#steps and turn duration:* ns * *Turn height and length:* FRs > nFRS * *Turn width:* ns |

PD, Parkinson’s Disease; FRs, Freezers; nFRS, non-freezers; FOG, freezing of gait; FOG-Q, Freezing of Gait Questionnaire; NFOG-Q, New Freezing of Gait Questionnaire; UPDRS-III, Unified Parkinson’s Disease Rating Scale part III (motor examination); MDS-UPDRS-III, new modified version of UPDRS; DD, disease duration; H&Y, Hoehn and Yahr stage; LED, levodopa equivalent dose; MMSE, Mini-mental state examination; MoCA, Montreal Cognitive Assessment; PIGD, Postural instability and gait disorders; COM, Center of mass; mini-Best, Mini Balance Evaluation Systems Test; iTUG, instrumented Timed up and go; PCI, Phase coordination index; EOG, electrooculography.

\* p<0.05

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| Supplementary table 3: Strengths and limitation of the included articles | | |
| Article | **Strengths** | **Limitations** |
| Arias P, et al., 2010 [38] | * No differences in demographics and disease development between groups * Trials were performed at a certain sequence to avoid carryover effect * Sensitivity analysis * Mentioning of sources of bias * Statistical methods were well described | * No explanation on how missing data were addressed * No reporting of numbers of individuals at each stage of the study * The effect of stimulation was assessed for a limited period of time 🡪 no research of long term effects * FOG-episodes were included in the analysis of turn parameters |
| Bengevoord A., et al., 2016 [31] | * No differences in demographics and disease development between groups * Sufficiently large power * Raters for FOG detection were independent and blinded for NFOG-Q scores * Standardisation of turning arc (retroreflective markers) * Statistical analyses were well described * Two separate analysis for trials with and without FOG | * Turning in laboratory settings (performance is different from performance at home) * Low frequency of FOG episodes 🡪 this potentially influences the power of the pre-FOG segments * No sensitivity analyses * No explanation on missing data * No reporting of numbers of individuals at each stage of the study |
| Bhatt H, et al., 2013 [35] | * No differences in demographics and disease development between groups * High inter-rater reliability for FOG-episodes * Mentioning of sources of bias | * The amount of FRs is too small to make a conclusion about turning strategies during a FOG episode * No explanation on how study size was arrived * No explanation on missing data * FOG-episodes were included in the analysis of turn parameters |
| De Souza Fortaleza Ac, et al., 2017 [41] | * No differences in demographics and disease development between groups (except for PIGD and mini-best) * Large sample size | * Groups were not matched for postural stability (mini-BEST and PIGD) * Instructions from examiner can be interpreted as cueing * Turning period to short for dual task + no instructions on task prioritization * No information on the frequency of FOG-episodes * No information on the in- or exclusion of FOG-episodes in the statistical analysis |
| Fietzek UM, et al., 2017 [37] | * Safety of patients was ascertained | * Groups were not matched for DD, LED and MDS-UPDRS * No exclusion of freezing trials * No information on the frequency of FOG-episodes * No explanation of how study size was arrived * No reporting of potential sources of bias * No information on randomisation of the protocol |
| Lohnes CA, et al., 2011 [40] | * No differences in demographics and disease development between groups * Missing data were well documented * Numbers of individuals at each stage of study was reported | * 2 different methods were used to measure saccades * No mentioning of how study size was arrived * Participants knew that their execution was being observed and monitored 🡪 influenced their performance * No information on the frequency of FOG-episodes * No information on the in- or exclusion of FOG-episodes in the statistical analysis |
| Mancini M, et al., 2017 [39] | * ANCOVA was used to correct for disease severity and PIGD * 2 independent movement disorder specialists blinded for group allocation rated FOG-severity | * Groups were not matched for UPDRS and PIGD * Only a sensor on the lumbar segment was used to characterise turning parameters * Freezing trials were not analysed separately |
| McNeely ME, et al., 2011 [43] | * Explanation on how study size was arrived * Statistical methods well described * Characteristics of study participants were well documented | * Groups were not matched for LED * All tests were executed in 1 day in fixed order: OFF state first, ON state second 🡪 fatigue or experience could affect the result * No reporting of potential sources of bias |
| Nieuwboer A, et al., 2009 [27] | * No differences in demographics and disease development between groups * Home setting * Data were analysed by a blinded rater who was not involved in data collection for cueing modality * Potential sources of bias were described * Explanation of how study size was arrived | * No reporting of numbers of individuals at each stage of study * No sensitivity analyses * No explanation of how missing data were addressed |
| Peterson DS, et al., 2012 [42] | * No differences in demographics and disease development between groups * The gait tasks were performed at comfortable, preferred pace * Potential sources of bias were described | * Setting, locations, relevant dates are not documented * No mentioning of how study size was arrived * No explanation on how missing data were addressed * No reporting of numbers of individuals at each stage of the study * No information on how freezing episodes were defined * No information on the in- or exclusion of FOG-episodes in the statistical analysis |
| Sijobert B, et al., 2016 [42] | * external validity * Eliminated learning bias | * No information on subject characteristics * No information on medication state while testing * No individual justifications * Small sample size (13 patients) * No mentioning of specific objectives and hypotheses * No explanation of how study size was arrived * No documentation of statistical analyses * No reporting of numbers of individuals at each stage of study * No information on the frequency of FOG-episodes * No information on the in- or exclusion of FOG-episodes in the statistical analysis |
| Spildooren J, et al., 2010 [28] | * No differences in demographics and disease development between groups (except for cognitive outcomes) * 2 raters were blinded for NFOG-Q score 🡪 they analysed all trials in which FOG occurred (independently) * Encouragement to standardize turning performance: placement of markers * Equal walking distance during turning trajectories, for each participant * Potential sources of bias are described | * FRs and NFRs were not matched for MMSE and SCOPA-COG * No explanation of how study size was arrived * No explanation of how missing data were addressed * No sensitivity analyses |
| Spildooren J, et al., 2012 [32] | * No differences in demographics and disease development between groups * Encouragement to standardize turning performance: placement of markers * Equal walking distance during turning trajectories, for each participant * Raters who detected the FOG episodes were independent and blinded for NFOG-Q score * Potential sources of bias were well described * Numbers of individuals at each stage of study are reported | * No explanation of how study size was arrived * No reporting of reasons for non-participation at each stage |
| Spildooren J, et al., 2013 [33] | * No differences in demographics and disease development between groups * Good standardization of the turning arc * Statistical analyses were well documented * Extra analyses were reported * Numbers of individuals at each stage of study were reported | * No reporting of potential sources of bias (methods) * No explanation on how study size was arrived |
| Vervoort G, et al., 2016 [34] | * Potential sources of bias were well described * Explanation of how quantitative variables were handled in analyses * Statistical analyses well documented | * FRs had higher age and MDS-UPDRS III scores compared to NFRs * Small number of FRs (n=13, compared to 60 NFRs) * No explanation on how study size was arrived * No reporting on how missing data were addressed |
| Willems AM, et al., 2007 [22] | * Clear parameters for gait * Statistical analyses well documented * Sources and data of methods of assessment for each variable of interest were documented * External validity was discussed | * FRs had higher age and DD compared to NFRs * The baseline measurements were not the same between the groups * Small sample size * Potential sources of bias were not well described * No explanation of how study size was arrived * No sensitivity analyses * No reporting of numbers of individuals at each stage of study |

FRs, Freezers; nFRS, non-freezers; FOG, freezing of gait; NFOG-Q, New Freezing of Gait Questionnaire; UPDRS, Unified Parkinson’s Disease Rating Scale; MDS-UPDRS-III, new modified version of UPDRS; DD, disease duration; LED, levodopa equivalent dose; MMSE, Mini-mental state examination; SCOPA-COG, scales for outcomes in Parkinson's Disease-cognition; PIGD, Postural instability and gait disorders; mini-Best, Mini Balance Evaluation Systems Test.

Supplementary table 4: The results on the STROBE checklist for case-control studies.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **Arias P, et al., 2010 [38]** | **Bengevoord A., et al., 2016 [31]** | **Bhatt H, et al., 2013 [35]** | **de Souza Fortaleza AC, et al., 2017 [41]** | **Fietzek UM, et al., 2017 [37]** | **Lohnes CA, et al., 2011 [40]** | **Mancini M, et al., 2017 [39]** | **McNeely ME, et al., 2011 [43]** | **Nieuwboer A, et al., 2009 [27]** | **Peterson DS, et al., 2012 [42]** | **Sijobert B, et al., 2016 [36]** | **Spildooren J, et al., 2010 [28]** | **Spildooren J, et al., 2012 [32]** | **Spildooren J, et al., 2013 [33]** | **Vervoort G, et al., 2016 [34]** | **Willems AM, et al., 2007 [22]** | | Title and abstract |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Study design |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Introduction |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Background |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Objectives |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Methods |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Study design |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Setting |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Selection participants |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Matching criteria | na | na |  | na | na | na | na | na | na |  | na |  |  |  | na | na | | Variables |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Measurement |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Bias |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Study size |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Quantitative variables |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Statistical methods |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Subgroups |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Missing data |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Matching group |  | na |  | na | na | na | na | na | na |  | na |  |  |  | na | na | | Sensitivity analysis |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Results |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Number of participants |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Non-participation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Flow-diagram |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Subject characteristics |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Missing data |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Outcome data | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | | Unadjusted estimates |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Category boundaries | na |  | na | na | na | na | na | na | na | na | na | na | na | na | na | na | | Riskanalysis | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na | | Other |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Discussion |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Key results |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Limitations |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Interpretation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Generalisability |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Other information |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | Funding |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   = yes, = no, na= not applicable  Supplementary table 5: Quality assessment (presented in %) of the included articles.   |  |  |  | | --- | --- | --- | | **Author(s)** | **%** | **Quality** | | Arias P, et al., 2010 [38] | 75,9% | High | | Bengevoord A., et al., 2016 [31] | 75,9% | High | | Bhatt H, et al., 2013 [35] | 66,7% | High | | De Souza Fortaleza AC, et al., 2017 [41] | 64.3% | High | | Fietzek UM, et al. 2017 [37] | 67,9% | High | | Lohnes CA, et al., 2011 [40] | 75% | High | | Mancini M, et al., 2017 [39] | 75% | High | | McNeely ME, et al., 2011 [43] | 67,9% | High | | Nieuwboer A, et al., 2009 [27] | 75% | High | | Peterson DS, et al., 2012 [42] | 73,3% | High | | Sijobert B, et al., 2016 [36] | 46,4% | Moderate | | Spildooren J, et al., 2010 [28] | 73,3% | High | | Spildooren J, et al., 2012 [32] | 80% | High | | Spildooren J, et al., 2013 [33] | 76,7% | High | | Vervoort G, et al., 2016 [34] | 75% | High | | Willems AM, et al., 2007 [22] | 64,3% | High |   \*0-40% low, 41-60% moderate, 61-80% high and 81-100% very high |