A study into the

PSYCHOPATHOLOGY OF ADULTS WITH A MENTAL HANDICAP AND EPILEPSY

A thesis presented for the degree of DOCTOR OF MEDICINE at the UNIVERSITY OF LEICESTER

by

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"All you, healthy people, do not even suspect what happiness is, that happiness which we epileptics experience during the second before the attack.....I do not know whether this bliss lasts seconds, hours, or months, yet take my word, I would not exchange it for all the joys which life can give."

(Feodor Mikhailovich Dostoievski, 1821-1881)

DECLARATION

I hereby declare that this thesis has been composed by myself, that it has not been submitted in any previous application for a degree, that except as acknowledged, the work has been carried out by myself, that the general matter of the thesis is my general composition, and that all quotations have been indicated by quotation marks and the source of information acknowledged.

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A study into the Psychopathology of Adults with a Mental Handicap and Epilepsy by Saumitra Deb

Abstract of the Thesis

The debate regarding the relationship between epilepsy and mental illness started in Ancient Greece and has continued until the present. As a group, individuals with epilepsy tend to show increased rates of psychopathology compared to others. However this discrepancy disappears when compared to individuals with chronic physical illness.

The psychopathology (maladaptive behaviour, psychiatric illness, personality disorder and overall mental disorder) of 150 individuals with a mental handicap and epilepsy both from hospital and the community was studied, and compared to an individually matched control group of 150 individuals with a mental handicap who did not sustain epilepsy. Fifty five percent of the total population, representing 58% of individuals with epilepsy and 53% of individuals without epilepsy, showed severe maladaptive behaviour. The difference between the groups with and without epilepsy was not significant. However, individuals resident in hospital showed significantly higher rates of severe maladaptive behaviour compared to individuals who were resident in the community. Nearly 25% of the whole group, representing 19% of the individuals with epilepsy and 31% of individuals without epilepsy, had a diagnosis of a psychiatric illness. The difference between those with epilepsy and those without was significant. Twenty-seven percent of mild to moderately mentally handicapped individuals with epilepsy, compared to 25% of individuals without epilepsy, had an abnormal personality. This difference was not statistically significant, although the hospital residents had a significantly higher rate of abnormal personality compared to individuals resident in the community.

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ACKNOWLEDGMENTS

"If a writer is so cautious that he never writes anything that cannot be criticized, he will never write anything that can be read. If you want to help other people you have got to make up your mind to write things that some men will condemn" (Thomas Merton, New Seeds of Contemplation.

I was first encouraged to do clinical research in the field of mental handicap and epilepsy when I was working in the unit for mentally handicapped people at Cardiff. Inspiration and help came from Professors Valerie Cowie and Alan Richens. Subsequently I conceived the idea for the current study while I was working in the unit for mentally handicapped people at Leicester. Initial discussions took place with Professor Rory Nichol and Dr Richard Collacott. Dr Collacott helped and advised me all along the study up to the writing stage, very painstakingly correcting my mistakes, yet encouraging all the way. Without his help, it would not have been possible for me to go through the difficult journey from the conception of an idea to writing up the final draft of the thesis. I am most grateful to him.

I am also grateful for the help and advice of Professors John Corbett and George Fenton, Drs Lorna Wing and Michael Trimble. I would like to thank Dr Vera Brezinova and the EEG technicians at the Leicester Royal Infirmary for performing the EEGs and reading the results. Thanks are also due to Mr David Hunter who patiently helped me to analyse vast amounts of data on the computer, often working late

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hours. Had it not been for the many patient typings and re-typings of drafts by Mrs Jeanette Forbes, one would not have seen this thesis in print. My sincere thanks are due to her. I would also thank all those people with learning difficulties who took part in this study and their carers, particularly the nurses in the Leicester Frith and Stretton Hall hospitals, the staff at Coalville and Fosse day centres and many relatives. My thanks are due to my former colleague Dr Robert Drummond for commenting on part of the thesis. I also wish to thank Dr Femi Oyebode who helped me by sending a copy of the draft of his own MD thesis. Above all, I wish to express my gratitude to my wife Arundhati and daughter Tanya, who have waited so long, and so patiently.

I have been very fortunate to have had help from many people in writing this thesis and yet it is impossible to mention everybody here. I am most grateful not only to those people whose names I have mentioned, but also those whose names I have omitted.

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ABBREVIATIONS

APA	=	American Psychiatric Association.
BNF	=	British National Formulary.
CCEI	=	Crown-Crisp Experiential Index.
DAS	=	Disability Assessment Schedule.
DSM	Ħ	Diagnostic and Statistical Manual.
EEG	=	Electroencephalogram.
EP	=	Epileptic patients.
FE	=	Focal epilepsy.
GE	=	Generalized epilepsy.
GHQ	=	General Health Questionnaire.
ILAE	=	International League Against Epilepsy.
10	=	Intelligence Quotient.
MCV	Ш	Mean Corpuscular Volume.
MMPI	=	Minnesota Multiphasic Personality Inventory.
NEP	=	Non-epileptic patients.
NTLE	=	Non-Temporal lobe epilepsy.
PAA	=	Profile of Abilities and Adjustment.
PSE	=	Present State Examination.
SAP	=	Standardized Assessment of Personality.
SD	=	Standard Deviation.
SPSS	=	Statistical Packages for Social Sciences.
TLE	=	Temporal lobe epilepsy (Psychomotor epilepsy or
		Complex partial seizure).
T-L	=	T-L Personal Behaviour Inventory.
WAIS	=	Weschler Adult Intelligence Score.
WHO	=	World Health Organisation.
WMS	=	Weschler Memory Scale.

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CHAPTER 1

1

HISTORICAL ASPECTS OF EPILEPSY AND MENTAL DISORDER

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1.1 PRE-HISTORIC PERIOD

The Hippocratic writings (460-377 BC) mention the practice of *"trephination"*, although this practice goes back to the Neolithic period (Okley et al, 1959). *"Trephination"* involved the surgical removal of a portion of the skull. Amongst many theories behind this practice Broca (1876) suggested that *"trephination"* was used to cure mental disorders. As epilepsy is believed to have been considered a feature of mental disorder it may be assumed that *"trephination"* was the first suggested cure for epilepsy.

1.2 ANCIENT PERIOD

The oldest account of epilepsy is found in a Babylonian text comprising two tablets (Kinnier Wilson & Reynolds, 1990). The first tablet originated in Turkey and was written in Neo-Assyrian script. The second tablet belongs to the British Museum's "*Babylonian Collection*", was written in Neo-Babylonian script, and dates from the middle of the first millennium BC. These tablets form part of a medical diagnostic series known as "*Sakikku*" or "*All diseases*" (Hunger, 1976).

In these tablets epilepsy was referred to as "antašubba", a Sumerian term meaning "the falling disease", a term which was later used in Greek writings to describe epilepsy. In these Babylonian writings epilepsy was described as possession by a demon called "Lilû " and his wives, "Lilītu" and "ardat Lilī". These writings include vivid descriptions of the clinical features of the major forms of epilepsy, ["he (the patient) laughs loudly for a long time"....."his (the patient's) hands and legs - being continuously flexed and extended"....."he loses consciousness and foam comes from his mouth"....."he cries 'u'ayi!"](Kinnier Wilson & Reynolds, 1990).

1.3 GREEK PERIOD

The earliest surviving monograph on epilepsy is the book "On the Sacred Disease" in the Hippocratic collection of medical writings (c. 400B.C.). Doubt exists regarding the authorship of the Hippocratic corpus however, and the consensus view is that these are the writings of several anonymous physicians who assumed the name of Hippocrates. Plato, a younger contemporary of Hippocrates, thought that the name "sacred disease" was justified on the basis that it disturbed the revolutions in the head which were the most divine. The author of the book thought that its divine character arose from the inexperience and amazement of observers to whom it seemed quite different from other diseases (Temkin, 1971).

Others assumed that the disease had been called sacred because a deity had sent it, or because a demon had been thought to enter the patient, or because it attacked those who had sinned against Selene, the goddess of the moon. Furthermore, it might have acquired its name because its cure was not human but divine. Owsei Temkin wrote, "but at the bottom of all these alleged reasons lies the basic belief that the disease is an infliction or possession by a higher power and that its cure must be supernatural. So, in order to prevent and cure the disease, it seems necessary to the superstitious to find out the powers which might inflict it, to remember all the transgressions which might offend them, and finally to know all procedures and remedies which could ward them off or conquer them" (Temkin, 1971). Such superstitious beliefs and myths concerning epilepsy still survive.

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1.4 ROMAN PERIOD

In the Roman period, gods and demons who possessed epileptic patients acquired certain social significance. They were dreaded, and the epileptic fit constituted a bad omen. The comitia, the assembly of the people, used to be disturbed by an epileptic attack. Hence the Romans called epilepsy the *"morbus comitialis"*. Theophrastus described the superstitious: *"when he sees a madman or an epileptic, he shudders and spits in his bosom"*, (Theophrastus, translated by Edmonds, 1929). Three hundred years later, Pliny added, *"In the case of epilepsy we spit, that is, we throw back contagion"* (Pliny, translated by Bostock and Riley, 1893-98). It seems from the use of

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the phrase "the disease which is spit upon" in a play to describe epilepsy that this custom was widespread amongst the Romans (Temkin, 1971).

Herodotus, in commenting upon the activities of the Persian King Cambyses, wrote that he suffered from birth from "a certain great disease.....which some people called sacred. And thus it would not be unlikely that if the body suffered from a great disease, the mind was not sound either" (Herodotus, translated by Godley, 1921). Temkin questioned whether the "sacred disease" always referred to epilepsy. Many forms of the disease were described, the causes of each being attributed to a different god. The description of some of these shows, however, a closer resemblance to psychiatric illness than epilepsy.

Galen attempted to explain epilepsy in terms of the four humours (blood, phlegm, black and yellow bile) and of the four qualities (cold, warm, moist and dry). As with Hippocrates, Galen acknowledged that epilepsy was a disease of the brain. He classified epilepsy as *"idiopathic"* or *"protopathic"* when the brain was directly involved, and *"sympathetic"* when the brain was affected indirectly. The *"idiopathic"* type was also allied to various forms of insanity (Galen, translated by Brock, 1929).

There is a reference in the Bible to a story in which Christ drove out an unclean spirit from a boy who seems to have suffered from epilepsy. "And one of the crowd answered him, 'Teacher, I brought my son to you, for he has a dumb spirit; and wherever it seizes him, it dashes him down; and he foams and grinds his teeth and becomes rigid;' And they brought the boy to him; and when the spirit saw him, immediately it convulsed the boy, and he fell on the ground and rolled about, foaming at the mouth. And Jesus asked his father, 'How long has he had this?' And he said, 'From childhood'. And it has often cast him into the fire and into the water, to destroy him......' And when Jesus saw that a crowd came running together, he rebuked the unclean spirit, saying to it, 'You dumb and deaf spirit, I command you, come out of him, and never enter him again'. And after crying out and convulsing him terribly, it came out, and the boy was like a corpse; so that most of them said, 'He is dead'. But Jesus took him by the hand and lifted him up, and he arose " (St Mark, ix, 17-27).

1.5 <u>THE MIDDLE AGES</u>

In the Middle Ages epilepsy acquired a new name; it was called the *"falling evil"* or the *"falling sickness"*. Latin texts of the seventh century and earlier, mentioned names such as *"caducus"*, *"demoniacus"* and *"lunaticus"*, which later found their way into the literature as *"maniacs"* and *"lunatics"* (Corpus Glossariorum Latinorum, 1889-94). The idea of epilepsy being a possession by an evil force had originated during the Babylonian and Ancient Greek

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periods, became deep-rooted in the Middle Ages, and continued into the Christian era and beyond.

The association between epilepsy and the moon was commented upon by Owsei Temkin (1971) who explored in detail the concepts and ideas surrounding the word "lunacy". Temkin (1971) states that "The term 'lunatic' was, therefore, no mere synonym for 'epileptic', but comprised all such abnormal states as manifested themselves in more or less regular periodical attacks". Again, confusion surrounded epilepsy and psychiatric illness.

The debate on possession endured beyond the Renaissance. Physicians of the sixteenth and seventeenth centuries tried to distinguish between possession and the natural disease, epilepsy. Paradoxically, during the Renaissance, a belief originated that most individuals with epilepsy were of great intelligence. This belief was based on the fact that many great men suffered from epilepsy. Temkin thought this was an extension of the [Pseudo]-Aristotelian thesis that melancholy and genius co-existed. He wrote "The lists of 'great' epileptics compiled during the Renaissance contained names famous in the history of the West. So strong was the tradition, that even in the nineteenth century, when new names were added, they were rarely chosen from among epileptics in other parts of the world" (Temkin, 1971).

1.6 <u>THE NINETEENTH CENTURY</u>

It was only in the nineteenth century that prisons for epileptics and the insane began to assume the character of asylums or hospitals. Pinel (1745-1826) in France, Chiarugi (1759-1820)(Temkin, 1971) in Italy, and the Tukes (1882) in England, systematically studied individuals with epilepsy within the institutional setting.

In France, Esquirol described epilepsy as, "*le grand et petit mal*" which originated from the ancient names "*epilepsia maior*" and "*minor*". Esquirol (1838) first studied in detail the prevalence of psychiatric illness amongst hospitalized individuals with epilepsy. Of 385 women studied, 46 suffered from hysteria, 12 from monomania, 30 from mania (some with a tendency to suicide), 34 from fury, 145 dementia, 8 idiocy, 50 showed periodical loss of memory (absence de memoire) or exalted ideas etc., and the remaining 60 showed peculiarities of character (Temkin, 1971)(see Summary Table 1.1). It is apparent from these figures that the vast majority suffered from organic as opposed to functional psychiatric illness.

In England, Reynolds (1861), studied 62 individuals with epilepsy and found that insanity was a rare complication. He concluded that epilepsy did not necessarily involve any mental change. He wrote "the commonest failure is loss of memory. Depression of spirits and timidity were common in the male sex, but not in the female; but that excitability of temper is also found in both sexes".

In the latter half of the 19th century ideas on the relationship between epilepsy and insanity were dominated by Morel, Farlet, Herpin and Jackson. Morel (1860) put forward the concept of masked epilepsy (epilepsie larvée) and the epileptic character. Farlet (1860) referred to *"epileptic insanity"* and, following Morel's views on larval or masked epilepsy, concluded that mental symptoms could replace convulsions (Temkin, 1971; Berrios, 1984). Herpin (1867) however challenged the concept that epilepsy and insanity were closely related (Berrios, 1984). Jackson (1875) described temporary mental disorders that occurred after epileptic seizures. He tried to explain this as the loss of control over lower centres of the brain by higher centres. Gowers (1881) studied 1,085 patients with epilepsy and concluded that a memory defect could be caused by the epileptogenic lesion. His book failed to emphasize non-cognitive psychiatric symptoms in epileptic patients (Berrios, 1984).

At the turn of the twentieth century Kraepelin (1896), Bleuler (1924) and others carefully delineated the nosology of functional psychiatric disorders. By this time, epilepsy had become well- established as an organic disease of the brain.

1.7 <u>SUMMARY</u>

The relationship between epilepsy and mental disorder has been commented upon since antiquity, and has been surrounded by superstition and ignorance. It is only from the beginning of the 19th century that appropriate medical attention has been applied to those with epilepsy. By the 20th century, epilepsy was firmly established as an organic disease of the brain and understanding mental disorders underwent a radical revision. However, uncertainty concerning the relationship between epilepsy and mental disorders continues.

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<u>CHAPTER 2</u>

PSYCHIATRIC DISORDERS AND EPILEPSY

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2.1.1 <u>INTRODUCTION</u>

Until recently epilepsy has been categorised under psychiatric disorders in many international classifications. Psychiatric disorders associated with epilepsy have attracted interest because they can be perceived as disease models. These models may offer insight into the complex and intricate relationship between brain functioning and behaviour. They may throw light on the complex relationship between neuroanatomy, neuropathology, seizures and psychopathology.

Different studies have tried to concentrate on different aspects of psychopathology, including psychiatric illness, aggression, sexual dysfunction, personality and behavioural changes. Hermann and Whitman suggested that, "virtually all the known or suspected etiologic variables in epilepsy/psychopathology research can be subsumed under one of three hypotheses" (Hermann and Whitman, 1984).

The neuroepilepsy hypothesis (Summary Table 2.1) evaluated the relationship between psychopathology and factors such as age of onset of epilepsy, seizure control (frequency/severity), duration of epilepsy, seizure type, the presence of multiple seizure types, the aetiology, type of aura, neuropsychological status, neurophysiological status (EEG and CT scan results etc).

In the psychosocial hypothesis (Summary Table 2.2) the relationship between psychopathology and other factors (such as the fear of seizures, perceived stigma, and discrimination, adjustment, locus of control, life events, social support, socioeconomic status, childhood home, and other environmental features) has been tested. The medication hypothesis (Summary Table 2.3), on the other hand, evaluated the influence of factors such as anticonvulsant polypharmacy, serum anticonvulsant levels, type of medication, serum folate level etc., on the psychopathology of individuals with epilepsy.

As in other areas of scientific research, different schools of thought exist together, with competition between the schools for primacy of their perspective. Gibbs (1951), Geschwind (1979) and Sherwin (1981) are amongst the proponents of the neuroepilepsy hypothesis. However, Stevens (1966,1980), and Hermann & Whitman (1984) have highlighted the effect of psychosocial factors in the relationship between epilepsy and psychopathology. Others, such as, Reynolds (1976) have strongly argued the case for the medication hypothesis. Others have accepted some combination of the above three hypotheses (Serafetinides, 1965; Taylor, 1969; Stevens, 1980; Reynolds, 1981; Fenton, 1986; Betts, 1981). However, Hermann & Whitman (1984) argued that "no direct empirical comparisons between the hypotheses have yet been affected".

Clinical investigations in this field have to establish and compare the prevalence of psychiatric disorders in populations with and without epilepsy. To do this satisfactorily, representative samples of both populations must be evaluated, employing similar investigative tools. Epilepsy, and the nature of the psychiatric disorders associated with it should be defined, using widely accepted, and comparable criteria, (Oyebode, 1989). The aims of this section are (1) to review the literature on the psychiatric complications of epilepsy, (2) to evaluate the validity of the results and (3) to summarize the findings.

2.1.2 COMMUNITY SURVEYS

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Pond and Bidwell (1959) studied 218 epileptic patients from 14 general practices. Twenty-nine were of pre-school age, (0-5 years), whereas 39 were of school age (6-15 years). The remainder were adults (16-60+ years). Seventy (29%) showed psychological difficulties. These included neurosis in 34 patients (15%), behaviour problems in 14 children, "epileptic personality" (with temporal lobe epilepsy) in 11 patients, and organic syndromes in six. A further 5 patients fell into the category of 'miscellaneous psychological difficulties', which included alcohol abuse, overprotection & inadequacy and chronic depression following a leucotomy. Thirty-nine percent (39%) had temporal lobe epilepsy, of whom half had psychological disturbances. The characteristic "epileptic personality" was found in 11% of these patients, whereas 4%-5% of the total group had such diagnosis. It is of interest to note that no evidence of psychosis, either schizophrenic or affective was recorded. In
addition, personality disorder was found to occur at a similar rate in the epileptic population as in the general population (see Summary Table 2.4).

Krohn (1961) studied 951 epileptic patients amongst a general population of 416,000 in the northern part of Norway. Of 908 patients whose mental state was known, 35% showed symptoms of mental disorder. Twelve percent showed debility and 7% imbecility. Two percent (16) had a present or past history of psychosis. Five percent (46) had either neurosis or behaviour disorder. One percent (10) showed psychopathy and 8% (75) showed secondary mental reduction. It is of interest that only a relatively small number was found to have psychological symptoms, the majority being of an organic nature (see Summary Table 2.4).

Gudmundsson (1966) studied 1169 epileptic patients from a general population in Iceland, of whom, 884 were examined for the presence of psychiatric illness. Of these, 883 were examined by the author, and 104 were examined by other specialist doctors. Four hundred and eighty-one (54.5%) of the 883 patients studied by the author showed some mental abnormality, whereas 31 (29.8%) of the 104 patients examined by the other interviewers showed evidence of mental abnormality. Of them, 271 (27.5%) suffered from *"ixoid personality change"*, 73 (7.4%) *"ixothym personality change"*, and 168 (17%) *"neurotic personality change"*. A major psychosis was found in 7.3% of the patients with epilepsy. Low intelligence was common amongst epileptic patients (21.7%). It is interesting to note

the discrepancy in the prevalence rates of psychiatric illness between the group studied by the author and the group studied by other specialist doctors. Most of the psychiatric illness was of *"personality change"*, the definition of which was not clear: diagnostic criteria were not validated (see Summary Table 2.4).

In the Isle of Wight study, Rutter et al., (1970) found 2.9% of the 2,334 children of 9-10 years of age to be intellectually retarded. However, the rate of severe intellectual retardation in the 5-14 age group was 3.1 per thousand. The male/female ratio of intellectual retardation was 0.9 to 1. Neurological abnormalities were detected in about 33% of the intellectually retarded children. All of those children whose IQ fell below 50 points showed some neurological abnormality. About 1% had a history of epilepsy. About 7% of 10 to 12 year old children showed a psychiatric disorder. Twenty-four percent of intellectually retarded children compared to 1.4% of normal children showed emotional and behaviour disorders. Fifty eight percent of the children with epilepsy between 9-11 years of age were found to suffer from a psychiatric disorder, compared to 6.8% of children those who did not have epilepsy. However, the two groups with and without epilepsy were not matched for sex or level of intelligence.

In a primary care survey in Belfast, Fenton et al., (1986) studied all the patients with epilepsy in a total practice population of 75,200. Those aged 16 years and over who agreed to participate in the study, completed the Crown Crisp Experiential Index (CCEI). A control sample of non-epileptic patients from the same practices, matched for age, sex and social class was also examined. The female patients with epilepsy did not differ from their controls. In contrast, the epileptic men had significantly higher rates of free floating anxiety, depression and obsessionality scores. This gender difference related to seizure frequency and employment status, but not to polypharmacy of anticonvulsants, serum anticonvulsant levels or type of seizures. Age influenced the form that symptoms took. Males under 40 years of age were prone to anxiety whilst those in the 40-65 age group were prone to depressive mood changes. Young women had more somatic symptoms.

Edeh and Toone (1987) in another primary care survey in South London, studied a sample of 88 adult epileptic patients drawn from a general practice population. According to the Clinical Interview Schedule (CIS), 48% emerged as psychiatric cases. On the basis of the ICD-9 (WHO, 1978) classification, 15% had anxiety neurosis, 22% depressive neurosis, 1% other neurosis, 1% schizophrenia, 1% affective disorder, 2% organic psychosis, 2% personality disorder and 3% mental handicap. When either the total CIS score, or caseness status, was used for comparison, patients with temporal lobe epilepsy and focal non-TLE did not differ. However each was significantly more impaired than those with primary generalized epilepsy. The groups also differed in their psychiatric symptom profiles. The authors commented, that the increased prevalence of interictal psychopathology commonly associated with TLE, may also be a feature of other forms of focal epilepsy. Unlike Fenton et al's (1986) study, no control group was used in this study. Although there were

inter-group differences in psychiatric symptoms, no such difference was observed in actual psychiatric illness categories. ICD-9 (WHO, 1978) which was used in this study to obtain a psychiatric diagnosis, does not, however, define operational criteria for psychiatric illness. The high prevalence of anxiety and depressive neuroses in the psychiatric cases was similar to that found by Fenton (1986).

The results of these community surveys of mental disorder amongst individuals with epilepsy are summarised in Summary Table 2.4.

2.1.3 <u>CONTROLLED STUDIES ON GENERAL</u> <u>PSYCHOPATHOLOGY</u>

Guerrant et al. (1962), in a well controlled study, compared psychopathology in the following three groups (i) those who suffered from psychomotor epilepsy (TLE)(n = 32), (ii) those who suffered from idiopathic grand mal epilepsy (GE)(n = 26), and (iii) those who suffered from chronic illness other than epilepsy (n = 26). They used three rating scales derived from the psychiatric interview, and other psychological tests, including Minnesota Multiphasic Personality Inventory (MMPI). Overall psychopathology was similar in all three groups. However, psychosis was found to be more common in epileptic patients, particularly when those with temporal lobe epilepsy (TLE) were compared with the non-epileptic controls. Neurosis was found to be more common in the medical controls than in those with epilepsy. The chronically ill control subjects also had higher scores on Depression, Hypochondriasis, Hysteria and a number of T scores > 80

(that is a score at or above three standard deviations from the mean) according to the MMPI.

No difference was found in the MMPI ratings between patients with TLE and other types of seizure. However, the TLE group achieved higher scores on phobias, obsessions, chronic fatigue and memory problems. Similarly epileptic patients without TLE scored higher on ideas of reference, excess alcohol consumption and negativism. Patients with GE showed more personality disorders, including aggression and suspiciousness. Overall, TLE patients showed more organic symptoms in the form of impairments in memory, speech, concentration, etc. (see Summary Table 2.5).

Small et al., (1966) studied individuals with epilepsy from medical and psychiatric units. There were 25 patients with temporal lobe epilepsy and 25 patients with other seizure types in each group. The medical sample was matched with the psychiatric sample on the basis of age and sex. The two groups were compared in respect of psychiatric diagnosis, mental state, social behaviour, mood, thought content, parasuicide rate, number of arrests by the police, community adjustment and aggression. No statistically significant difference was noted between the two groups (see Summary Table 2.5). Small and Small (1967) examined 89 individuals with epilepsy (46 psychomotor, 33 grand mal, 10 Jacksonian) with 89 psychiatric patients without epilepsy, in respect of their psychiatric diagnosis. The two groups were matched according to age, race, sex and hospital/clinic status. They found that individuals with epilepsy were more likely to be diagnosed as having chronic brain syndromes and mental handicap, than psychiatric patients in whom functional psychoses were more prevalent. Patients with temporal lobe epilepsy were more likely to be diagnosed as having organic brain syndromes or sociopathic personality (see Summary Table 2.5).

Matthews and Klove (1968) compared a group of epileptic patients with two control groups of neurological and non-neurological patients, matched on the basis of age and education. No major differences emerged between the groups on various MMPI scales except the Depression Scale, where elevated scores were more likely to be found in patients with epilepsy (see Summary Table 2.5).

Standage and Fenton (1975) compared a group of individuals with epilepsy (19 temporal lobe epilepsy, 15 generalized epilepsy, 3 focal epilepsy) with 27 individuals who suffered from chronic illnesses other than epilepsy. The two groups were matched according to sex, age and duration of illness. Wing's present State Examination, the Eysenck Personality Inventory and a history of previous mental health were used as parameters of psychopathology. No difference emerged between the epilepsy group and the chronic illness group on the Present State Examination or Eysenck Personality Inventory.

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However, individuals with epilepsy were more likely to have had previous psychiatric treatment. Amongst epileptic patients there was no difference between those who had and those who did not have temporal lobe epilepsy (see Summary Table 2.6).

Kogeorgos et al., (1982) compared 66 individuals with epilepsy (75% focal seizure, 25% generalized seizures) to a sex-matched control group of 50 neurology patients without seizures. Using the General Health Questionnaire (GHQ) and the Crown-Crisp Experiential Index (CCEI), they found no overall differences between the epileptic patients and those with other neurological disorders. The group with generalized epilepsy scored higher on the hysteria scale of the Crown-Crisp Experiential Index. However no significant differences were observed between the groups on the basis of the General Health Questionnaire score (see Summary Table 2.6)

Strauss et al., (1982) used the Fear Inventory (Overall Fearfulness Scale, and four scales pertaining to specific fears) in order to compare a group of individuals with epilepsy (61 TLE, and 53 with generalized epilepsy), a group of 35 patients who suffered from carpal tunnel syndrome, and a healthy group of 113 individuals. No overall differences emerged between the groups. However, those with epileptic discharges originating in the left temporal lobe, scored higher on two specific fear scales (Social and Sexual Fearfulness) relative to healthy controls (see Summary Table 2.6).

Whitman et al., (1984) compared a group of 809 individuals with epilepsy (409 TLE, 258 generalized epilepsy, 142 with other seizure types), a group of 870 neurological patients, and a third group of 1107 patients with chronic non-neurological illness, using the MMPI and Goldberg Sequential Diagnostic System. Matching of these three groups was undertaken according to sex and level of education. They were unable to find any significant increase in psychopathology in individuals with epilepsy relative to the neurological and chronicillness control groups; however, when psychopathology was present, the probability of psychosis was highest in the group with epilepsy. No significant difference in the rate or type of psychopathology was observed between individuals with different seizure types (see Summary Table 2.6).

2.1.4 <u>SUMMARY</u>

The earlier community based surveys (Pond and Bidwell, 1959; Krohn, 1961) do not give adequate definitions of their criteria for psychiatric diagnoses. The prevalence figures quoted were based on mere numerical analysis in the absence of a matched control group. The lack of a matched group is also a major shortcoming in interpreting data from Rutter's Isle of Wight study.

The controlled studies (Kogeorgos et al., 1982; Whitman et al., 1984) with one exception (Strauss et al., 1982) demonstrated increased psychopathology in epileptic patients compared to healthy controls. However, when compared to subjects with chronic disorders (Guerrant et al., 1962; Standage and Fenton, 1975; Whitman et al., 1984) and neurological disorders other than epilepsy (Kogeorgos et al., 1982, Matthews & Klove, 1968; Whitman et al., 1984) this difference disappears.

2.2.1 AGGRESSION AND EPILEPSY

The relationship between epilepsy and aggression is controversial because it involves two discrete issues. The first is the question of whether, during a seizure, an individual is able to demonstrate coordinated goal-directed aggression to others, himself, or property. The second issue relates to the question of whether people with epilepsy, as a group, manifest more aggressive and other abnormal behaviours between seizures (interictally) compared to people who do not suffer from epilepsy.

2.2.2 CONTROLLED STUDIES

Guerrant et al., (1962) compared a group of patients with epilepsy to a group with other forms of chronic illness, in respect of aggressive behaviour. They used two interview-based rating scales to score aggressive behaviour. The subjects themselves reported symptoms concerning chronic anger, and psychiatrists scored their observations

of the subjects' angry and aggressive behaviour. Individuals with epilepsy scored higher in aggression on both measures. However there was no difference between epileptic patients with or without temporal lobe seizures (see Summary Table 2.7).

In contrast; Standage and Fenton (1975) failed to detect any difference in irritability or aggression between a group of patients with epilepsy and a group with chronic illness. Wing's Present State Examination was used to define irritability (see Summary Table 2.7).

However Cairns (1974), using the "Hostility and Direction of Hostility Questionnaire", found that individuals with epilepsy achieved significantly higher scores when compared with healthy college students. This study also failed to detect any significant TLE/NTLE difference (see Summary Table 2.7).

Rodin (1973) studied 34 aggressive patients with epilepsy and an age, sex, IQ matched control group of non-aggressive patients with epilepsy. They checked for a history of *"destructive assaultive behaviour"* on the clinical evaluation form. Altogether 4.8% of 700 patients with epilepsy evaluated at the Epilepsy Centre of Midregan had a history of such behaviour.

2.2.3 UNCONTROLLED STUDIES

Two studies of neurosurgical patients have become particularly influential. Serafetinides (1965) studied 100 consecutive referrals of TLE patients to Guy's Hospital Neurosurgical Unit who underwent temporal lobectomy. He defined aggression as recurring, unprovoked (in the ordinary sense) acts of explicit physical aggression, either in hospital or outside, towards people or inanimate objects. He reported incidents of aggression amongst 36% of patients. He emphasized that many of these patients came from psychiatric sources which made this sample not only biased towards TLE, but also to a group of patients with temporal lobe epilepsy plus behaviour difficulties (see Summary Table 2.7).

Taylor (1971) re-examined this sample and added a further 50 patients to the original sample. He made a retrospective clinical assessment of personality from the pre-operative medical notes, and defined aggression as petulant rudeness, and lack of social control. According to these measures 27% of his sample were reported to be aggressive pre-operatively (see Summary Table 2.7).

Although these two studies received a certain amount of publicity and were cited as evidence of the relationship between epilepsy and aggression, Hermann & Whitman (1984) highlighted the pitfalls of these studies and suggested a cautious interpretation of results. Patient selection was highly biased because less than 1% of TLE patients undergo temporal lobectomy (Ward, 1983). Many of the

patients were referred because of associated intractable behavioural abnormalities. Data was collected retrospectively. The history of aggression that was obtained depended largely on the memory of patients. The absence of data on the nature and social setting of the aggression was seen as a further weakness. There were no control subjects.

2.2.4 EPILEPSY AND THE PRISON SERVICE

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It could be argued that it is not possible to detect a high level of aggression in the general population since aggressive individuals might be imprisoned because of the very nature of their behaviours. If this were true it should be possible to detect in the prison population more epileptic patients in general, and TLE patients in particular, in association with a history of violent crime.

Gunn and Fenton (1969) tested this hypothesis in the British prison population. They documented a significantly increased prevalence of epilepsy amongst the prison population (7.1 per 1,000) compared to the general British population (4.45 per 1,000). Similarly, in the USA, Whitman et al., (1982) detected epilepsy amongst 2.4% of prisoners in Illinois. This is significantly higher than in the general US population (National Commission for the Control of Epilepsy and its Consequences, 1978).

When the epileptic group of prisoners was compared with a matched control group of non-epileptic prisoners, both studies, failed to show a significant difference in the occurrence of either serious crimes or crimes of violence. Both studies showed no difference in the occurrence and the degree of violence between TLE patients and NTLE patients.

2.2.5 <u>SUMMARY</u>

Despite the many anecdotal reports in the literature and the media of violent outbursts in individuals with epilepsy, and the generally-held view that interictal aggression is more common amongst individuals with epilepsy, the evidence is lacking. A non-neurosurgical group of epileptic patients had a much lower rate of aggression (4.8%, Rodin, 1973) relative to a neuro-surgical sample (36%, Serafetinides, 1965). Studies on prison populations on the other hand, whilst they have shown a higher prevalence of epilepsy than in the general population, have failed to demonstrate an increase in violent or serious crime amongst individuals with epilepsy. Some controlled studies have shown a higher rate of aggression in individuals with epilepsy than other types of illness or in group of healthy controls (Guerrant et al., 1962; Cairns, 1974). However, others have failed to support this standpoint (Standage and Fenton, 1975).

2.3.1 PSYCHOSES AND EPILEPSY

Considerable controversy remains regarding the nature of the relationship between psychosis and epilepsy. In 1935 von Meduna put forward the hypothesis of "Biological Antagonism", which postulated an antagonistic relationship between epilepsy and psychiatric illness. Wolf and Trimble (1985) wrote; In discussing the relationship between epilepsy and schizophrenia, László von Meduna (1935) said, "Between the two diseases there is an antagonism so striking that it cannot only be accidental". Indeed as a result of this hypothesis, intramuscular camphor-induced seizures (and in recent times electroconvulsive therapy) have been successfully used in treating psychiatric illness.

Many had supported this view, such as Landold (1958) who put forward the hypothesis of *"Forced Normalization"* (normalization of epileptiform changes in EEG when psychosis is manifested in a patient). Tellenbach (1965) put forward the concept of *"Alternative Psychosis"* (an inverse relationship between seizure-frequency and appearance of psychosis). Others have held a diametrically opposed view that epilepsy predisposes an individual to a schizophrenia-like psychosis (*"Affinity Hypothesis"*) (Slater et al., 1963). Some authors (viz Stevens, 1966), argued that the presence of psychosis in patients with epilepsy was merely coincidental. Others (viz Slater et al., 1963), opposed this view and suggested that psychosis in epileptic patients was qualitatively different from psychosis in people who do not have epilepsy. Unfortunately there is no population-based survey

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of epilepsy and psychosis which could help to resolve this controversy.

One of the earlier studies was of Dongier (1959), who studied 516 epileptic patients and found that patients with centrencephalic epilepsy suffered from more transient psychosis, with an associated impairment of the sensorium, than patients with other types of seizures. In his study, TLE patients were more likely to suffer from affective disorders and dissociative episodes.

Slater et al., (1963) studied 31 patients from the National Hospital for Nervous Diseases in London, together with 38 patients from the Maudsley Hospital, London. All patients suffered from both epilepsy and psychiatric illness. The mean age of onset of epilepsy was 14 years and the mean age of onset of psychosis was 29.8 years. They found an excess of focal epilepsy (mainly TLE) and a preponderance of Paranoid Schizophrenia. There was also a suggestion of an inverse relationship in that when psychotic symptoms first appeared, the frequency of seizures was falling. They also observed some phenomenological differences in the psychotic symptoms of epileptic patients compared with those of non-epileptic patients.

They tried to seek answers to three basic questions. Firstly, was this a chance combination? By a series of statistical computations, involving family history, pre-psychotic personality and psychotic phenomenology, they concluded that this was more than a chance finding. Secondly, they discarded the idea that epilepsy merely acted

as a precipitating factor in patients who were pre-disposed to develop schizophrenia. Thirdly they questioned whether the schizophrenia-like illness in their population was purely epileptic in origin; either epilepsy itself caused the symptoms or the underlying basic brain disorder caused both illnesses. They favoured the latter because most of the epilepsy was of focal origin; neurological lesions were present in one fifth of the patients; many showed organic personality change; airencephalography detected atrophic changes in 37 out of 54 patients; those who had undergone lobectomy showed neuropathological changes in their brains; and at follow-up, many patients developed an organic deficit syndrome.

This study was criticized by others (viz, Stevens, 1966; Hermann and Whitman, 1984). Firstly, the study population in the above study came from two very specialized centres. As TLE is the most common form of epilepsy in adults and the most treatment- resistant, it would not be unexpected to see a high proportion of patients with TLE to be referred to such centres. It is to be expected that such centres would see an accumulation of treatment-resistant psychiatric illnesses associated with both epilepsy in general, and TLE in particular. The prevalence figure of 54% for patients with temporal psychomotor seizures who had been hospitalized for psychiatric illness (Stevens, 1966) does not differ greatly from the figure of 65% for patients with temporal lobe and/or psychomotor seizures who suffered from psychosis in Slater et al's (1963) study.

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Bruens (1971) retrospectively studied 19 patients with psychosis and epilepsy from three different sources. Of the 19 patients, nine cases suffered from paranoid syndromes with delusions. Five suffered from psychosis with marked mental regression, characterized by puerile, bizarre behaviour, compulsive phenomena and transient paranoid symptoms. Two suffered from schizophrenia-like psychoses (with thought disorder and affective disturbances) and three had confusional states. They pointed out that this classification was somewhat artificial. Partial seizures were observed in 16 patients, in all of whom epileptiform EEG changes were localized to one of the temporal regions. All cases showed a degree of secondary generalization.

In view of the conspicuous association of a particular seizure type with psychosis, a causal relationship between epilepsy and psychosis was assumed. The number of patients in this study was very small and data were collected retrospectively. Interestingly, all patients with temporal lobe lesions suffered from multiple types of seizure. In addition, the nine cases in this study, which were collected from the Hans Berger Clinic, were the only psychoses in a population of 900 epileptic patients admitted during the period 1960-1969 (Hermann & Whitman, 1984). As in Slater et al's study (1963), Bruens (1971) also demonstrated an inverse relationship between the development of psychotic symptoms and seizure-frequency.

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In a retrospective study Flor-Henry (1969) collected data over a fifteen year period on all 50 cases from the Maudsley Hospital who had a combined diagnosis of TLE and psychosis. He also studied a group of 50 randomly selected TLE patients without a diagnosis of psychosis. He compared and contrasted the two groups on 71 sociomedical variables. His conclusions were that (a) temporal lobe epilepsy of the dominant hemisphere predisposed an individual to schizophrenia (b) epilepsy of the non-dominant temporal lobe was associated with manic-depressive psychosis, (c) the frequency of temporal-lobe seizures was inversely related to the risk of psychosis. He suggested that epileptic psychoses were fundamentally related to the epileptic process, rather than constituting a non-specific psychosis resulting from structural brain damage, as had been postulated by Slater et al., (1963).

Karagula and Robertson (1955) described the ictal phenomena of temporal lobe seizures. They included many psychiatric symptoms such as induction of thought, hearing of an inner and external voice, and visual hallucinations of simple and complex types. Such symptoms were also replicated in patients when the temporal lobe had been electrically stimulated by Penfield & Kristiansen (1951) during temporal lobectomy.

Gibbs' (1951) analysis of 458 cases with EEG evidence of focal seizure discharges, revealed that 95% of 163 cases with focal seizure activity in the anterior temporal lobe had clinical psychomotor seizures. Gibbs found that psychiatric disorders were three times

more common in cases with a focus in the temporal lobe area than any other cortical area. In his opinion, psychiatric symptoms which accompanied psychomotor epilepsy were clinically indistinguishable from those encountered in *"purely psychiatric"* disorders. He suggested that the major psychiatric syndromes were commonly due to pathological/physiological involvement of temporal lobe structures. Although found in association with psychomotor epilepsy, this type of disorder was not temporally associated with electrophysiological abnormalities, and was actually somewhat antithetic to seizure discharges and to the physiological basis of epilepsy.

 In a prospective study, Perez and Trimble (1980) undertook a detailed
examination of psychotic disorders in 24 patients with epilepsy and psychosis who represented consecutive referrals to the Department of Neuropsychiatry at the National Hospital for the Nervous Diseases. The clinical presentation of the patients was rated using the Present State Examination (PSE) (Wing et al., 1974) and the diagnostic categories determined by the CATEGO system.

Of the 24 patients studied, 17 suffered from complex partial seizures and had a history of an EEG abnormality compatible with temporal lobe epilepsy. They noted an association between nuclear schizophrenia and a lesion of the left hemisphere. No clear link between depressive symptoms and a right sided focus was discovered. Schizophrenia was associated significantly with TLE, whereas affective psychosis was more common (if not significantly) with generalized epilepsy. However the numbers in the two groups of

patients were small, and the groups were not matched on

demographic epilepsy-related variables.

Ramani and Gumnit (1982) identified 10 patients with psychotic episodes out of 380 consecutive admissions to a special unit for the treatment of patients with poorly controlled seizures. Almost all the psychotic patients suffered from a schizophreniform psychosis. Sixty percent of the psychotic patients had a diagnosis of TLE. Another 28 patients had a past history of psychotic episodes. Of these, 63% had TLE.

Standage (1973) reviewed the records of the 1,836 residents of a psychiatric hospital in England and identified 53 (2.8%) to have a diagnosis of epilepsy. This is higher than the prevalence of epilepsy in the general population. However, none of the 6 individuals with a schizophreniform psychosis had TLE.

Small et al., (1962) studied 50 consecutive referrals of patients with epilepsy to the University of Oregon Medical School Hospital and Clinics. Half of the patients suffered from psychomotor epilepsy and showed a temporal spike or sharp wave focus on the EEG: the other half showed the classical clinical and EEG findings of *"centrencephalic"* seizures. Patients were seen by a neurologist, a psychologist and a psychiatrist. The psychiatric examination involved 1 to 3 interviews consuming 1-2 hours per patient. A diagnostic formulation was made according to the Diagnostic and Statistical

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Manual proposed by the American Psychiatric Association (APA, 1952).

Each patient was also evaluated on a series of 5 different personality rating scales (anxiety, passivity, depression, hysteria and impulsivity) using a reliable personality inventory (Saslow et al., 1950). The overall adjustment in each patient was estimated according to Wolberg's description of the adaptive mechanisms of the personality in terms of levels of psychopathology (Wolberg, 1954). Other psychological tests administered included (a) the Wechsler Adult Intelligence Scale (WAIS) (b) the Minnesota Multiphasic Personality Inventory (MMPI) (c) the Rapaport Word Association Test (d) the Biographic Inventory (The Taylor Anxiety Scale), and (e) the Wechsler Memory Scale (WMS).

Although the two groups were not originally matched, they were compared for age, IQ, age of onset and duration of epilepsy, seizure frequency and severity of seizures. A significant difference was found between the two groups in age and duration of illness. No significant difference was found between the two groups either in psychiatric diagnoses or in personality scores. The authors recognized the problem of differentiating episodic psychiatric disturbances from ictal phenomena or the effects of drugs on the mental state. Stevens (1966) studied the rate of psychiatric hospital admission of 100 epileptic patients from a neurology clinic of The University of Oregon Medical School Hospital. Twenty-eight patients had a major psychiatric illness. Amongst these, 17 patients (60.7%) had TLE. Fifty-four percent of the total cohort had a diagnosis of TLE as opposed to 46% of those who had either diffuse tonic-clonic or focal seizures originating from outside the temporal lobes. Thirty-one percent of the group were hospitalized for a psychiatric illness, which was similar to the 29.4% of patients with a diagnosis of tonic-clonic epilepsy. The EEG demonstrated a relative normalization during the psychotic period, as described by Landolt (1958).

Stevens (1980) reviewed the prevalence of epilepsy amongst 750 consecutive admissions to the acute psychiatric unit at The University of Oregon and found 21 (2.8%) patients to have a diagnosis of epilepsy. Although this figure is higher than that of the general population, this was similar to the figures quoted in Standage's study (Standage, 1973). Twenty-seven percent of the total cohort of 750 patients had schizophrenia. However, amongst the 21 patients with epilepsy, only 9% had schizophrenia. Schizophrenia was much less common amongst the epileptic patients than in the entire group of psychiatric patients.

Taylor (1975) selected from 255 lobectomy patients, 41 with evidence of mesial temporal sclerosis and 47 with alien tissue lesions. Fifteen of these 88 patients manifested a schizophrenia-like psychosis. Taylor found that psychosis was more common amongst

patients with alien tissue lesions and concluded that schizophrenialike psychoses do not occur at random amongst individuals with TLE.

Standage & Fenton (1975) used Wing's (1974) Present State Examination (P.S.E.) to compare the mental state of 37 epileptic patients collected from the clinics of Guy's Hospital and Maudsley Hospital with that of 27 control patients with non-neurological chronic physical illnesses. Apart from one epileptic with a single positive rating for schizophrenic thought disorder, no patient in either group received a score for any of the psychotic symptoms. There were no overall differences in the scores of the epileptic and non-epileptic groups or TLE and non TLE groups.

2.3.2 <u>SUMMARY</u>

In the field of psychosis and its relationship with epilepsy there seems to be support, however controversial, for three hypotheses, namely antagonism, affinity and coincidence. Some evidence suggests a specific relationship between TLE and schizophrenia, whilst other studies have failed to support this. Unfortunately no studies of psychosis in epilepsy have resolved this debate. Many authors comment on the inverse relationship between psychosis and seizurefrequency, or EEG abnormality.

2.4.1 AFFECTIVE DISORDER AND EPILEPSY

Research in the field of affective disorder and epilepsy has not received the same attention as that of schizophrenia. Several studies using the MMPI found that the Depression scale was frequently elevated amongst epileptic patients (Dikmen et al., 1983; Glass and Mattson, 1973; Klove and Doehring, 1962; Matthews and Klove, 1968; Mittan and Locke, 1982).

Clinical investigations in patients with epilepsy have reported high rates of affective disorders. Betts (1974), in an investigation of psychiatric admissions amongst epileptic patients, found depression to be the most common psychiatric diagnosis. Similarly Dalby (1971) found depression to be the most common diagnosis amongst 93 patients with TLE. Currie et al., (1971) studied 666 patients with TLE and found depression and anxiety to be the two most common diagnoses. In two separate studies Guerrant et al., (1962) and Gunn (1977), depression and anxiety were found to be the most common psychological correlates of temporal lobe and generalized epilepsy (see Summary Table 2.8).

Mittan and Locke (1982) reported that 80% of 118 patients with epilepsy complained of depression. Palia and Harper (1990) surveyed 53 in-patients and day-patients with epilepsy in a general psychiatric service. According to the Hamilton Rating Scale and the Beck Depression Inventory, 32% of their cohort had serious depressive illness, mostly classified as non-endogenous on the Newcastle Index.

Robertson and Trimble (1983) found more endogenous depression than non-endogenous depression amongst epileptic patients. Fenton et al's (1986) primary care survey in Belfast revealed an increased rate of minor psychiatric morbidity in individuals with epilepsy (see Summary Table 2.8).

Bipolar depression, on the other hand, does not seem to be associated with epilepsy (Bruens, 1971; Toone et al., 1982). Depression was reported to be the most common psychological problem of patients with late onset epilepsy (Dominian et al., 1963) and was extremely common in neurosurgical TLE patients (Serafetinides, 1975). No major differences have emerged between different types of epilepsy and depression (Kogeorgos et al., 1982; Trimble and Perez, 1980), although some authors suggested a relationship between seizures originating in the non-dominant hemisphere and depression (Flor-Henry, 1983). Matthews and Barabas (1981) reviewed studies of the rates of suicide and parasuicide in epilepsy. They concluded that, although such studies are fraught with methodological difficulties, the accumulated evidence suggested that there was an elevated rate of suicide associated with epilepsy, compared to rates in the general population.

Affective disorders appear to be the major inter-ictal psychiatric disorder amongst individuals with epilepsy. However, Hermann and Whitman (1984) commented that "The lack of controlled investigations, the failure to use operational definitions of depression and anxiety, the paucity of information concerning seizure-type variations, and the effects of anticonvulsant medications, are only a few of the conceptual and methodological shortcomings that limit our understanding".

2.4.2 PERSONALITY AND EPILEPSY

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Around the turn of the century the concept of "epileptic personality" became popular. It was believed that all patients with epilepsy underwent mental deterioration because of their seizures. In recent times Lennox (1960) challenged this view and suggested that most patients with epilepsy had a normal psychological profile. The abnormal psychological states found in some individuals were caused by the underlying brain damage, anoxia or by the effects of the chronic use of anticonvulsants.

Although the concept of a global "epileptic personality" has generally fallen into disfavour for lack of support from well controlled investigations, attempts have still been made to demonstrate a personality disorder specific to epileptic patients. In 1975 Waxman and Geschwind rekindled the debate by proposing a specific cluster of interictal behaviours related to the TLE patients. This syndrome consists of (a) increased religiosity (b) increased philosophical interest

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 (c) humourlessness
(d) alterations in sexual behaviour and (e) a tendency toward extensive and often compulsive writing (hypergraphia).

Trimble (1983) criticized the use of the MMPI as an inappropriate instrument used in previous studies to detect personality disorder amongst patients with epilepsy. Noting the shortcomings of the MMPI, Bear and Fedio (1977) developed their own personality inventory. This inventory measures 18 personality traits with the help of both self-reported and observer-rated questionnaires. Using their own scale, Bear and Fedio (1977) studied 27 patients with a unilateral temporal lobe focus, and compared them to a control group of 12 healthy subjects and 9 patients with neuromuscular disease. TLE patients scored higher on all 18 traits in the self-rated version, and on all but 4 traits (hypermoralism, hypergraphia, elation, altered sexuality) in the observer-rated version, compared to controls.

Neilsen and Kristensen (1981) tested Bear and Fedio's (1977) personality scales (with the exception of the altered sexual interest scale) on 42 patients with epilepsy. Fourteen had a left lateral focus, 9 a left mediobasal, 11 a right lateral and 8 a right mediobasal focus in the temporal lobe. Patients with lateral foci scored higher on 4 out of 17 when compared to those with mediobasal foci. Hermann and Riel (1981) administered this personality questionnaire to a group of 14 TLE patients and another group of 14 patients with general epilepsy. The two groups were matched for age, sex, age at onset,

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duration of disorder and education. The TLE group scored significantly higher on 4 of the 18 traits.

Mungas (1982) conducted two studies to test Bear and Fedio's (1977) hypothesis. In the first study he rated 14 TLE patients, 14 patients with neurobehavioural disorders and 14 psychiatric patients on Bear and Fedio's personality inventory. The three groups were matched according to age, race, sex and education. In a further study he used the same scale in four matched groups which included (a) twelve patients with TLE (b) twelve patients with neurobehavioural disorders, and (d) twelve healthy subjects. Neither study detected any difference between the TLE group and the other control groups. The small number of subjects used in these studies make the interpretation of the results difficult. However where appropriate controls were used, the findings remained equivocal.

The relationship between epilepsy and Multiple Personality Disorder has been examined by a number of authors. "Multiple personality" is defined by the Oxford Textbook of Psychiatry as sudden alterations between two or more patterns of behaviour, each of which is forgotten by the patient when the other is present. Each 'personality' is a complex and integrated scheme of emotional responses, attitudes, memories and social behaviour, and the new one usually contrasts strikingly with the patient's normal state (Geldar et al., 1984). Mesulam (1981), Schenk and Bear (1981), and Greaves (1980) have found an increased number of patients with Multiple

Personality Disorders to have a history of seizures or other recurrent disturbance of neuronal activity. An association between temporal lobe epilepsy and multiple personality has been proposed (Benson, 1986).

2.4.3 <u>SUMMARY</u>

The belief that personality disorder is commoner amongst epileptic individuals appears to be based more on anecdotes than scientific proof. The concept of a global *"epileptic personality"*, held earlier this century, has generally fallen into disfavour. The pendulum has swung from the constitutional concept, via the denial of any mental abnormality (Lennox, 1960) to the contested identification of a specific temporal lobe syndrome, such as that put forward by Gibbs (1951) and later redefined and reformulated by Geschwind (1979) and Bear & Fedio (1977). A critical review of studies using standardized objective tests however, has been unable to confirm the position of TLE in psychopathology.

2.5 RISK FACTORS IN EPILEPSY AND PSYCHOPATHOLOGY

2.5.1 <u>SEX RATIO</u>

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According to Rodin (1973) and Serafetinides (1965) there are more males than females amongst aggressive individuals with epilepsy. Taylor (1971) however suggested a reverse relationship and found that women were more vulnerable to epileptic psychoses. In a further analysis of post-lobectomy patients, Taylor (1975) demonstrated a similar increased prevalence of epilepsy in women, although this did not reach statistical significance. Fenton (1986), in his community survey, found that more male than female epileptic patients suffered from minor psychiatric illnesses. These findings are supported by other studies (Flor-Henry, 1969; Sherwin, 1981).

2.5.2 <u>AGE</u>

An inverse relationship between age and measures of aggression has been reported in patients suffering from both temporal lobe epilepsy and generalized tonic-clonic seizures (Hermann et al., 1982: Serafetinides, 1965).

2.5.3 AGE OF ONSET OF EPILEPSY

Serafetinides (1965) reported that aggressive individuals with temporal lobe epilepsy tend to have developed seizures prior to 10 years of age. However, the age of onset of epilepsy in individuals with epileptic psychoses does not appear to differ from that of nonpsychotic control groups (Kristensen and Sindrup, 1978; Flor-Henry, 1969; Sengoku et al., 1983). Taylor (1971) reported that in the majority of females, the age of onset of epilepsy was before 15 years of age. This is significantly different to that of men. He also commented that in those patients who later developed psychoses, the onset of epilepsy peaked around puberty.

2.5.4 DURATION OF EPILEPSY

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Slater et al., (1963) showed that the mean duration of epilepsy prior to the development of psychosis was 14.10 years (range 2-20 years). This has subsequently been confirmed by several other authors (Flor-Henry, 1969; Kristensen and Sindrup, 1978; Perez et al., 1985). However, this did not differ from the duration of epilepsy in a controlled sample without psychosis (Flor-Henry, 1969; Kristensen and Sindrup, 1978).

2.5.5 SEIZURE FREQUENCY

Many authors quoted an inverse relationship between seizure frequency and the appearance of psychiatric symptoms (Slater et al., 1963; Bruens, 1971). However it is unclear as to whether patients with frequent seizures show more aggression and other problem behaviours compared to patients who have less frequent seizures. When TLE patients with and without psychosis were compared, no significant difference in global seizure-frequency was found (Kristensen and Sindrup, 1979; Sengoku et al., 1983).

2.5.6 MULTIPLE SEIZURE TYPES

Rodin et al., (1976) compared a group of 78 TLE patients with a matched control group of 78 non-TLE epileptic patients. They found that TLE patients who suffered from multiple types of seizures were affected by more psychopathology than those who suffered from a single type. Hermann et al., (1982) tested this hypothesis further when they compared 33 patients with TLE with 34 patients who suffered from both TLE and secondarily generalized seizures. They found the group with secondarily generalized seizures manifested more aggression, psychosis and general psychopathology, as defined by the MMPI. Similarly, Mignone et al., (1970) found elevated scores on the schizophrenia scale of the MMPI amongst patients who suffered from secondarily generalized temporal lobe epilepsy.

2.5.7 SEIZURE TYPE

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The most widely studied type of seizure in relation to psychopathology is that of the complex partial seizure or temporal lobe seizure. Guerrant et al., (1962), Hermann et al., (1981), Shukla et al., (1979), Small et al., (1962), and Stevens (1966) studied patients from either neurology or epilepsy clinics. A diagnosis of psychosis was made either on clinical grounds or on the basis of scores on the MMPI. Patients with temporal lobe epilepsy were compared to patients with other seizure types. Two studies have reported an increased rate of psychosis in patients with temporal lobe epilepsy (Guerrant et al., 1962; Shukla et al., 1979).

2.5.8 NEUROPSYCHOLOGICAL FACTORS

Ferguson et al., (1969) proposed that severe psychopathology in epilepsy was associated with deficits in higher cortical function. However, Stevens et al., (1972), Matthews et al., (1977), and Matthews & Klove (1968) failed to support this hypothesis. The inappropriate use of the MMPI in the latter studies was criticized by Hermann & Whitman (1984). Hermann's (1981) recent analysis of the data of Batzel et al., (1980) and Dikmen & Morgan's (1980) study using Goldberg's (1972) method revealed an increased risk of psychosis in individuals with more widespread cognitive deficits, and appears to support the general hypothesis of Ferguson et al., (Hermann, 1981). Hermann & Whitman (1984) argued that the comparison of patients with temporal lobe epilepsy and generalized

epilepsy unmatched for neuropsychological factors, could obscure any real relationship between psychopathology and temporal lobe epilepsy.

2.5.9 PSYCHOSOCIAL FACTORS

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In a recent study Hermann et al., (1990) postulated some psychosocial predictors of psychopathology in patients with epilepsy. Those that were considered to be the most important included an increased number of stressful life events in the preceding year, poor adjustment to epilepsy and financial stress. Other psychosocial predictors included increased stigma, vocational problems and an external locus of control.

Hermann & Whitman (1984) suggested that patients with epilepsy develop a state of learned helplessness, as hypothesized by Seligman (1975) because of the episodic, unpredictable, uncontrollable, aversive nature of the epileptic seizures. Mittan & Locke (1982) found medical misinformation and fear to be widespread amongst the patients with epilepsy. They found a pervasive fear of seizures and of death from seizures, together with a fear of progressive brain damage, mental deterioration and mental illness to be common. Mittan & Locke (1982) concluded on the basis of their findings that depression and anxiety amongst patients with epilepsy were due, in part, to the psychological stresses that accompany the disorder. Genuine and perceived stigma could also add to the psychosocial stress.

2.5.10 OTHER FACTORS

Flor-Henry (1969), Kristensen & Sindrup (1979), and Peters (1979) studied patients with temporal lobe epilepsy with and without psychosis for a variety of demographic, neurological and seizure-related variables. Flor-Henry (1969) observed an association between left hemisphere foci and schizophrenia, and also right hemisphere foci and manic depressive psychosis. He proposed that psychoses were primarily related to the epileptic process rather than to structural brain damage, as believed by Slater et al., (1963).

Kristensen & Sindrup (1979), argued that the epileptic psychoses were fundamentally associated with underlying structural damage to the deep limbic system of the temporal lobe. Such damage was considered to be responsible for both the epilepsy and the psychosis. Peters (1979) found that psychotic patients with epilepsy had significantly lower levels of dopamine metabolites in the cerebrospinal fluid. Some investigators have reported an exacerbation of a psychotic state in association with normalization of EEG (Landolt, 1958) and improved seizure control (Slater et al., 1963; Bruens, 1971; Flor-Henry, 1969; Kristensen & Sindrup, 1978).

2.6 METHODOLOGICAL PROBLEMS

Research into epilepsy has its own methodological shortcomings. An awareness of these shortcomings is essential to an interpretation of the data. The major areas of concern are with the definition of epilepsy and its related variables, difficulties with sample size and selection, the use of adequate and appropriate controls, the definition and quantification of psychopathology and problems surrounding the retrospective analysis of data.

2.6.1 PROBLEMS WITH DEFINITION

Criteria for the diagnosis and classification of epilepsy have varied between studies. In some studies the diagnosis and classification was purely on the basis of clinical features, and did not take EEG findings into consideration. In other studies, epilepsy was diagnosed only on the basis of EEG findings and clinical features were not considered. However, in the majority of studies a diagnosis of the seizure type was made on the basis of both clinical as well as EEG findings. Some studies failed to specify their selection criteria. Where EEG findings were used, the definition of EEG confirmation varied enormously. Studies have also varied in their use of activation techniques for the EEG. A small number used sleep EEG and sphenoidal electrodes to enhance the chances of detecting temporal lobe abnormalities. Kligman and Goldberg (1975) emphasised that socalled temporal lobe epilepsy includes heterogeneous conditions, and
suggested substituting the term with "temporal lobe epilepsies" to reflect the true nature of this clinical condition.

Hermann and Whitman (1984) also questioned the validity of the concept of the *"interictal state"*. They argued that although this is a period in between two clinical seizures, there remains a significant variation both between and within patients in the amount of electrophysiological activities which occur in the brain, during the period. The effect of these varied electrophysiological changes on human behaviour is unknown.

2.6.2 BIAS IN SAMPLE SELECTION

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It is likely that the findings of studies of epileptic patients from medical facilities cannot be generalized to epileptic patients in general (Hermann & Whitman, 1984). Zielinskin's (1974) study amongst epileptic patients from Warsaw, Poland, highlights this problem. He found in a random sample of the general population, that one third of those who had a diagnosis of epilepsy (confirmed by clinical history, neurological evaluation and EEG findings) had never visited a doctor. Another third of the same population had had treatment for their epilepsy in the past, but had not been seen by any doctor at the time of the study. Only the remaining third were reviewed regularly by doctors. It would appear that those patients who are not known to doctors, suffer from partial seizures, absence seizures and other less severe forms of epilepsy (Zielinski, 1974). This poses a problem of

generalizing the results from TLE patients who attend medical facilities to all TLE patients.

Sample selection methods have varied. Some did not specify the selection criteria, some collected all available patients, others collected consecutive cases. Very rarely was a random selection method used. Many patient groups have been highly selected, for example, patients from neurosurgical units (eg. Blumer, 1970; Jensen & Larsen, 1979; Serafetinides, 1965, 1975; Sherwin, 1981; Sherwin et al., 1982; Taylor, 1975), specialized neurological centres and psychiatric hospitals (Slater et al., 1963). As TLE remains the most treatment-resistant of all the types of adult epilepsy, there seems to be an exceptionally high proportion of such patients in these specialized groups. Ramani and Gumnit (1981) found 65% of their study population (n = 380) to suffer from TLE. Stevens (1975) argued that the prevalence of TLE amongst psychotic patients is not significantly higher than the rate of TLE in the group from which these patients derived. Another possible source of sample-selection bias was mentioned by Stevens (1975), who found less psychopathology amongst epileptic patients attending private clinics than amongst those who attended large university medical centres (where most of the American studies were done).

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<u>CHAPTER 3</u>

EPILEPSY AND MENTAL DISORDER IN MENTAL HANDICAP

3.1 EPILEPSY AND MENTAL HANDICAP

Although high intelligence and epilepsy are not incompatible with each other, some people who suffer from epilepsy also develop cognitive deterioration. On the other hand epilepsy seems particularly common amongst individuals with mental handicap. In Camberwell, Corbett et al., (1975) found one third of children with severe mental handicap to have a life-time history of seizures, and that 19% of them had had an epileptic seizure during the previous year. One in 200 (0.5%) of the general population currently suffer from epilepsy, whereas 1-2% of the general population have a lifetime history of seizure (Shorvon, 1990). Most studies have shown that 25 to 30% of individuals with mental handicap to have a history of epilepsy (Corbett et al., 1975). Other studies have shown that up to 40% of individuals with severe mental handicap who are resident in institutions have a history of epileptic seizures (Coulter, 1988). In a recent study, Forceville and colleagues found certain subtests of the intelligence tests (ie., digit symbol, digit span and information) to be more significantly impaired in patients with a mental handicap and epilepsy compared to mentally handicapped patients without epilepsy (Forceville et al., 1992).

Certain causes of mental handicap such as extensive and local cerebral damage, amino-acidurias (viz phenylketonuria and homocysteinuria), neurocutaneous syndromes (viz tuberous sclerosis, Sturge-Weber syndrome), and autism, are strongly associated with epilepsy. The prevalence of epilepsy in specific

disorders varies from 28% in autism (Rutter, 1970), to more than 90% in tuberous sclerosis (Gomez, 1979). According to some, epilepsy seems to be rare in individuals with Down's syndrome, kernicterus and cretinism (Crome, 1965). However, Collacott (1991) found 35 (10.2%) of 344 people with Down's Syndrome to have a life-time history of epilepsy. The age of onset of epilepsy was known in 34 cases. In seventeen the age at onset of epilepsy was before 20 years, and in the rest epilepsy started after 19 years.

Corbett et al., (1975), in a community study, found a higher prevalence of epilepsy amongst individuals with more extensive brain damage, those of younger age, and those with a lower IQ. The prevalence of epilepsy seems to rise till late adolescence. However, amongst the long stay residents in hospitals, the prevalence of epilepsy was higher in older population groups. A higher proportion of boys as opposed to girls were found to suffer from epilepsy (39% as opposed to 26%)(Corbett et al., 1975).

In a survey of mentally retarded children, Richardson and his colleagues found 25% of the population to have some history of seizure up to age 22. There was a relatively higher proportion of males compared with females. They did not find any significant association between degree of seizure impairment and severity of mental retardation (Richardson et al, 1981).

Lund (1985b) in a Danish population survey of 302 mentally retarded adults found 18.2% to have a life-time history of seizures, whereas

8.3% had sustained seizures within the previous one year of the study.

Shepherd & Hosking (1989) in a population survey of 5 to 16 year old mentally handicapped children in an English city, found 18% of the overall cohort to have a history of seizure. This ranged from 7% of those with mild to moderate intellectual impairments to 67% of those with severe intellectual impairments and a physical disability.

There are many factors that may cause both epilepsy and mental handicap, such as cerebral malformations, intra-uterine infection (eg rubella, cytomegalovirus), birth trauma, perinatal hypoxia, transient biochemical abnormalities (eg. hypoglycaemia, hypocalcaemia and hypomagnesaemia), post natal cerebral infections, inborn errors of metabolism, intracranial haemorrhage etc.. There seems to be a particular association between mental handicap and certain epileptic syndromes such as infantile spasms, West's syndrome, prolonged febrile convulsions, Lennox-Gastaut syndrome etc..

Corbett commented that all types of seizure could be seen amongst individuals with mental handicap, although in some cases their manifestations varied (Corbett et al., 1975). For example, the child with severe infantile hemiplegia will have asymmetrical generalized convulsive attacks with less movement on the paralysed side. Types and patterns of seizures are often mixed in this population and may change over time. The most common types of seizure are generalized tonic-clonic, atonic and myoclonic seizures. In addition

temporal lobe epilepsy with and without secondary generalization was not uncommon.

Pond (1961) identified five factors important in the relationship between epilepsy and behaviour disorder in children. They were, (a) the general genetic or constitutional endowment of the child (b) the brain damage or disorder that was causing the epilepsy (c) the effects of the epileptic attacks themselves (d) the psychological environment of the child, and (e) the anti-convulsant and other drugs used in therapy.

Behavioural changes associated with epilepsy may manifest in the peri-ictal (ie, pre-ictal, ictal and post-ictal) or inter-ictal periods. In the pre-ictal prodromal phase, psychological features can last up to a few days. Epileptic seizures could be the cause of psychological symptoms (*"Working up to a fit?"*). Epileptic seizures could also be the effect of psychological conditions, such as tension, excitement (non-specific triggers) or music (a specific trigger in musicogenic epilepsy). In the ictal phase the aura can produce simple or complex sensory experiences. In the post-ictal period, confusional states, furors and fugue states can produce psychological symptoms. The non-ictal or inter-ictal psychological symptoms are most important in that these do not appear to improve with treatment of the epilepsy. These behaviours may not have a direct relationship to the seizures, or may be the result of subclinical neurophysiological disturbances.

3.2.1 MENTAL ILLNESS IN PEOPLE WITH MENTAL HANDICAP

At the beginning of the nineteenth century, the French psychiatrist, Jean-Marc-Gaspard Itard, published "On the education of a Wild Man". This concerned Victor, known as "the wild boy of Aveyron" (Itard, 1932). Itard's report initiated widespread scientific and professional interest in mental handicap.

Recently, Menolascino (1977) has suggested, that the relationship between mental handicap and mental illness could be explained under three broad categories; (1) those in whom the chronic manifestation of mental illness mimics mental handicap; (2) those who develop mental illness because of their mental handicap, by virtue of the increased number of stresses experienced by individuals with mental handicap; and (3) those whose mental illness and mental handicap are the manifestation of some underlying brain dysfunction.

3.2.2 MENTAL ILLNESS CAUSING MENTAL HANDICAP

A small proportion of children who suffer from psychiatric disorders, such as pervasive developmental disorder, autism, progressive dysintegrative psychosis, childhood schizophrenia and depression may eventually develop mental handicap (Kanner, 1943; Bailer, 1970). Chess (1971), however, highlighted the problem of misdiagnosing of behaviour disorder in mentally handicapped children as *"emotional disturbance with pseudoretardation"*.

3.2.3 <u>MENTAL HANDICAP CAUSING MENTAL ILLNESS</u> (SUSCEPTIBILITY THEORY)

Arguments exist for both the increased and the decreased susceptibility of mentally handicapped individuals to the development of emotional disorders. Simmons (1968) noted the old concept of "to be dumb is to be happy" which considered that mentally handicapped people were protected from the stresses of everyday life. This was considered to be the result of their inability to think in abstract terms, and their relatively sheltered lives. Penrose (1966) also held the optimistic view of the "happy retardate" by stating; "Nevertheless, on the whole, a striking feature of the intellectually handicapped is their amiability, their freedom from emotional stress, and their willingness to operate with others".

Pollock (1944) believed that mentally handicapped people were more vulnerable to stress, and postulated four frequently given reasons for this; (1) the reduced capacity of the mentally handicapped people to withstand stress; (2) their reduced ability to resolve emotional conflicts in daily life; (3) their exploitation by associates as a result of their lower social competence; and (4) emotional instability, which could lead to a loss of self-control.

Cytryn and Lourie (1967) highlighted the factors operating at the developmental stage of mentally handicapped individuals which may make them more susceptible to stress. Such factors included the lengthy process of individuation, the longer duration of childhood

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stages, delayed or abnormal perceptual and language development, and hypersensitivity to social stimuli. They also noted that unlike non-mentally handicapped people, individuals with mental handicap, under stress, often lack the support of family, peers or the broader community. Menolascino (1977) pointed out the particular difficulty in problem-solving by mentally handicapped people with sensory impairments.

There is no scientific proof to support or refute the susceptibility hypothesis and the debate must be settled empirically. Many believe that common underlying factors cause both mental illness and mental handicap (James, 1939; Barr, 1956; Bartemeier, 1925; Jancar, 1977).

3.3.1 PREVALENCE OF MENTAL ILLNESS IN MENTAL HANDICAP

There have been many studies to ascertain the frequency of the dual diagnosis of mental handicap and mental illness. Some studies have included those in institutions for mentally handicapped individuals, or in psychiatric hospitals. A few studies have included those resident outside institutions. Some have surveyed only children, or the elderly.

In a recent survey, Collacott et al., (1991) found depression and dementia relatively more common in people with Down's syndrome compared to other mentally handicapped people without Down's syndrome. However, non-Down's syndrome controls were more likely to have been diagnosed as suffering from conduct disorder, personality disorder and schizophrenia/paranoid state.

3.3.2 <u>SURVEY OF INSTITUTIONALIZED MENTALLY</u> <u>HANDICAPPED PEOPLE</u>

Institutionalized mentally handicapped individuals were studied by Primrose (1971), Vanuxem (1935), Penrose (1975), Rohan (1946), Neuer (1947), Leck et al., (1967), Donoghue et al., (1970), Williams (1972) and Reid (1972). The estimate of mental illness in people with mental handicap varies enormously according to these studies. On average, the prevalence of psychoses amongst mentally handicapped individuals clusters between 4% and 6%. Most estimates of serious psychiatric illness, including both psychosis and the personality disorders, range between 8% and 15%. The prevalence of all types of mental illness, including minor emotional problems is estimated at well above 50%. It is important to be aware of certain methodological shortcomings in interpreting data from studies of the prevalence of mental illness in people with mental handicap. Most studies were undertaken within an institutional setting, giving rise to selection bias. Many depended on retrospective data collection from medical case-notes, rather than on examination of the present mental state. Lack of well-established and validated diagnostic criteria for mental illness in mentally handicapped people added further problems to the consistency of reports.

3.3.3 SURVEY OF INSTITUTIONALIZED MENTALLY ILL PEOPLE

Pollock (1944), Duncan (1936), Hunsicker (1938), Innes et al., (1968), Payne (1968), Mercer (1968) and others surveyed institutionalized mentally ill people for an estimate of mentally handicapped individuals amongst them. Rosanoff et al., (1935) found 30% of individuals with a diagnosis of epileptic psychoses, 17% with schizophrenia, and 10% with manic depressive psychosis in a New York State hospital, to have a diagnosis of mental handicap also.

3.3.4 SURVEY OF COMMUNITY BASED MENTALLY HANDICAPPED PEOPLE

Ballinger & Reid (1977) found 41% of community-based mentally handicapped individuals to have a psychiatric disorder. Reid et al., (1978) found 46% of the community-based mentally

handicapped people to have diagnosis of a psychiatric illness. Corbett (1979) in the Camberwell study found 46% of the mentally handicapped people living in the community to have a psychiatric illness. Eaton & Menolascino (1982), on the other hand, found only 14% of the mentally handicapped people from the community to be so affected. These authors surveyed mentally handicapped individuals of all ages. In a recent Danish population survey, Lund (1985) on the basis of the Handicap, Behaviour and Skills (HBS) Schedule (Wing, 1980) found about 28% of the mentally handicapped individuals to have a diagnosis of psychiatric disorder. Approximately 11% had a diagnosis of behaviour disorder, 5% of psychosis of uncertain type, 4% had a diagnosis of dementia, 4% had autism, 2% had neuroses, while 1% had schizophrenia, and 2% affective disorder. The use of different diagnostic criteria for psychiatric illness in different studies, makes interpretation of the data difficult.

3.3.5 SURVEY OF MENTALLY HANDICAPPED CHILDREN

In the Camberwell study, Corbett (1979) found three quarters of the severely mentally handicapped children to have a psychiatric illness. Corbett (1979) found that, in half the children with severe mental handicap, the parents had experienced emotional or behaviour problems of sufficient severity to cause them to seek professional advice. In the Isle of Wight follow-up study, Rutter et al., (1976) found that in 50% of children with mental handicap, psychiatric illness persisted for 10 years compared to only 6% of normal

children. Chess (1971) found 60% of the 52 mentally handicapped children, resident at home, to show evidence of psychiatric illness. Menolascino (1965) reported psychotic symptoms amongst 5% of 616 mentally handicapped children under 8 years of age. Menolascino (1977) reviewed the reports of the previous 20 years and concluded that 20% to 35% of mentally handicapped children under 12 years of age and living in the community, show evidence of emotional disturbance. Menolascino and Stark (1984) pointed out that in the non-mentally handicapped children population 14% to 18% show emotional disturbance.

3.3.6 SURVEYS OF ELDERLY MENTALLY HANDICAPPED PEOPLE

The prevalence of psychiatric disorders amongst mentally handicapped individuals aged over 65 years has ranged between 16% and 20% (Ballinger, 1978; Day, 1987). Kay and colleagues (1964) found a similar prevalence of psychiatric disorders amongst non-mentally handicapped elderly population. Day (1985) found that 30% of the 357 mentally handicapped residents of a hospital, aged 40 years and over had a psychiatric illness. Day noted a progressive fall of all types of psychiatric diagnoses with increasing age. This was considered to be the result of the differential mortality of those with severe mental handicap who had much higher rates of behaviour disorder, compared to those with lesser degrees of mental handicap. Dementia increased with age, whereas affective and paranoid states occurred at the same rate as in younger individuals.

In Day's (1985) study population, half had a diagnosis of behaviour disorder, 28% had psychoses, 9% had possible psychoses, 9% had organic states and 4% had neuroses. Day (1985) also found, in a retrospective study of 215 new admissions to a psychiatric unit for mentally handicapped people, that 20% of those aged 40 and over had a psychiatric diagnosis. Thirty-six percent of these had behaviour disorders, 22% had psychoses, 33% neuroses and 10% had organic mental states.

The prevalence of senile dementias amongst the mentally handicapped population varies from 14% (Reid and Aungle, 1974) to 6% (Tait, 1983; Day, 1985). This compares with the prevalence of 6% in the general population (Kay et al., 1964). Post mortem studies show Alzheimer's type neuropathology in up to 100% of adult Down's syndrome individuals over 40 years of age (Wisniewski et al., 1985). Acknowledging the difficulty of diagnosing dementia on clinical grounds in individuals with Down's syndrome, Lai & Williams (1989) found that 8% of individuals between 35-50 years, 50% between 50-60 years, and 80% over age of 60 years had dementia. Similarly, Zigman et al., (1987) suggested that 15-40% of Down's syndrome subjects over 40 years of age show signs of dementia. According to a recent study 20% of individuals with Down's syndrome over age 35 years, showed dementia and cerebral blood flow changes characteristic of Alzheimer's disease (Deb et al., 1991).

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<u>CHAPTER 4</u>

STUDY DESIGN

4.1. PURPOSE AND AIMS OF THE STUDY

The purpose of the present study has been to measure quantitatively as well as qualitatively the inter-ictal psychopathology of individuals with mental handicap and epilepsy and compare those with a carefully matched control group of individuals with mental handicap but without epilepsy.

The objectives of the present study were:

- I to determine the differential prevalence of mental disorders in individuals with mental handicap, with and without epilepsy, with particular reference to:
 - (a) various types of maladaptive behaviours.
 - (b) the total score on measures of severe maladaptive behaviour.
 - (c) psychiatric illness.
 - (d) personality disorders.
- II to determine the prevalence of mental disorders in different subgroups of mentally handicapped individuals with epilepsy (according to demographic, neuropsychiatric and anticonvulsant variables) compared to those in mentally handicapped individuals without epilepsy.
- to determine the prevalence of total psychiatric morbidity and the inter-relationship of maladaptive behaviour, psychiatric illness and personality disorders in mentally handicapped individuals with and without epilepsy.

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IV	(a)	to determine the prevalence of different EEG
		abnormalities amongst a group of individuals with
		mental handicap and epilepsy.
	(b)	to examine the rates of mental disorders in various
		groups defined by EEG parameters, and to compare
		such prevalence rates to those found in mentally
		handicapped individuals without epilepsy.
V	(a)	to determine the nature of anticonvulsant treatments
		received by individuals with mental handicap and
		epilepsy.
	(b)	to determine the effect of various anticonvulsant
		variables on mental disorders in mentally handicapped
		individuals.
	(C)	to determine the effect of various anticonvulsant

variables on biochemical parameters.

VI to determine the effect of folate metabolism on the mental disorders of individuals with mental handicap with or without epilepsy.

4.2 MATERIALS AND METHOD

The study was undertaken within the mental handicap services of the Glenfrith Unit, Leicester, U.K.

The in-patient population was drawn from the long stay residents of Leicester Frith and Stretton Hall hospitals. These two hospitals are for adults with mental handicap of varying abilities. At the time of

the study, the inpatient population of these two hospitals numbered 370 individuals. All patients who fulfilled the defined criteria of having had a clinical diagnosis of epilepsy were included, with the exception of patients from two wards in Leicester Frith Hospital for individuals with profound mental handicap. Altogether 107 individuals fell in this category. Seven individuals whose names were the last according to an alphabetical list were excluded to make this a round figure of 100.

The community sample was drawn from two Local Authority Adult Training Centres for adults with a mental handicap, namely Coalville Day Centre and Fosse Day Centre, Leicester. Coalville Day Centre is situated in a suburb of Leicester and had 80 day members. Fosse Day Centre is situated near Leicester city centre and had 150 day members. All members (excluding profoundly mentally handicapped individuals) who fulfilled the operational criteria for a diagnosis of epilepsy were included. In total 53 day members fell into this category. Three individuals whose names were the last according to an alphabetical list were excluded to make this a round figure of 50.

A control group of adults with mental handicap but in whom a history of epilepsy was absent was drawn from the same hospitals and same day centres. The control group was matched according to sex, age, level of mental handicap, level of communication skill (expressive speech, comprehension and clarity of speech), sensory impairment (vision and hearing), living environment (in the case of hospital population the same ward; in the case of the community population,

the same type of residential placement) and the presence or absence of associated chronic physical illness. The matching was done for both the hospital-based patients as well as those who lived in the community.

An interview which lasted $\frac{1}{2}$ - 1 hour was carried out by the author with an observer who knew each individual well. In the instance of hospital residents, this comprised a senior nurse from the ward. For individuals living in the community, the interview was undertaken with a member of the day centre staff, or the individual's carer or relative, who had known the mentally handicapped person for at least three years. The following instruments were applied:

- (1) Profile of Abilities and Adjustments (PAA)
- (2) Standardized Assessment of Personality (SAP)
- (3) T-L Personal Behaviour Inventory (T-L scale)
- (4) Diagnostic and Statistical Manual 3rd edition revised (DSM III-R).

Information from the above sources, as well as from the medical case notes, was gathered in order to complete a research questionnaire (see appendix 1). This included data on name, sex, age, IQ, epilepsy variables (eg., seizure type, age of onset, duration and frequency), EEG, and the type and dosage of anticonvulsant medication. Blood was drawn from individuals with epilepsy, twelve hours after the ingestion of the last dose of anticonvulsant medication, and sent to the laboratory for analysis of serum anticonvulsant level, full blood count, serum folate and vitamin B12 level.

4.3 INSTRUMENTS USED

4.3.1 PROFILE OF ABILITIES AND ADJUSTMENTS (P.A.A.) SCALE

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Aspects of the interictal behaviour of each individual (including maladaptive behaviour) during the twelve month period prior to the study were measured with the P.A.A. scale (see appendix 2). The P.A.A. was designed by Dr Lorna Wing and her colleagues from the Social Psychiatry Unit of the Institute of Psychiatry, London, U.K. This scale was created by the combination of two scales; the Disability Assessment Schedule (DAS)(Holmes et al., 1982) and the STAR (Williams, 1982). Holmes et al (1982) undertook an extensive reliability study of the DAS and found high inter-rater, inter-informant and test-retest reliability. All the maladaptive behaviour sub-sections of the P.A.A. used in this study were included in the DAS. Reliability scores on the maladaptive behaviour sections were found to be between 78% and 93%.

The following sections of the PAA were used;

- (VI) <u>Vision and Hearing.</u>
- (VIII) <u>Vocal Communication</u> (expressive speech, comprehension, clarity of speech).
- (IX) Maladaptive Behaviours
 - (a) aggression towards others
 - (b) aggression towards property
 - (c) overactivity

- (d) attention seeking behaviour
- (e) aggression towards self
- (f) wandering
- (g) screaming and other noises
- (h) temper tantrums
- (i) disturbing others at night
- (j) objectionable personal habits
- (k) throwing objects aimlessly
- (I) anti-social behaviour
- (m) sexual delinquency,
- (X) <u>Co-operation.</u>
- (XI) <u>Psychiatric and Physical condition</u> (this includes subsections such as mood, irritability, chronic physical illness and various psychiatric illness).
- (XII) Social Relationship.
- (XIII) Social Interaction.
- (XIV) Stereotyped Behaviour.
- (XV) Echolalia.

The PAA is an observer-rated scale, sections of which were scored on a ranked scale. Each of the 13 maladaptive behaviour subscales was rated on a sliding scale of 1 to 6. A score between 1 and 3 signified severe problems, and 4 to 6 signified mild or no problem. Each individual was then rated according to the number of maladaptive behaviour subscales on which they scored a severe problem rating (eg., 1 to 3). Consequently each individual could score between 0 and 13 on a *"severe maladaptive behaviour"* rating.

The mood subsection was scored as (a) rather flat (b) mostly unhappy (c) very changeable (d) changeable (e) usually happy.

4.3.2 DIAGNOSTIC AND STATISTICAL MANUAL <u>3rd EDITION REVISED (DSM III-R)</u>

Section XI of the PAA (Psychiatric and Physical Conditions) was used as an initial screening instrument. Those who scored positively on any of the subsections of psychiatric conditions were selected for further study. Individuals with mild to moderate handicap who had good communication skills were interviewed for 30 to 40 minutes according to a standard psychiatric interview based on the PSE10 Scan Schedule (the computerised diagnostic system was not used)(Wing et al, 1990). The behaviour of individuals with severe handicap was observed for 30 minutes. The medical case notes were thoroughly scrutinised and supplementary information was gathered from the individual's carers. Finally a diagnosis of psychiatric illness was made according to Axis I of DSM III-R (American Psychiatric Association, 1987)(see Flowchart 4.1).

It was possible to achieve a psychiatric diagnosis according to the DSM III-R criteria for all individuals with mild to moderate handicap and most of those with severe handicap. A descriptive diagnostic category of *"Cyclical behaviour and/or mood change"* was made in those individuals with severe handicap who had sustained periodic behaviour changes with or without associated mood change. These individuals could not be classified according to DSM III-R criteria due

Flowchart 4.1

Psychiatric diagnosis (according to the axis I of the DSM III-R)







to the lack of specific psychiatric symptoms. Had these individuals been able to express themselves they may have manifested symptoms characteristic of affective disorder. Since ritualistic behaviour is common amongst individuals with mental handicap, specific DSM III-R criteria were applied in order to diagnose Obsessive Compulsive Disorder. However, in some cases, evidence of personal distress was not present and overt resistance to the performed act could not be detected.

The term *"Total Psychiatric Illness"* was used to mean the presence of any one or more of the psychiatric illness categories. The term "Psychotic Illness" was used to state the presence of either (a) Cyclical behaviour and/or mood change and/or (b) Major depression and/or (c) Bipolar disorder and/or (d) Schizophrenia and/or (e) Delusional Disorder. The term *"Neurotic Illness"* was used to include categories such as hypochondriasis, anxiety, obsessive-compulsive or phobic disorder.

An attempt was made to make a diagnosis of pervasive developmental disorder through the use of sections XIII, XIV and XV of the PAA (personal communication with Dr Lorna Wing). Using those criteria, 16 individuals with epilepsy compared to 17 without epilepsy, had a diagnosis of pervasive development disorder. These data were not analysed further since (a) only a small number of individuals fell into this diagnostic category, (b) a similar number of individuals with and without epilepsy fell into this diagnostic category,

and (c) there was an inability to obtain an adequate developmental history.

4.3.3 THE STANDARDIZED ASSESSMENT OF PERSONALITY (SAP) SCALE

The SAP scale was devised by Mann et al., (1981). The SAP (see appendix 3) is an observer-rated semi-structured interview designed to diagnose either the presence or absence of the following personality types: self-conscious, schizoid, paranoid, cyclothymic, obsessional, anxious, neurosthenic, aggressive, psychopathic and hysterical. Two grades are possible for each category. Grade 1 consists of a personality accentuation. Grade 2 represents personality disorder. An individual may score on more than one personality type. In this study it was only possible, for practical reasons (vide infra), to score on the following categories; cyclothymic, obsessional, anxious, aggressive and psychopathic.

The inter-rater reliability of the SAP scale has been examined, and found to be good, with a weighted kappa of between 0.60 to 0.85. Ballinger and Reid (1987) established the reliability of the SAP in an institutionalized population of individuals with mild to moderate degrees of mental handicap. Training in the use of this schedule had been received previously from Professor Mann.

4.3.4 THE T-L PERSONAL INVENTORY (T-L) SCALE

The inadequacy of the available personality inventories such as MMPI to diagnose specific behaviour syndromes which have been considered to be associated with epilepsy, has been highlighted by Trimble (1983). Acknowledging this difficulty, Bear and Fedio (1977) devised the T-L scale to determine abnormalities of personality characteristics that are considered might be associated with epilepsy. This scale has both client-rated and informant-rated versions. In the present study, part of the informant-rated version was used (see appendix 4). There are 18 subsections, each subsection being rated on a sliding scale of zero to five. The following subsections were used in the current study:

- a) excessive writing tendency,
- b) feelings about sex,
- c) excessive religious conviction (over-religiosity),
- d) lack of sense of humour,
- e) interest in detail, and
- f) persistence and repetitiveness.

A personality type is considered to be present if a score of three or more points on any of the six subsections is obtained (Fedio, personal communication). More than one personality type could be present in any individual.

Since the T-L scale has not been used previously in individuals with mental handicap, an inter-informant reliability test was undertaken. Information was gathered by the author from both ward nursing staff as well as staff from the Occupational Therapy department on the T-L personality types of 50 institutionalized individuals with mental handicap (with and without epilepsy). Scores for T-L personality types on each resident were gathered from the two informants and compared using Spearman's correlation coefficient. The following T-L personality types demonstrated good inter-informant reliability (P<0.001); (a) writing tendency, (b) feelings about sex, (c) interest in detail, and (d) persistence. Insufficient data were available to compare the groups on two T-L personality types, namely, 'sense of humour' and 'religious conviction'. Both the SAP and T-L scale could only be employed in individuals with mild to moderate degree of mental handicap.

4.4 DEFINITION OF OTHER VARIABLES

The classification of mental handicap was undertaken according to the Ninth Revision of the International Classification of Diseases (WHO, 1978), as follows:- Mild mental handicap, IQ 70-50; moderate mental handicap, IQ 49-35; severe mental handicap, IQ below 35. Intelligence had been tested by various psychometric tests, such as, Weschler Adult Intelligence Score (WAIS), WAIS-R, Raven's Progressive Matrices, Peabody Picture Vocabulary Test and Vineland Social Maturity Scale; this was expressed in terms of IQ. In almost all cases, IQ measurements were recorded in a psychologist's report in

the medical casenotes. The degree of communication skill, sensory impairment (vision and hearing) and chronic physical illness were measured according to the appropriate sections of the Profile of Abilities and Adjustment (PAA) Scale. Information regarding the cause of mental handicap was gathered from each individual's medical casenotes, and from information supplied by carers.

4.4.1 EPILEPSY VARIABLES

Epilepsy was defined according to Gunn & Fenton's (1969) operational criteria. These include a history of at least three epileptic seizures in the previous two-year period, or, if the last seizure occurred before that time, the individual was still in receipt of anticonvulsant treatment. In addition, 11 individuals were included, who fulfilled the above criteria, but because of a recent remission of seizures (over 3 years), anticonvulsant treatment had been discontinued shortly prior to the study period. Drug-induced epilepsy and febrile convulsions were excluded. The classification of seizures was undertaken on the basis of clinical features only, according to the International Classification of Epileptic Seizures (The Commission on Classification and Terminology of the International League Against Epilepsy, 1981). A detailed description of epileptic seizures was obtained from an eye-witness. Where necessary, a "behaviour check-list during seizures" (see appendix 5) was completed.

Individuals with seizures were divided into "active" epilepsy (those who had sustained seizures during the twelve month period prior to the study) and "non-active" epilepsy (those who had not sustained a seizure during the previous twelve month period). Information concerning seizure-frequency was obtained from the medical and nursing casenotes and from information supplied by carers. Seizure frequency was estimated as the average for the previous twelvemonth period. Status epilepticus was, however, discounted. Where individuals sustained more than one type of seizure, the most frequent type of seizure was counted. It was classified as "frequent" if seizures occurred once or more per month and "less frequent" if seizures occurred less often than once per month. Information regarding the age of onset and duration of epilepsy was gathered from the medical casenotes and from the carers.

4.4.2 <u>EEG</u>

An interictal EEG recording was available for 100 of 150 individuals with epilepsy. Forty individuals had had EEG recordings undertaken within the twelve month period prior to the study. A further 60 individuals with epilepsy underwent an EEG during the study period. In 47 individuals with epilepsy an EEG could not be performed because either they did not co-operate or consent. Three individuals were excluded randomly to get a round figure of 100. The consultant electrophysiologist who reported on these EEGs was unaware of the seizure type. EEG recording was performed for 20-30 minutes depending on the degree of cooperation of the individual. A sixteen-

channel SLE machine was used, 19 pad electrodes were placed according to the 10-20 system; EEG sensitivity 100uV per cm; paper velocity 30mm per second. A rest period was recorded in each of eight montages, with the eyes open/closed manoeuvre, an overbreathing period of three minutes, and photic stimulation. Spike, polyspikes, spike wave, sharp wave and sharp and slow waves were accepted as epileptiform activities in the EEG.

4.4.3 ANTICONVULSANT MEDICATION

Information concerning the type and dosage of anticonvulsant medication was gathered from the medical casenotes. Only the anticonvulsants received during the twelve month period prior to the study were counted and an average dosage during this period was calculated for the purposes of this study. Serum levels of anticonvulsant medication were estimated for the point approximately twelve hours following the administration of the last dose.

4.5 STATISTICS

Data were analysed by computer using the Statistical Packages for Social Sciences (SPSSX). Variables for individuals with epilepsy were compared with those of the matched control group using the Wilcoxon matched pairs signed rank test (2 tailed), Mann Whitney (2 tailed) or Chi-Square (after Yate's correction) and Fisher's exact probability test, wherever appropriate. Advice was sought from medical statisticians for the analysis of data.

4.6 METHODOLOGICAL CONSIDERATIONS

As in any research enquiry, it is important to examine the methodological limitations of the study design. Such an examination permits the appropriate interpretation of results.

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Although this is not a population study, the overall sample size and that of the subgroups were reasonable. Samples were selected from two major institutions for individuals with mental handicap: two other similar institutions in the area with a small number of residents in each were excluded. Similarly out of several Adult Training Centres for adults with mental handicap in the area, individuals from only two were included. Samples were collected from the only day centre in Leicester city centre and another one from a rural area. The extent of any bias inherent in such selection is unknown. However, this process gave a balance to the sample, and made the communitybased population as representative as possible.

As regards hospital-based individuals, almost all individuals with epilepsy from the sample were included, with the exception of profoundly mentally handicapped individuals with associated physical deformity. These individuals were excluded for a number of reasons. A high proportion of individuals with profound handicap are known to sustain epilepsy. However, a low proportion show behavioural problems. The inclusion of profoundly handicapped individuals might therefore have produced bias. In addition, since the majority of those individuals with profound mental handicap sustain seizures the

identification of a control group matched for intellectual ability and resident in the same wards would have been unachievable.

Although the aim was to study interictal behaviour, difficulties remained, since Hermann and Whitman (1984) argued that the interictal period is anything but a quiescent state. Significant variations both between and within individuals in brain electrical activities occur during this period. The effect of this variation of brain electrical activities on behaviour is unknown. Some alterations of behaviour in the peri-ictal phase were observed in a minority of individuals. In individuals who sustained very frequent seizures, the interictal period was difficult to define.

For practical reasons this remained a cross-sectional study. Behaviour of a particular individual could have changed during the years prior to the study. To avoid this problem, an account of behaviour in the twelve month period prior to the study was taken, and an average score of severity for that period was ascertained.

A diagnosis of epilepsy on the basis of clinical features only, was made for several reasons. The diagnosis of epilepsy remains a clinical rather than electrophysiological process. A combined diagnosis on the basis of clinical features and EEG findings would have caused a selection bias in collecting a subsection of mentally handicapped individuals with epilepsy. A major reason for failing to obtain EEG recordings in 50 individuals with epilepsy was the associated behaviour problems. Hence a combined diagnosis would

have excluded some individuals with severe maladaptive behaviour. Individuals with epileptiform changes in the EEG were studied separately. Findings in this subgroup are similar to those of the whole group.

Difficulty was experienced in the classification of seizures. In some individuals, the seizure-type remained undetermined because the criteria of the International Classification of type of seizures were not met.

The diagnosis of psychiatric illness in individuals with mental handicap using standard diagnostic criteria, was difficult on occasions. Sovner (1986) highlighted some of the limitations of using DSM III criteria in mental handicap, although both he (1990) and Melanoscino (1990) saw DSM III-R as an improvement, and as an acceptable diagnostic framework to use in individuals with mental handicap. In this study, no major difficulty was found in using DSM III-R in individuals with mild to moderate degree of handicap. However, in some individuals with severe handicap who lacked communication skills, the use of DSM III-R criteria was not possible. Instead a descriptive diagnostic category was adapted.

Another problem in this population was the chronic manifestation of many psychiatric features which caused confusion over diagnoses such as state- and trait-anxiety. It is also recognised that some features (such as withdrawal, stereotypy, persistence and repetitiveness, etc.) are common manifestations both of psychiatric illness (eg., schizophrenia) as well as underlying brain damage. Indeed features such as persistence and repetitiveness, covered under the T-L personality categories, could have been features of pervasive developmental disorder. For the same reason, diagnoses such as schizoid, paranoid and neurasthenic personality disorders were avoided. There remains a considerable controversy as to whether the diagnosis of such personality categories amongst long-term institutionalized individuals represents the mistaken diagnosis of pervasive developmental disorder.

The two groups in this study were carefully matched with regard to independent variables which may affect the behaviour of an individual with mental handicap. Care was also taken in the collection of information such as the age of onset, duration, type and frequency of seizures. Because of the dependence on casenotes in these matters, the collection of data remained incomplete in some instances. Some types of seizures (eg., partial, absence, nocturnal and occasional myoclonus), could have been missed and not reported. The problems associated with the analysis of data obtained from one-off blood samples were also appreciated.

<u>CHAPTER 5</u>

DESCRIPTION OF THE POPULATION

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5.1.1 INTRODUCTION

The incidence of epilepsy in the general population is considered to be between 20 and 70 per 100,000 per year (range 11-134/100,000 per year)(Shorvon, 1990). The point prevalence of epilepsy, on the other hand, ranges between 4 and 10 per 1000 of the general population (Shorvon, 1990). The incidence of epilepsy is greatest in early childhood: there is a slight increase in incidence in late adult life. Prevalence rates show a similar, albeit less pronounced, age-related variation (Hauser & Kurland, 1975). Goodridge and Shorvon (1983) reported a life-time prevalence of 20.3 per 1000 of the general population; 10.5 per 1000 of the general population with active epilepsy (one or more seizures in the preceeding 24 months period) and/or on treatment.

5.1.2 TOTAL POPULATION

The group of 150 individuals with epilepsy consisted of 77 males and 73 females. Forty-nine had mild mental handicap, 26 had moderate handicap and 75 severe mental handicap. Ages ranged between 20 and 77 years, the mean age being 40 years with an S.D. of 13 years. Eighty-three individuals were aged below 40 years and 67 aged 40 years or over. (See table 5.1).

5.1.3 HOSPITAL RESIDENTS

Of 100 epileptic mentally handicapped residents in hospital, 48 were males and 52 females. Twenty-two had mild, 16 had moderate and 62 had severe mental handicap. Their ages ranged between 23 and 77 (mean 43 years; S.D. 12 years). Forty-eight were below 40 years of age and 52 were 40 years or over (see table 5.1).

5.1.4 COMMUNITY RESIDENTS

Of 50 individuals with epilepsy resident in the community, 29 were males and 21 females. Twenty-seven had mild, 10 had moderate and 13 had severe mental handicap. Their ages ranged between 20 and 67 (mean 34 years; S.D. 12 years). Thirty-six were below 40 years of age and 21 were 40 years or over (see table 5.1).

Amongst hospital residents there was a significantly higher proportion of individuals with severe handicap (Chi Square = 15.87;d.f. = 1; P<0.001) and of older individuals (Z = -4.075; P<0.001), compared to the community population. There was no difference in the sex distribution.

The control group was individually matched for sex, age, level of mental handicap and living environment. Subsequent analysis of data did not reveal any statistically significant difference between the experimental and the control groups in scores on communication

skills, sensory impairment, associated chronic physical illness, according to the PAA scale.

No statistically significant differences emerged between individuals with epilepsy and the controls without epilepsy, when the variables used for matching purposes were compared. The number of male, female and different degrees of mental handicap (i.e., mild, moderate, severe) remained the same in both groups. Both groups had a mean age of 40 years and S.D. of 13 years. There was also no statistically significant difference between the groups in their scores on the following sections of the PAA; vision (Z = -1.61, P = 0.108), hearing (Z = -0.27; P = 0.788), speech (Z = -1.17; P = 0.243) and the presence of chronic physical illness (Z = -0.63; P = 0.526).

5.2 AETIOLOGY OF MENTAL HANDICAP

In most cases the cause of mental handicap was uncertain. In particular, in 76 individuals with epilepsy and 99 individuals without epilepsy the aetiology of mental handicap was unknown. Chromosomal causes (Down's syndrome, Trisomy 18, XXY syndrome) were found amongst 4 individuals with epilepsy and 19 individuals without epilepsy. Pre-natal causes (viz toxaemia of pregnancy, congenital rubella, cytomegalovirus infection, tuberous sclerosis, Moebius syndrome, de Lange syndrome, phenylketonuria, hypoprolinaemia) were found in 12 individuals with epilepsy and 6 without epilepsy. Peri-natal injury was considered to be the cause of mental handicap amongst 29 with epilepsy and 21 without epilepsy.

Post natal causes such as cerebral infection and head injury were found in 29 individuals with epilepsy and 5 without epilepsy (see table 5.2).

Amongst individuals resident in hospital, 15 were considered to have a chromosomal cause for mental handicap; twelve had a pre-natal, 39 perinatal, and 19 a post-natal aetiology. In 116 cases the aetiology of mental handicap remained unknown (see table 5.2). Similarly, amongst individuals resident in the community, 8 had a chromosomal aetiology, 6 pre-natal, 12 perinatal and 15 post-natal. In 59 cases the aetiology remained unknown (see table 5.2). There was significantly higher proportion of chromosomal abnormalities in the group without epilepsy (Chi Square = 9.229; d.f. = 1; P<0.01) and significantly higher rate of post-natal abnormalities in the group without epilepsy were considered to have a prenatal or perinatal aetiology for mental handicap than those without epilepsy. However, this failed to reach a significant level (see table 5.2)

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5.3 EPILEPSY VARIABLES

5.3.1 TOTAL POPULATION WITH EPILEPSY

Of the total population of 150 individuals with epilepsy, 92 had "active" epilepsy (i.e. they had sustained seizure within the previous year of the study) whereas 58 had "non-active" epilepsy (i.e. they had sustained no seizure within the previous year of the study). Eighty-five individuals sustained one type of seizure; 38 individuals had more than one type of seizure; in 27 individuals, the seizure-type remained unclear. In 84 instances the age of onset of seizures was before ten years of age. In 31 instances, epilepsy commenced after nine years of age. In 35 individuals the age when seizures commenced remained uncertain. Seventy-eight individuals had sustained epilepsy for more than 19 years; for 37 individuals, epilepsy had been present for less than 20 years. Of 92 with "active" epilepsy, 35 sustained "less frequent" (less than one seizure per month) and 56 "frequent" (one or more seizures per month) seizures. In one individual the seizure frequency was unclear (see table 5.3).

Of the total population of 150 individuals with epilepsy, the seizuretype was known in 123(82%) individuals. The type of seizures sustained by these 123 individuals are shown in table 5.4.

5.3.2 HOSPITAL RESIDENTS WITH EPILEPSY

Amongst individuals resident in hospital, 60 sustained "active" epilepsy (at least one seizure within the past year) and 40 "nonactive" (no seizure within the last year) epilepsy. Fifty-nine sustained a single type and 25 multiple types of seizures. In 16 individuals, the seizure type remained unclear. Amongst those who sustained "active" epilepsy, 36 sustained "frequent" (one or more per month) and 24 "less-frequent" (less than one per month) seizures. In 49 individuals the age of onset of epilepsy was prior to the age of 10 years: in 21 individuals, seizures commenced after 9 years of age. In 22 individuals the duration of epilepsy was less than 20 years, whilst in 48, the duration was equal to or exceeded 20 years. Of the 100 in-patient epileptics studied, 73 sustained generalized tonic-clonic, 15 absence, 9 tonic, 1 atonic, 6 myoclonic, 11 complex partial and 11 secondarily generalized partial seizures. Sixty-seven individuals sustained generalized seizures only, whereas 17 individuals sustained only partial seizures (with or without secondary generalization) (see table 5.3, 5.4).

5.3.3 COMMUNITY RESIDENTS WITH EPILEPSY

Amongst the individuals resident in the community, 32 sustained "active" (at least one seizure in the past year) epilepsy and 18 "nonactive" (no seizure in the past year) epilepsy. Of the individuals with "active" epilepsy 20 sustained "frequent" (one or more per month) and 11 "less frequent" (less than one per month) seizures. In one case, the frequency of seizures was undetermined. Twenty-six individuals sustained one type of seizure whereas 13 sustained multiple types. In 11 cases the seizure type remained unclear. Of 50 individuals with epilepsy, 29 sustained generalized tonic-clonic, 11 absence, 2 tonic, 2 atonic, 4 myoclonic, 6 complex partial and 2 secondarily generalized seizure. The age of onset of epilepsy was before 10 years in 35 individuals and after 9 years of age in 10 individuals. Similarly the duration of epilepsy was less than 20 years in 15 individuals and 20 years or more in 30. Thirty-three individuals sustained generalized seizures alone, whereas 6 sustained partial seizures only (with or without secondary generalization)(see table 5.3, 5.4).

No statistically significant differences emerged when epilepsy variables (eg, active/non-active, single type/multiple type seizures, different types of seizures, age of onset and duration of epilepsy, frequent/less frequent seizures) were compared between the hospital residents and the community residents.

5.4 <u>EEG</u>

Only 9 out of 100 available EEG recordings were normal. Forty-eight showed only excessive slow background activity. Forty-three EEG tracings showed some type of epileptiform activity with or without associated slow background activity. Of these, 12 showed bilateral diffuse generalized changes (including 3Hz abnormality), 18 showed focal activities in the temporal region (5 left-sided, 4 right-sided and 9

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bilateral) whilst the remaining 13 demonstrated both focal temporal and generalized epileptiform activities (see table 5.5).

Of those who sustained generalized epilepsy, 21% (n = 14) showed generalized epileptiform changes in the EEG, whereas 31% (n = 20) showed focal epileptiform changes in the EEG. Of those who sustained partial epilepsy, 13% (n=2) showed generalized epileptiform changes, whereas 25% (n = 7) showed focal changes. In some cases EEG results were unavailable. Of those whose EEG showed generalized epileptiform changes, 87% (n = 14) sustained generalized epilepsy whereas 13% (n = 2) sustained partial epilepsy. Of those whose EEG showed focal epileptiform changes, 75% (n = 20) sustained generalized epilepsy whereas 25% (n = 7) sustained partial epilepsy. A Chi-Square test did not reveal any statistically significant difference between these groups. Further details concerning individuals who had undergone EEG investigation are given later in the text.

5.5 ANTICONVULSANT MEDICATION

Of the one hundred and fifty individuals with epilepsy, the majority (n = 139) currently received anticonvulsant medication. Of these, 87 (58%) received monopharmacy and 52 (35%) received polypharmacy of anticonvulsant medication. Of the individuals who received monopharmacy, 56 (37%) were on carbamazepine, 16 (11%) on sodium valproate, 10 (7%) on phenobarbitone, 4 (3%) on phenytoin and only 1 on ethosuximide.

Overall, 51 (35%) individuals with epilepsy received either phenobarbitone or phenytoin, either alone or in combination with other anticonvulsant medication. Forty-two (29%) received sodium valproate, and 93 (62%) received carbamazepine, either alone or in combination. Five individuals also received ethosuximide, either alone or in combination. Another 4 individuals received primidone in combination (see table 5.6). For the 139 individuals who received anticonvulsant medication, there were altogether 195 anticonvulsant prescriptions.

Study of the dosage schedule of these 195 prescriptions revealed that 16 (18%) were below the recommended dose of the British National Formulary (BNF). One hundred and sixty-five (85%) were within the BNF recommended dose. Fourteen (7%) were in excess of the BNF recommended dose (see table 5.7). When the serum levels of anticonvulsant drugs were compared with the local laboratory reference range, 40 (21%) were found to be sub-therapeutic. One hundred and twenty-nine (66%) were within the therapeutic range, and 26 (13%) exceeded the therapeutic range (see table 5.8).

5.6 SERUM FOLATE AND VITAMIN B12 LEVEL

Serum folate levels were available for 115 individuals (83%) out of the 139 who received anticonvulsants. The local laboratory reference range for serum folate was 1.7uG/L to 10uG/L. In the study population, the serum folate ranged between 1.2uG/L and 9.9uGL. In only 5 cases (4%) did the serum folate level fall below the normal

range. In 110 individuals (96%), the serum folate was within the normal range. In no instance was the normal range exceeded (see table 5.9).

Serum vitamin B12 levels were obtained for 115 individuals (83%). For these, the serum B12 ranged between 80nG/L and 2000nG/L, whilst the local laboratory reference range was between 170nG/L and 800nG/L. In only 2 instances was the serum vitamin B12 level below the reference range. In 92 individuals (80%), the serum vitamin B12 level fell within the reference range, whilst in 21 individuals (18%) the level exceeded the reference range (see table 5.9).

5.7 HAEMOGLOBIN AND MCV

A haemoglobin estimation was undertaken in 96 out of the 139 individuals (69%) who received anticonvulsant medication. Haemoglobin concentration ranged between 8.8g/dl and 16.5g/dl. The local laboratory reference range for females was 11.5g/dl to 16.5g/dl and for males 13.5g/dl to 18.0g/dl. In 32 individuals (33%) the haemoglobin concentration fell below 13.5g/dl, and in 5 instances below 11.5g/dl. For 64 individuals (67%), the haemoglobin concentration the normal range (see table 5.9).

An estimation of mean corpuscular volume (MCV) was obtained from 96 individuals (69%) who received anticonvulsants. This ranged between 70.1fl and 99.9fl. The local laboratory reference range for males was between 80fl and 94fl, and for females between 81fl and

99fl. In 4 instances (4%), the MCV fell below the normal range. In 19 instances (20%) the MCV exceeded 94fl and for 3, it exceeded 99fl. In 73 instances (76%) it fell within the normal range (see table 5.9). Further information regarding anticonvulsant therapy and folate metabolism are given later in the text.

5.8 DISCUSSION

The natural history of epilepsy in individuals with mental handicap remains uncertain. In this study, contrary to the expected preponderance of males an almost equal sex ratio was found. There are more males than females amongst people with mental handicap (Penrose, 1975). In the current study there was a slightly higher number of females in the hospital group and a somewhat higher number of males in the community group.

In Pond & Bidwell's (1959) survey of 14 general practices there were 65 males and 61 females with epilepsy who attended hospital either as out-patients or as in-patients. In Krohn's (1961) population survey in northern Norway, there were 531 males and 420 females with epilepsy. In Gudmmundsson's (1966) epidemiological survey amongst people with epilepsy in Iceland, there were 538 males and 449 females. However in a recent study of epileptic patients resident in the community, Hermann et al., (1990) found 45 males and 57 females. In a survey of hospital residents of mentally handicapped adults, Jamil et al., (1991) found 37 males and 35 females with epilepsy. In the total population studied, there was a similar number of individuals with severe, as with mild and moderate handicap. There was however a difference between the hospital and community population. In the hospital group there were more individuals with severe handicap, whereas in the community group there was a higher proportion of individuals with mild to moderate mental handicap. This is not unexpected because of the policy of deinstitutionalisation of individuals with less severe degrees of handicap from the institution into the community, leaving individuals with more severe degrees of handicap behind in the hospital.

The age distribution of the study population varied between the hospital and the community residents. There was a similar number of individuals both below and above the age of 40 years in the total group and in the hospital group. However in the community a very high proportion of individuals were aged less than 40 years. This could again be explained by discharge policies into the community, whereby younger individuals are preferentially discharged, leaving older individuals to remain in the hospital. In the Camberwell study Corbett (1981) found a similar age distribution. The mean age of epileptic individuals in this study was 40 years, whereas the average age in Hermann et al., (1990) and Jamil et al's (1991) study were 31.2 years and 40.3 years respectively.

In the majority of individuals with epilepsy, seizures began before the age of 10 years. Seventy-two individuals (63%) developed epilepsy before the age of 6 years and of these, 21 (18%) developed seizures within the first year of life. In contrast only 8 individuals (7%) developed epilepsy after the age of 30 years and only 2 (2%) after the age of 60 years. In Gudmmundsson's (1966) study amongst epileptic patients in Iceland, the onset of epilepsy was before 15 years of age in 60%. Serafetinides and Dominian (1963), in their study of neurosurgical referrals found that epilepsy started after the age of 20 in 32.7%. In Hermann et al.,'s (1990) study, the average age at onset of epilepsy was 14.9 years with an SD of 11.1 years. The average duration of epilepsy in people with mental handicap started at an earlier age compared to those who were not handicapped.

Presumably, in the majority of cases, epilepsy was either idiopathic or else caused by the syndromes associated with underlying brain damage and mental handicap. It is conceivable that the onset of epilepsy and the concomitant use of anticonvulsants from an early age could contribute to the development of mental handicap by affecting a vulnerable brain at the developmental stage. A large proportion of individuals had sustained epilepsy for a long period of time; in 24 individuals (21%) the duration of epilepsy exceeded 40 years. This duration is considered to be of adequate length to have had an effect on psychopathology, either directly from epilepsy per se, or as a result of the concomitant use of anticonvulsants.

Although the majority of individuals (61%) sustained regular seizures, a proportion (39%) had not had any seizure in the previous twelve months of the study period. Annegers et al., (1979) in a survey of 465 patients with epilepsy of 20 years duration found 50% to receive no anticonvulsant medication. None of these 50% patients sustained any seizure in the previous 5 years. However, 20% had not sustained seizures for the previous 5 years yet continued to receive treatment. Only 30% continued to have seizures. The longer the epilepsy remained active, the smaller were the chances of remission.

Psychiatrists in mental handicap have become aware of the need to reconsider the continuation of anticonvulsant treatment in individuals with mental handicap and epilepsy who have not sustained seizures for a period of two to three years or more. Until recently however, many individuals received long-term anticonvulsant medication in the absence of seizures. The lifetime prevalence of epilepsy is between 2% and 5%, thus 1 in 20 of the general population will have had an epileptic seizure at some point in their lives, whereas 1 in 200 will have epilepsy. These figures exclude febrile convulsions, which occur in up to 5% of children (Nelson & Ellenberg, 1976).

Of individuals where the frequency of seizures was known, roughly 1/3rd sustained infrequent attacks. In Serafetinides & Dominian's (1963) study, 26 epileptic patients sustained infrequent seizures (six or less in a year), 7 sustained frequent seizures (one or less in a month) and 18 had very frequent seizures (more than one a week). According to US Government statistics (Commission for the Control

of Epilepsy and its Consequences, 1978), about a third of patients with epilepsy have less than one seizure a year, a third have between 1 and 12 seizures a year and the rest more than one seizure a month (20% more than one seizure a week).

Jamil et al., (1991) in a study of 72 epileptic individuals in a hospital for mentally handicapped adults, found 22 with severe (more than 4 seizures a month), 19 with moderate (more than 4 seizures a year) and 31 with mild epilepsy (less than 4 seizures a year). Using similar criteria Jawad et al., (1991) found 57 with severe, 39 with moderate and 53 with mild epilepsy amongst 149 adults with mental handicap, all of whom were resident in a hospital.

The majority of individuals (69%) sustained only one type of seizure. However 31% sustained multiple type seizures. Corbett (1981) observed a similar tendency in mentally handicapped individuals in Camberwell. Of 102 epileptic patients studied by Hermann et al., (1990), 40 sustained one type of seizure, 59 two types and 3 three types of seizures. These data suggest that multiple types of seizure are even more prevalent in non-mentally handicapped adults than in adults with a mental handicap. In such individuals, the effect of individual types of seizure on psychopathology remains difficult to measure.

All common seizure types were observed in the study population, although the majority (81%) sustained generalized tonic-clonic seizures. However several individuals (19%) suffered from complex partial seizure. Absence seizures, myoclonus and secondarily generalized seizures were equally common. However, no individual with simple partial seizures was identified. Presumably this reflects the difficulty of diagnosing such seizures in individuals with mental handicap. However, it is possible that simple partial seizures went unrecognised.

There is a wide variation in the quoted prevalence figures for different seizure types (Shorvon, 1990). Many studies have found generalized seizures to be most common, whereas others estimated a prevalence of up to 60% for complex partial and secondarily generalized seizures (Hauser & Kurland, 1975; Juul-Jensen & Foldsprang, 1983). Primary generalized tonic-clonic seizures are considered to account for 30%, and generalized absence seizures and myoclonus for 5%. In a prospective population-based survey of the National General Practice Study of Epilepsy (NGPSE), in the UK, Shorvon (1990) reported 36% to have secondarily generalized, 33% generalized tonic-clonic, 4% simple partial, 1% absence and 1% myoclonic seizures amongst the index attacks (the attack initiating diagnosis).

In a special sample of epileptic patients referred to neurosurgical units, Serafetinides & Dominian (1963) found 17 patients with major, 17 with psychomotor and 17 with mixed types of epileptic seizures. Of 102 epileptic patients studied by Hermann et al., (1990) 5 had generalized, 2 absence, 4 tonic-clonic, 8 simple partial, 90 complex partial, 55 secondarily generalized from simple or complex partial seizure and 4 other types of seizure. Jamil et al., (1991) found 19 partial and 53 generalized seizures amongst epileptic adults in an institution for mentally handicapped people. Those who sustained partial seizures also had more frequent seizures. Jawad et al., (1991) in a similar study of an institution for the mentally handicapped , found 113 (76%) to sustain generalized and 36 (24%) partial epilepsy. Unlike Jamil et al.,'s (1991) study there was no relationship between seizure type and the severity of seizure.

In spite of a high proportion of focal EEG abnormalities, only a minority of individuals sustained partial seizures. This is considered to be due to the fact that most of the clinically determined generalized seizures were in fact secondarily generalized from partial seizures.

There was little difference in the distribution of the various types of seizures between the hospital and community groups. There was a slightly higher portion of individuals with generalized tonic-clonic seizures and secondarily generalized seizures amongst the hospital group. The clinical diagnosis of seizure types remains difficult in individuals with mental handicap as has been noted earlier.

Gibbs et al., (1960) found abnormal EEG recordings in 80% of individuals with mental handicap and cerebral palsy. In individuals with mental handicap and epilepsy, 96% showed an abnormal EEG. In those with mental handicap, epilepsy and cerebral palsy the EEG was abnormal in 100%. In the current study, 91% had an abnormal EEG. The high proportion of abnormal excessive slow background activities in the EEG, could have been caused either by underlying brain damage or else from the effect of long term anticonvulsant use. The significance of a single interletal EEG should not be overemphasised. However, the presence of abnormalities such as epileptiform changes are more reliable indicators for interpretation, than the absence of abnormalities.

In SerafetInIdes & Dominian's (1963) follow-up study of late-onset epilepsy, 11 patients with epilepsy had a normal EEG whereas, 40 had abnormal EEGs. A normal EEG was associated with a better prognosis. Of 40 abnormal EEGs, 28 were of specific changes (spike or sharp waves), 7 non-specific changes (slow or irregular slow waves and asymmetries of the background activities), and 5 both specific and non-specific changes. Thirty-one had a temporal lobe focus, 26 of which were associated with a specific EEG abnormality (10 right, 10 left and 6 bilateral). Six patients with specific EEG changes in the temporal lobe had major seizures, 16 psychomotor and 4 had mixed types of seizure. Three patients with specific EEG changes outwith the temporal lobe had major seizures, 2 psychomotor and 4 had mixed types of seizure. Similarly 1 patient with non-specific EEG changes in the temporal region had major

seizures, 1 had psychomotor seizures and 3 had mixed types of seizure: 4 patients with non-specific EEG changes, outwith the temporal lobe, had major seizures, 2 had psychomotor and 1 had mixed types of seizure.

The overall use of anticonvulsant medication reflects the trend of using monopharmacy of new generation anticonvulsants. Barbiturates are used less often owing to their long-term behavioural and other side effects. The high rate of carbamazepine usage may reflect the personal choice of the doctor, or local trends. However, it may also be an attempt to treat epilepsy as well as maladaptive behaviour in the same individual, as described by Trimble and Corbett (1980).

In the Tonbridge survey, Haerer et al., (1986) found that over 40% of patients who sustained active epilepsy on the day of the survey, received no anticonvulsant treatment. Of 102 epileptic patients studied by Hermann et al., (1990), 46 received polypharmacy, 55 monopharmacy and 1 received no anticonvulsants. Fourteen patients received barbiturates whilst 88 received other anticonvulsants. Of 72 mentally handicapped adults studied by Jamil et al., (1991), 35 received monopharmacy, 28 polypharmacy and 9 had no anticonvulsant medication. In a similar study of 149 adults with mental handicap and epilepsy, Jawad et al., (1991) found 70 to receive monopharmacy, 63 to receive polypharmacy and 16 to receive no anticonvulsant medication. It seems that the proportion of epileptic patients who receive monopharmacy and polypharmacy is

very similar amongst both the mentally handicapped and the normal populations, although the proportion receiving monopharmacy is higher in the current study.

The aetiology of mental handicap remained unknown in a large number of instances. In some cases, where the aetiology was known, the reliability of that information remained questionable. The high proportion of chromosomal abnormalities amongst people without epilepsy could be due to the fact that young individuals with Down's syndrome do not suffer from epilepsy, although, in a recent study, Collacott (1991) found 10% (n=35) of the people with Down's syndrome to have a lifetime history of epilepsy. In 17 of these the age at onset of epilepsy was before 19 years. However, Down's syndrome is the most common chromosomal cause for The high rate of pre-natal abnormalities in mental handicap. individuals with epilepsy may be explained by the high proportion of individuals with tuberous sclerosis and Sturge-Weber syndrome who have epilepsy, although few patients in the current study had such diagnoses. The high rate of postnatal abnormalities amongst those with epilepsy may be due to the inclusion of head injury or cerebral/meningeal infection in early childhood in this category. Such may cause either extensive or focal brain damage.

The aetiology of epilepsy is commonly multifactorial. In the general population, approximately 60-70% of individuals have no clear cause for their seizures. According to the NGPSE study, 15% had a cerebrovascular cause, 6% had a cerebral tumour, 2% were post-traumatic, whilst other causes were found to be rare. The contribution of perinatal damage in causing epilepsy remains controversial (Shorvon, 1990).

Serafetinides & Dominian (1963) found no cause for the seizures in 37 (74%) of the epileptic patients referred to neurosurgical units at Guy's and The Maudsley hospitals. Three had a cerebral tumour, 4 had miscellaneous causes (tuberous sclerosis, cerebral infarction etc), 7 suffered from the effects of head injury and 2 had neurosyphilis. Further investigations with air encephalography (AEG) and EEG in the 37 patients without an obvious aetiology showed evidence of indirect brain damage in 30. Investigations by Hermann et al., (1990) established evidence for structural brain damage in 15 patients and no such damage in 87 patients with epilepsy. It seems that the aetiology of epilepsy is more likely to be known in the case of the mentally handicapped (50% in the current study) than in the general population (30%, vide supra).

5.9 <u>SUMMARY</u>

The characteristics of the epileptic patients who were the basis of the current study, have been described. There was an almost identical number of males and females. The age ranged between 20 to 77 years, with a mean of 40 years. Half had severe mental handicap, whilst the others were of mild to moderate mental handicap. Amongst hospital residents there were more elderly and severely handicapped individuals. The majority sustained generalized seizures, and their age at the onset of epilepsy was prior to 10 years. The EEG frequently showed focal abnormalities of epileptiform type originating in the temporal regions. The overall use of anticonvulsant medication reflected the trend of using monopharmacy of new generation anticonvulsant drugs. Amongst epileptic patients, there was a higher proportion of individuals who had a postnatal or perinatal cause for mental handicap.

<u>CHAPTER 6</u>

MALADAPTIVE BEHAVIOUR

6.1. INTRODUCTION

Maladaptive behaviour, although not uncommon in people with mental handicap, is difficult to define. A variety of terms, such as disturbed behaviour, problem behaviour, challenging behaviour etc. has been used. Primrose (1971) analysed 500 consecutive admissions to a hospital for mentally handicapped people between 1968 and 1970, and found that 64% of admissions were for anti-social behaviour or allied psychiatric reasons. Parsons et al., (1984) suggested various groups amongst people with mental handicap;

- (1) mental handicap with no behaviour disorder,
- (2) mental handicap with behaviour disorder due to cerebral dysfunction,
- (3) mental handicap with reactive behaviour disorder,
- (4) mental handicap with neurotic behaviour disorder,
- (5) mental handicap with psychosis.

Multiple factors frequently operate and interact to cause maladaptive behaviour in this population.

As maladaptive behaviour is often reported by the carers and the relatives rather than by the mentally handicapped individual, the interpretation varies according to the perception of others. There are no generally accepted guidelines as to which behaviours come under the category of maladaptive behaviours. Behaviours such as aggression (to others, to self or to property), hyperactivity, temper tantrums, acting-out behaviours, pestering others, wandering,

screaming, shouting, stereotyped activity, non-co-operation and many others could come under the maladaptive behaviour category.

There are many causes of maladaptive behaviour in mentally handicapped people. These include, physical discomfort, psychiatric illness, ictal behaviour associated with epileptic seizures, underlying brain damage etc., etc.,. The side-effects of medication, the interaction between drugs, and withdrawal effects may cause maladaptive Communication problems, such as dysarthria and behaviour. dysphasia of expressive or receptive type, may cause maladaptive behaviour. Over-stimulation or understimulation in the environment, lack of love or overindulgence, failure or rejection, lack of attention and life-events, have all been implicated. Sometimes the cause of these behaviours is not apparent. On occasions they arise periodically and raise the suspicion of non-clinical subthreshold electrophysiological discharge in certain areas of the brain. The American literature (Maltesky, 1973) describes this phenomenon as "Episodic dyscontrol".

Thirteen subsections of the maladaptive section of the Profile of Abilities and Adjustment (PAA) scale were used to score the occurrence, frequency and severity of these behaviours. Each behaviour was rated on a sliding scale from 1 to 6. The scores on each behaviour for the epileptic patients and their subgroups, were directly compared to the non-epileptic group using the Wilcoxon signed rank paired test.

6.2.1 RESULTS

The relationship between epilepsy and maladaptive behaviour in the mentally handicapped population was explored through examining scores on the PAA. All the 13 subsections of the maladaptive behaviour section, together with the 'co-operativeness', 'irritability', 'mood' and 'social interaction' sections of the PAA were compared between epileptic individuals and controls using the Wilcoxon signed rank paired test. When the total population of 150 epileptic individuals were examined no statistically significant difference between epileptic individuals and controls emerged (see table 6.1, 6.2). A similar result was obtained for both hospital and community residents.

When these behaviours were examined in those with active epilepsy (n=92) and their matched controls without epilepsy (n=92), a statistically significant difference was observed in two behaviour variables only; namely 'co-operation' and 'echolalia'. Individuals with epilepsy were less co-operative (Z = -2.21, P=0.027) and more echolalic (Z = -2.36, P=0.018) than non-epileptic controls (see tables 6.3). However, no significant difference was observed on these behaviour variables when individuals with non-active epilepsy (n=58) were compared to the matched control group (n=58) of individuals without epilepsy.

The overall prevalence of severe maladaptive behaviour, according to the PAA scores, was estimated in various groups. Of 150 individuals with epilepsy, 58% had *"severe maladaptive behaviour"* ratings compared to 52.7% of the control group. Overall 55.3% of the total population (n = 300) had such ratings. No significant difference was found when individuals with and without epilepsy were compared.

Maladaptive behaviour as defined by PAA scores was examined further in respect of the following variables:

- a) sex (male:female)(table 5.1)
- b) age group (20-39 years: 40 years and over)(table 5.1)
- c) degree of mental handicap (mild:moderate:severe) (table 5.1)
- d) type of epilepsy (single type: multiple types of seizure) (generalized: partial)(table 5.3, 5.4)
- e) age at onset of epilepsy (1-9 years: 10 years and over) (table 5.4)
- f) frequency of seizures (frequent: less frequent)(table 5.3)
- g) type of EEG abnormality (slow activity: epileptiform change)(generalized: focal)(table 5.5)
- h) number and type of anticonvulsants received (table 5.6).

Various subgroups of individuals with epilepsy were compared to their corresponding matched controls without epilepsy, in respect of behavioural attributes according to the PAA. The following statistically significant differences were observed;

- (a) Individuals with severe mental handicap and epilepsy (n = 75) were less aggressive than those without epilepsy (Z = -1.97; 2 tailed P = 0.049).
- (b) Individuals who sustained a single type of seizure (n = 85)were less aggressive than individuals without epilepsy (Z = -2.29; 2 tailed P = 0.022).
- (c) Individuals whose EEG had shown an abnormality consisting only of excessive slow background activity (n = 48) were less aggressive (Z = -2.53; 2 tailed P = 0.011) and overactive (Z = -2.01; 2 tailed P = 0.044) compared to individuals without epilepsy.
- (d) Individuals whose EEG had shown only generalized epileptiform activity (n = 12) showed more temper tantrums (Z = -2.47; 2 tailed P = 0.013) and irritability (Z = -2.42; 2 tailed P = 0.016) compared to individuals without epilepsy.
- (e) Individuals who received monopharmacy of anticonvulsant medication (n = 87) were less aggressive than their counterpart of individuals without epilepsy (Z = -2.10; 2 tailed P = 0.035).
- (f) Individuals who received carbamazepine monopharmacy (n = 56) were less aggressive than individuals without epilepsy (Z = -2.49; 2 tailed P = 0.013)(see table 6.4).

Both the hospital based and the community based group of epileptic individuals were further subdivided according to age, sex, level of handicap, type of epilepsy, age at onset of epilepsy, duration and frequency of seizures, type of EEG abnormalities and type of anticonvulsant medication received. These subgroups of individuals were then compared with matched non-epileptic controls and examined on aspects of behaviour through the use of the PAA. The following are the statistically significant differences between the groups.

6.2.2 HOSPITAL RESIDENTS

Scores relating to various maladaptive behaviours were compared between subgroups of epileptic individuals, resident in the hospital and their controls. Individuals who sustained a single type of seizure (n=58) were less aggressive than individuals without epilepsy (n=58). Those whose EEG had only shown slow background activity (n=33) were less aggressive and irritable than non-epileptic controls (n=33). Those whose EEG had shown generalized epileptiform activity alone (n=6) were more irritable than those without epilepsy (n=6). Those who received monopharmacy of anticonvulsant medication (n=65) were less aggressive than those without epilepsy (n=65). Those who received carbamazepine alone (n=48) were less aggressive compared to those without epilepsy (n=48)(see table 6.5).

6.2.3 COMMUNITY RESIDENTS

Scores relating to various maladaptive behaviours were compared between subgroups of epileptic individuals, resident in the community and their controls. Individuals with epilepsy who were mildly mentally handicapped (n=37) were more destructive and irritable than those mildly handicapped individuals without epilepsy (n = 37). Those individuals who had sustained epilepsy for less than 20 years (n = 15), showed more aggression, irritability, destructiveness and self-injurious behaviour than individuals without epilepsy (n = 15). Those individuals who sustained multiple types of seizures (n = 12) showed more self-injurious behaviour than individuals without epilepsy (n = 12). Those who sustained frequent seizures (n = 20) showed more self-injurious behaviour than individuals without epilepsy (n = 20).Those individuals whose EEG had shown generalized epileptiform activity (n = 6) showed more temper tantrums than those without epilepsy (n=6) (see table 6.6).

6.3 DISCUSSION

The literature on the psychopathology of individuals with mental handicap and epilepsy is sparse and fraught with methodological loopholes. Eyman et al., (1969) studied a population of individuals with mental handicap residents in three large hospitals in the USA. They showed that hyperactivity and other factors such as aggression, speech problems and difficulties in eating/dressing were more common in those with epilepsy. La Verne Capes & Moore (1970)(these two authors were also the co-authors of Eyman et al's, 1969, paper) compared 21 factors of maladaptive behaviour in 229 individuals with epilepsy comparing them to the rest of Arizon Children's Colony who did not have epilepsy (n=511). The two groups were not matched. They showed significant differences in sixteen out of twenty behavioural factors (mainly hyperactivity, withdrawal and aggression directed to others, self or objects).

Corbett (1981), failed to demonstrate any significant difference in the frequency of behaviour disturbances between children with severe mental handicap with or without epilepsy. This finding was supported by a previous study (Deb et al., 1987) in which the authors were unable to demonstrate any significant difference in maladaptive behaviour between institutionalized adults with mental handicap and epilepsy and matched non-epileptic controls.

A recent controlled study (Espie et al., 1989) involving residents in a hospital for people with mental handicap, concluded that "disturbed behaviour was not associated with epilepsy per se..... (although) a small subgroup of subjects who have poorly controlled epilepsy do present greater behavioural management problems". Similar observations were made by the same authors when they compared behaviour amongst people with mental handicap with or without epilepsy who lived in the community and attended day centres (Gilles et al., 1989). These authors observed a greater loss of social skills amongst individuals with epilepsy. They concluded that loss of social skills could either have been misinterpreted as behaviour problems, or that in some cases indirectly gave rise to behaviour problems.

The evidence for a correlation between maladaptive behaviour and epilepsy amongst individuals with mental handicap is poor. The commonest fault in such studies is the lack of adequate controls. When adequate controls are used, the apparent differences disappear (Kligman & Goldbert, 1975; Stevens & Hermann, 1981). In the current study, the two groups were matched according to variables which could have had effects on an individual's behaviour.

The findings support the idea that, in spite of widely held beliefs that individuals with epilepsy show more aggression and behaviour problems, evidence is lacking. This is supported by other studies where a matched control group was used (Espie et al., 1989; Gilles et al., 1989; Deb et al., 1987; Corbett, 1981). However, this is in

contrast to older studies (Eyman et al., 1969; La Verne Capes & Moore, 1970) where no adequately matched control group was used.

In the comparison of the subgroups of individuals with epilepsy there were 280 Wilcoxon test results and of them 10 (less than 5%) showed statistically significant results. In statistical terms these could be chance findings. Similar arguments apply for both the hospital based population (six significant results) and the community based population (nine significant results).

There are a number of possible explanations for this failure to find appreciable differences in maladaptive behaviour between individuals with and without epilepsy. Underlying brain damage which contributed to maladaptive behaviour in individuals with epilepsy may have remained the same in both groups. This is supported by recent literature reviews, which suggest that the relationship between aggressive behaviour and epilepsy is due to non-specific factors, particularly brain damage, that is common to both violent and epileptic individuals (Fenwick, 1986).

It is not clear whether psychosocial factors played a less influential role in individuals with mental handicap in causing behaviour problems. In the total group, individuals with epilepsy and severe handicap were less aggressive, whereas in the community group individuals with mild handicap and epilepsy were more irritable and destructive. However, psychosocial factors are overwhelmingly

considered to be the cause of behaviour disorders in individuals with mental handicap.

In an attempt to find psychosocial predictors of psychopathology in epilepsy, Hermann et al., (1990) administered the 30-item version of the General Health Questionnaire (Goldberg & Hillier, 1979) to 102 adults with epilepsy. They used neurological, psychosocial, medication and demographic variables to predict psychiatric distress. They found an association between psychopathology and increased perceived stigma, elevated number of stressful life events during the preceding year, poor adjustment to epilepsy, financial stress, vocational problems, external locus of control, and an earlier onset of epilepsy. By the use of multiple regression procedures they established three independent predictors of psychopathology; an increased number of stressful life events in the preceding year, poor adjustment to epilepsy, and financial stress.

Some workers believe that people with mental handicap are more susceptible to stress (Menolascino & Stark, 1984) and thus vulnerable to develop emotional problems. It is not known, however, whether mildly mentally handicapped individuals are more susceptible to stress than individuals with moderate to severe degrees of mental handicap. Similarly psychosocial factors, such as financial stress, poor adjustment to epilepsy, perceived stigma, and vocational problems, which were found to affect psychopathology in Hermann et al's study (1990) may or may not have had a less pronounced effect on people . .

with mental handicap in general, and people with severe mental handicap in particular.

Another possible explanation of these findings is the overwhelming use of modern anticonvulsants such as carbamazepine which possesses less behavioural side-effects. Both in the overall group and in the hospitalized group, individuals who received monopharmacy and carbamazepine alone showed less aggression compared to individuals without epilepsy. It is worth emphasizing that a high proportion of individuals with epilepsy in this study were treated with carbamazepine which is known to have less behavioural side effects. Indeed, in some individuals, it is considered to have a mood-stabilizing effect (Trimble & Corbett, 1980).

Similarly anticonvulsants such as phenobarbitone and phenytoin which are considered to have more adverse effects on behaviour (Trimble & Reynolds, 1976), were used in a minority of cases. It is possible that one of the reasons for choosing carbamazepine to treat epilepsy in this population was the need to treat concomitant behaviour problems. It is conceivable that the individuals with epilepsy who were studied were those in whom behaviour problems had already been treated with carbamazepine.

The finding of significantly higher maladaptive behaviour amongst the community based individuals whose duration of epilepsy was less than 20 years remains difficult to explain. However, this could be an artefact due to the small number of individuals in this category: or it could be explained as a chance statistical finding.

6.4 <u>SUMMARY</u>

Scores on the maladaptive subsections of the PAA for epileptic patients were compared to those for the non-epileptic group. There was no significant difference between the groups in respect of these scores. Overall, 55.3% of the total population (n = 300) showed severe maladaptive behaviour. Fifty-eight per cent of individuals with epilepsy and 52.7% of individuals without epilepsy showed severe maladaptive behaviour. Individuals with active epilepsy showed significantly more echolalia and less co-operation.

Less maladaptive behaviour was observed in the following subgroups of patients with epilepsy:

- i) those with severe mental handicap
- ii) those with a single type of seizure
- iii) those whose EEG showed an abnormality of slow background activity only
- iv) those who received monopharmacy of anticonvulsants

v) those who received Carbamazepine monopharmacy

More maladaptive behaviour was observed in those epileptic adults whose EEG showed generalized epileptiform activity.
[>] 123

<u>CHAPTER 7</u>

PSYCHIATRIC ILLNESS

7.1.1 INTRODUCTION

Psychiatric illness remains difficult to define. Rutter & Graham (1968) defined psychiatric disorder in children as follows: "Abnormalities of emotions, behaviour or relationships which are developmentally inappropriate and of sufficient duration and severity to cause persistent suffering or hardship to the individual and/or distress to the family and community".

There are practical problems in the diagnosis of psychiatric illness in people with mental handicap. The varied level of abilities, communication skills and associated neurological and special sense abnormalities makes the use of a single standard psychiatric interview difficult. Such individuals rarely show acute psychopathology. Some symptoms are so chronic that their manifestation is different. Withdrawal, blunted effect, echolalia, and stereotypy may be the manifestation of brain damage, as well as that of chronic psychosis.

All 300 individuals were screened with the help of the "*Psychiatric Conditions*" subsection of the PAA scale. Those who scored positively were studied further. Those people with mild to moderate mental handicap underwent a standard psychiatric interview lasting 30-40 minutes, carried out by the author. The behaviour of those individuals with severe mental handicap was observed by the author for 20-30 minutes. Further supplementary information was gathered from carers and the case-notes. Finally, a psychiatric diagnosis

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according to Axis I of the DSM III-R schedule was made, on the basis of the above information.

7.1.2 <u>RESULTS</u>

Psychiatric diagnoses were made on the basis of axis I of the DSM III-R. DSM III-R criteria are based on the current psychiatric illness not on the life-time prevalence of psychiatric illness. Nearly 25% of the total population had had a diagnosis of a psychiatric illness (including a past history). Nine per cent had sustained a psychotic illness and 12% a neurotic illness.

As a group, individuals with epilepsy had significantly less psychiatric illness than individuals without epilepsy (Chi Square = 4.036; d.f. = 1; P < 0.05). Individuals with epilepsy appeared to be more vulnerable to schizophrenia and delusional disorder: no such diagnoses were found amongst individuals without epilepsy. Affective disorder was not as common amongst those with epilepsy: no instance of bipolar disorder was demonstrated in this group. This difference was statistically significant (Chi Square = 7.635; d.f. = 1; P < 0.05). Although a diagnosis of cyclical behaviour and/or mood change remains controversial, this diagnosis was made in a similar number of individuals in both groups (see table 7.1, 7.2).

On the basis of DSM III-R criteria, 29 individuals (19.33%) with epilepsy (n = 150) had a diagnosis of a psychiatric illness. Of these 6 (4%) had cyclical behaviour and/or mood change, 1 (0.66%) major depression, 2 (1.33%) schizophrenia, 2 (1.33%) delusion disorder, 3 (2%) dementia, 1 (0.66%) generalized anxiety disorder, 7 (4.66%) hypochondriasis, 2 (1.33%) obsessive compulsive disorder and 5 (3.33%) phobia. None had a diagnosis of bipolar illness or a past psychiatric history (psychotic or depressive illness). Altogether 11 (7.33%) had been diagnosed as having a psychotic illness whereas, 15 (10%) a diagnosis of neurosis (see table 7.1, 7.2).

Amongst the total number of individuals without epilepsy (n = 150), 47 (31.33%) had been diagnosed as having a psychiatric illness. Sixteen (10.6%) had had a psychotic illness, whereas 22 (14.66%) had had a neurotic illness. Amongst these, 6 (4%) had cyclical behaviour and/or mood change, 5 (3.33%) had a history of previous psychotic or depressive illness, 4 (2.66%) had major depression, 6 (4%) bipolar disorder, 4 (2.66%) had dementia, 8 (5.33%) hypochondriasis, 4 (2.66%) obsessive compulsive disorder and 10 (6.66%) simple phobia. None had schizophrenia or delusional disorder.(see table 7.1, 7.2).

The distribution of the rates of psychiatric illness amongst hospital and community residents is shown in table 7.3

7.2 PSYCHIATRIC ILLNESS IN SUBGROUPS

In the total population, the prevalence of psychiatric illness did not vary significantly in between the sexes. Twenty-two per cent of the total male population as compared to 27% of the total female population had a psychiatric illness (see table 7.4). The distribution of psychotic and neurotic illness in both sexes was similar (see table 7.5, 7.6).

In the total population, psychiatric illness was more common in individuals with mild to moderate mental handicap. Thirty-two per cent of those with mild to moderate handicap had a psychiatric illness compared to 17% of those with severe handicap. This difference was statistically significant (Chi Square = 7.91; d.f. = 1; P<0.01)(see table 7.4). Nearly 15% of those with mild to moderate handicap, and 5.6% of those with severe handicap had a psychotic illness. This was a statistically significant difference (Chi Square = 4.07; d.f. = 1; P<0.05)(see table 7.5). Nearly 15% of those with mild to moderate handicap had a neurotic illness but this difference was not significant (see table 7.6).

Psychiatric illness was more common in older individuals (over 39 years of age). Twenty per cent of the younger group had a psychiatric illness as opposed to 34% of the older age group; this difference was significant (Chi Square = 11.24; d.f. = 1, P<0.001). Six per cent of the younger group and 14.5% of the older group had had a psychotic illness. Nearly 10% of the younger group and 14.9%

of the older group had had a neurotic illness. These differences were not significant (see table 7.3, 7.4, 7.5).

Compared with the community based population, a high proportion of hospital residents had been diagnosed as suffering from various psychiatric illness. The rate of psychiatric illness (mainly hypochondriasis) and, to a lesser extent psychotic illness, was higher in hospital residents. However, none of these differences was significant (see table 7.4, 7.5, 7.6).

One individual with mental handicap and epilepsy had autoscopic symptoms and was diagnosed under delusional disorder. This case was reported previously (Collacott & Deb, 1989).

When the various subgroups of individuals with epilepsy were compared with their controls for the prevalence of total psychiatric illness, some statistically significant results emerged.

Less psychiatric illness was observed in epileptic individuals in the following subgroups (see table 7.7):

- a) males (P<0.05)
- b) individuals over 39 years of age (P<0.05)
- c) those who sustained active epilepsy (P<0.05)
- d) those who sustained a single type of seizure (P < 0.05)
- e) those whose EEG showed focal epileptiform changes
 (P<0.05)
- f) those whose epilepsy started before the age of 10

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years (P<0.005)

- g) those who had sustained seizures for more than 19 years(P<0.001)
- h) those who sustained frequent seizures (P<0.05)
- i) those who received polypharmacy of anticonvulsants (P < 0.01).

More psychiatric illness was observed in those epileptic patients who had sustained seizures for less than 20 years (P<0.01). No significant difference emerged between the subgroups of epileptic and non-epileptic group in the prevalence of psychotic illness; however, neurotic illness was less common in those epileptic patients whose age of onset of epilepsy was before the age of 10 years (P<0.05)(see table 7.7).

Amongst the male population, individuals with epilepsy had significantly less psychiatric illness compared to those without epilepsy (Chi Square = 4.567; d.f. = 1; P<0.05). This effect appeared more significant in the older age groups. Amongst those aged 40 years and over, individuals with epilepsy showed significantly less psychiatric illness overall (Chi Square = 4.005; d.f. = 1; P<0.05). Under the age of 40 years also, individuals with epilepsy had less psychiatric illness, although this was not significant. Epileptic hospital residents had less psychiatric illness compared to those without epilepsy, although this failed to reach statistical significance.

7.3 MOOD DISORDERS

The prevalence of mood disorder in various groups was estimated on the basis of the results on the PAA scores. Forty-one per cent of the total population showed changeable mood. Five individuals with epilepsy and 8 without a history of epilepsy showed flat or unhappy mood. Changeable mood was demonstrated in 67 individuals with epilepsy compared to 55 without a history of epilepsy. Normal mood was shown in 78 individuals with epilepsy as opposed to 87 without. There was no statistically significant difference between the groups (see table 7.8).

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Mood swings were found to be more common amongst individuals in hospital. Amongst hospital residents (n = 200) only 7 showed flat or unhappy mood, whereas this was found in 6 of the total community based residents (n = 100). One hundred and three hospital residents but only 19 community residents showed changeable mood. The increased prevalence of changeable mood in hospital residents was statistically significant (Chi Square = 4.036; d.f. = 1; P < 0.05). Ninety of the 200 hospital residents compared to 75 out of the 100 community residents had normal happy mood. The increased prevalence of normal happy mood in the community residents was statistically significant (Chi Square = 4.325; d.f. = 1; P < 0.05)(see table 7.9).

7.4 DISCUSSION

Owing to the problems of diagnosis, prevalence figures for psychiatric illness in the mentally handicapped population vary enormously. Most estimates for the prevalence of major psychiatric disorders, including both personality disorder and psychosis, range from 8% to 15%. When minor emotional problems are included, estimates soar well above 50% (Menolascino & Stark, 1984). Estimates for the prevalence of neurotic illness amongst mentally handicapped individuals fall somewhere between 4% and 50% (Parsons et al., 1984).

Whilst this is not a prevalence study, the prevalences of psychiatric, psychotic and neurotic illness in this population are similar to those noted by Menolascino (1970). In previous studies, maladaptive behaviour, autism and personality disorders were included in the diagnosis of psychiatric illness (Lund, 1985b), whereas in the present study the prevalence of these conditions was calculated separately.

In spite of the views of some American authors (viz Himmelhoch, 1979) regarding the existence of "*Dysthymic*" subictal mood disorders, this study failed to show a higher rate of mood disorders amongst individuals with epilepsy compared to those without. Changeable mood was very common (41%) in the total population. In some individuals, mood changed within minutes: however more commonly mood changed within hours, and, in some cases, days.

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Individuals who were resident in hospital had a higher rate of changeable mood compared to the community based population.

The high prevalence of changeable mood amongst the hospitalized population may reflect a reporting bias on the part of the hospital nursing staff. It would appear that in the hospital population, mood changes were reported which included a change from normal happy mood to one of irritability and aggression. In the community, families predominantly reported changes from a happy mood to an unhappy one, and on occasions, to abnormal happiness. It is also possible that changeable mood acted as a deterrent to the rehabilitation of hospital residents. On the other hand, such changes may have precipitated hospital admission in the first instance.

It is worth remembering however, that these two groups (ie, hospital residents and community residents) were not matched. Individuals with epilepsy, as a group, had a higher rate of changeable mood, although this failed to reach a level of significance. It is possible that some who demonstrated a changeable mood may have suffered from rapid cycling affective disorder. However, owing to the lack of well-defined criteria for such a diagnosis in individuals with mental handicap, they were not classified as such in this study.

In 1935 von Meduna put forward his hypothesis of "Biological Antagonism". Commenting on this, Wolf & Trimble (1985) wrote; In discussing the relationship between epilepsy and schizophrenia, László von Meduna said, "Between the two diseases there is an antagonism so striking that it cannot only be accidental". Following this hypothesis, intramuscular camphor-induced seizures (and in recent times electroconvulsive therapy) have been successfully used in treating psychiatric illness.

The present demonstration of a lower rate of psychiatric illness amongst individuals with epilepsy is therefore of interest. Examination of the results reveals a total absence of current or previous bipolar affective disorder amongst individuals with epilepsy. The higher prevalence of psychiatric illness seen in the non-epileptic population was due to a variety of psychiatric illnesses apart from bipolar affective disorders. In particular, phobic disorders were twice as common in those without epilepsy. Whilst a percentage of epileptic individuals had a delusional disorder or schizophrenia, the absence of these diagnoses amongst people without epilepsy is of interest.

An increased vulnerability to depressive neurosis has been reported amongst individuals with epilepsy (Palia & Harper, 1990; Robertson & Trimble, 1983; Fenton et al., 1986; Edeh & Toone, 1987). Had psychosocial factors played a lesser role in the studied population as a result of their mental handicap, the opportunity of non-endogenous type depression would have been lessened. Bipolar affective

disorder, however, does not seem to be associated with epilepsy (Bruens, 1971; Toone et al., 1982). Widespread use of carbamazepine in the population with epilepsy may also have masked the presence of affective disorder.

Consideration of an individual's past history of psychiatric illness depended solely on retrospective data collection from the medical notes. Retrospective casenote studies are notoriously unreliable and this may have diluted the purity of the data collection.

A comparison of the subgroups of the individuals with epilepsy, showed that in the groups where the epileptic factor was stronger (ie, active epilepsy, an earlier age of onset, a longer duration of epilepsy and frequent seizures) individuals with epilepsy demonstrated less psychiatric illness. When the epileptic factor was less forceful as in the group with a shorter duration of epilepsy, individuals with epilepsy demonstrated an increased prevalence of psychiatric illness.

Such findings have to be interpreted with caution, however. In statistical terms, these could be seen as chance findings. In some instances the number in each group was small. It is unclear whether psychosocial factors played a lesser role in precipitating psychiatric illness amongst individuals with epilepsy. However, this was not supported when individuals of different degrees of mental handicap were examined. The findings in the subgroups may have simply reflected the findings of the whole group of epileptic individuals.

The similar rate at which dementia was diagnosed in groups with and without epilepsy is interesting. The majority of cases of dementia were considered to be due to either Alzheimer's disease or multiinfarct dementia.

Overall, 11% of the whole population had a diagnosis of pervasive developmental disorder. This is a considerably higher figure than would be expected in a general population of children (4.0/100,000 - 11.6/10,000) (Gillberg et al., 1991), but very similar to what could be expected in mentally handicapped children. Prasad & Deb (1991) described a prevalence of 14% for autism, defined by DSM-IIIR criteria, in mentally handicapped children. However, there was little difference in the prevalence of autism between individuals with and without epilepsy.

The higher rate of psychiatric illness, particularly neurotic illness, in hospitalized populations may have originated from a reporting bias of hypochondriasis. However, this may also be explained by the fact that the presence of chronic psychiatric illness in individuals with mental handicap can either precipitate hospitalization or prevent resettlement into the community.

Individuals with mild and moderate mental handicap showed significantly more psychiatric illness, particularly psychosis, compared to individuals with severe mental handicap. This may reflect the difficulty of diagnosing psychiatric illnesses amongst individuals with severe handicap due to communication difficulties. This difficulty

was highlighted by Brugha et al., (1989) in an attempt to use a standardized semi-structured psychiatric interview (Present State Examination) in individuals with mental handicap. However to avoid this controversy, a broad definition of psychiatric illness was used, as proposed by Rutter and Graham (1968).

Psychiatric illness was significantly more common in older individuals. The older population had more psychotic and neurotic illness compared to the younger group, although this failed to reach a level of significance. The total prevalence of psychiatric illness was significantly higher in the older group, possibly because of the inclusion of dementia as a diagnostic category. Day (1985) however noted a progressive fall in the prevalence of all types of psychiatric illness in mentally handicapped population with increasing age.

7.5 <u>SUMMARY</u>

The prevalence of psychiatric illness, according to DSM III-R criteria, was estimated and compared between the epileptic and the non-epileptic groups. Twenty-five per cent of the total population was diagnosed as having a psychiatric illness. Nearly 20% of the epileptic individuals compared to 31.3% of the non-epileptic individuals had a psychiatric illness. This difference was statistically significant. A diagnosis of schizophrenia and delusional disorder was found in epileptic individuals but not in the non-epileptic group. However, affective disorder was not as common amongst those with epilepsy. No instance of bipolar disorder was demonstrated in this group. Psychiatric illness was more common in hospital residents, older individuals, people with mild to moderate mental handicap, and marginally more common amongst females.

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<u>CHAPTER 8</u>

PERSONALITY DISORDER

8.1 INTRODUCTION

Rutter (1987) in his Maudsley lecture, succinctly discussed the concepts and controversies surrounding the terms, "temperament", "personality", and "personality disorder". He questioned the validity of the argument that these three are part of a continuum. Such a continuum had been considered to start at one end, as genetically determined environmentally reactive behaviours, and to continue to the other extreme as a psychiatric illness. He suggested that "temperament is best viewed in terms of a relatively small number of simple, non-motivational, non-cognitive, stylistic features of which emotionality, activity and sociability are the best validated. It is possible that these characteristics have fairly direct neurological correlates but this has yet to be demonstrated".

Rutter continued, "By contrast, personality refers to the coherence of functioning that derives from how people react to their given attributes, how they think about themselves, and how they put these together into some form of conceptual whole. There is no way of measuring personality". Personality disorder, on the other hand, he suggested, "includes several categories that are most appropriately considered as variants of conditions such as affective disorder, autism and schizophrenia". It remains difficult to determine which of these particular three terms is most suitably applied in relation to people with a mental handicap.

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One hundred and fifty individuals with mild to moderate degrees of mental handicap were selected for the assessment of abnormal personality. Abnormal personalities were diagnosed on the basis of scores on two observer-rated personality questionnaires, namely, the Standardized Assessment of Personality (SAP) and the T-L Personality Inventory. Only part of these questionnaires was found to be suitable for use in the mentally handicapped population (vide supra). According to the scores of the SAP schedule both the diagnosis of a *"personality accentuation"* and a *"personality disorder"* could be made. An abnormal personality type on the basis of the T-L schedule was considered to be present when individuals scored above a cut-off point.

8.2 <u>PERSONALITY DISORDER ACCORDING TO THE SAP</u> <u>SCALE</u>

According to the SAP scale, of the total population studied (n = 150), 26% (39) showed an abnormal personality. In 28 individuals (18.6%) the abnormality was severe enough to reach a diagnosis of personality disorder.

An abnormal personality was more common amongst hospital residents. Forty-five per cent of hospitalized individuals compared to 7% of the community based population had an abnormal personality. In 36% of individuals in hospital, the severity of the personality abnormality reached the status of personality disorder, whereas only 1 (1.3%) individual in the community had such a diagnosis. Four

hospital individuals were diagnosed as having two coexistent personality disorders, and a further 2 had a diagnosis of three coexistent personality disorders (see table 8.1).

Almost all types of personality abnormalities were more prevalent amongst individuals resident in hospital. Of these, aggressive personality disorder was found to be significantly more prevalent amongst hospital based individuals. None of the community residents and only 2.6% of the hospital based individuals had a diagnosis of cyclothymic personality disorder (see tables 8.2, 8.3).

There was no significant difference in the prevalence of SAP personality disorders between age groups. All individuals with cyclothymic or obsessional personality were aged 40 years or over; however, only 2 individuals (2.6%) had a diagnosis of cyclothymic personality. Amongst the older group (40 years and over), 25 (32.9%) had an abnormal personality compared with 14 (19%) in the younger group (below 40 years). Of these, 18 (23.7%) of the older individuals and 11 (14.9%) of the younger group had a diagnosis of aggressive personality. This difference was not statistically significant (see table 8.4).

There was no significant difference in the prevalence of personality disorder between the sexes. Nearly 23% of males and 31% of females had an abnormal personality. Of these nearly 15% of males and 26% of females had aggressive personality disorder (see table 8.5).

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There was no significant difference in the prevalence of personality disorders between individuals with and without epilepsy. Of 75 individuals with mild to moderate handicap and epilepsy, 20 (26.7%) were diagnosed as having an abnormal personality, compared with 19 (25.3%) of the 75 individuals without epilepsy. This difference did not reach significance. Seventeen individuals (22.6%) with epilepsy and 12 (16%) without epilepsy had a diagnosis of aggressive personality disorder; this difference was not significant. Two individuals in both groups had a diagnosis of two coexisting personality disorders, whereas 1 individual in each group had a diagnosis of three coexistent personality disorders (see tables 8.6, 8.7, 8.8).

Individuals with epilepsy had a higher prevalence of abnormal personality in the following subgroups;

- a) females
 b) individuals aged 40 years and over
 c) those who had non-active epilepsy
 d) those who sustained a single seizure type
- e) those who sustained generalized epilepsy
- f) individuals whose epilepsy commenced prior to the age of 10 years
- g) those who sustained frequent seizures
- h) individuals with only generalized epileptiform activity in the
 EEG
- i) individuals in receipt of anticonvulsant polypharmacy
- j) hospital residents

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However, none of these differences was significant (see tables 8.9, 8.10).

Individuals with epilepsy had a lower prevalence of abnormal personality in the following subgroups;

- a) those who were aged below 40 years
- b) those whose seizures commenced after 9 years of age
- c) individuals who sustained less frequent seizures
- d) individuals in whom the EEG had shown only slow
 background wave abnormalities
- e) individuals who received anticonvulsant monopharmacy
- f) those who received carbamazepine monopharmacy
- g) those who received monopharmacy of sodium valproate
- h) individuals who lived in the community.

None of these differences was statistically significant (see tables 8.9,

8.10).

The prevalence of personality abnormalities was the same in both those with and without epilepsy in the following subgroups;

- a) males
- b) individuals who sustained active epilepsy
- c) individuals who sustained multiple types of seizures
- d) individuals with partial epilepsy
- e) individuals who had sustained epilepsy for more than 19 years
- f) individuals who had epilepsy for less than 20 years
- g) individuals in whom the EEG showed only focal epileptiform

activity

h)

individuals who were treated with phenobarbitone or phenytoin monopharmacy (see tables 8.9, 8.10).

8.3 PERSONALITY ACCORDING TO THE T-L SCALE

On the basis of scores attained on the T-L scale, 23 out of 150 individuals (15%) with mild to moderate mental handicap were diagnosed as having an abnormal personality.

Amongst the 75 mild to moderately mentally handicapped individuals with epilepsy, 15 had a diagnosis of abnormal personality compared to 8 of the 75 matched controls. Amongst individuals with epilepsy, 8 individuals (10%) scored positively to one, 4 (5%) on two, and 3 (4%) on three abnormal personalities. Amongst individuals without epilepsy, 5 (7%) scored positively on one, 2 (3%) on two, and 1 (1.3%) on three abnormal personalities. Although those with epilepsy had a considerably higher rate of abnormal personality compared to their counterparts without epilepsy, this failed to reach a level of significance (see table 8.11).

Of the 76 hospital residents, 15 (20%) had a diagnosis of abnormal personality according to the T-L scale, compared with 8 (10%) individuals amongst the 74 community residents. Amongst hospital residents, 8 (10%) scored positively on one, 4 (5%) on two, and 3 (4%) on three abnormal personalities. Of the community based individuals, 8 (10%) scored positively on one, 5 (7%) on two, and 2

(3%) on three abnormal personalities. The rate of abnormal personality amongst hospital residents was higher than that amongst community based individuals, although this difference was not statistically significant (see table 8.12).

Six individuals (8%) with epilepsy as distinct from 3 (4%) without epilepsy had a diagnosis of *"persistence and repetitiveness"* personality disorder alone. Similarly 6 (8%) individuals from hospital as opposed to 3 (4%) from the community had a similar diagnosis. Again these differences were not statistically significant (see tables 8.11, 8.12).

When different subgroups of epileptic individuals were compared with their non-epileptic controls, individuals with epilepsy in most subgroups were found to have a higher prevalence of abnormal personality. However, exceptions included

(i) individuals who had sustained epilepsy for less than 20 years, and(ii) those who were treated with carbamazepine monopharmacy.

In these cases, individuals with epilepsy demonstrated a reduced prevalence of personality disorder (see tables 8.13, 8.14).

The prevalence of abnormal personality remained the same in both epileptic and non-epileptic groups when epilepsy was non-active and when individuals received monopharmacy of anticonvulsants (see tables 8.13, 8.14).

However, a significantly higher prevalence of abnormal personalities was found in a number of subgroups of epileptic individuals compared to individuals without epilepsy. These included

- (i) individuals with epilepsy who live in the community (Chi Square = 6.825; d.f. = 1; P < 0.01),
- (ii) individuals who sustained "active" epilepsy (Chi Square = 5.87; d.f. = 1; P < 0.02), and
- (iii) those who received polypharmacy of anticonvulsant medication (Chi Square = 4.44; d.f. = 1; P < 0.05).

Individuals who sustained partial epilepsy, those with frequent seizures, and individuals who received monopharmacy of sodium valproate or phenobarbitone or phenytoin, had a higher rate of personality disorder compared to their counterparts without epilepsy. However, these differences were not statistically significant (see table 8.13, 8.14). These findings are published in three separate papers (Deb & Hunter, 1991a, 1991b, 1991c) and are included in the appendix.

8.4 DISCUSSION

8.4.1 ABNORMAL PERSONALITY ACCORDING TO THE SAP SCALE

The classification and diagnosis of personality disorder remains controversial, particularly in individuals with mental handicap, where an informant-rated personality inventory has to be employed. Distinct personality disorders have seldom been identified in psychiatric

prevalence studies of this population. There are inherent difficulties in diagnosing personality disorders in this group, particularly amongst those individuals who additionally sustain epilepsy (Menolascino, 1970). Those studies which have attempted to identify personality disorders amongst individuals with mental handicap, have, in general, reported relatively high rates of such disorders (Parsons et al., 1984). Craft (1959) found that schizoid and emotionally unstable personalities were the most frequently observed psychiatric disorders amongst 324 in-patients with mental handicap.

It is possible that some of those who had a diagnosis of schizoid personality disorder in Craft's study, in reality suffered from autistic disorders. Others, who had a diagnosis of emotionally unstable personalities may have suffered from rapid mood swings which were found to be common in the current population (vide supra).

In a recent study, Reid & Ballinger (1987) used the Standardized Assessment of Personality scale to measure the rate of personality disorders amongst 100 randomly selected adults of mild to moderate mental handicap living in an institution. They found that 56% of individuals showed features of an abnormal personality. In 22% of individuals, this abnormal personality was sufficiently marked as to suggest the presence of a personality disorder.

The prevalence of abnormal personalities and personality disorders in the current study is considerably less than that obtained by Reid and Ballinger (1987). One possible explanation for this is that the current

study included community based individuals. However, in the current study, 46% of the hospital residents demonstrated an abnormal personality, which is comparable to the findings of Reid & Ballinger. A further explanation is the exclusion of some SAP sub-categories from the current study (ie, self-conscious, schizoid, paranoid, neurosthenic and hysterical) which were included in Reid & Ballinger's study.

Reid & Ballinger (1987) considered personality disorder to be a major exclusion criterion for the rehabilitation and integration of individuals with mental handicap into the community. This is to some extent supported by the present finding in that only 6.5% of the community based population demonstrated abnormal personality, compared to 46% of the hospital residents. The most frequent abnormal type of personality in the overall population was aggressive, which constituted 19% of the total personality abnormalities. The similarity in the prevalence of abnormal personalities in individuals with and without epilepsy is in keeping with Reid & Ballinger's (1987) findings. The prevalence of abnormal personality was not increased either in individuals with complex partial seizures or in those whose EEG showed only focal changes.

8.4.2 ABNORMAL PERSONALITY ACCORDING TO THE T-L SCALE

Most abnormal personalities defined by the T-L scale, were of the *"persistence and repetitiveness"* type. The slightly elevated rate of abnormal T-L personality found amongst individuals with epilepsy (although statistically insignificant), is in agreement with the findings of Bear & Fedio (1977). However this should be interpreted with caution. The T-L scale is a relatively new personality schedule which has not had extensive field trials. It has not been previously tested in individuals with mental handicap and in this study the number of individuals with this personality type was small.

Compared to individuals living in the community, those who lived in hospital had a marginally greater prevalence of abnormal T-L personalities. Although the hospital and community groups were not matched, the findings suggest that abnormal T-L personality types may prevent resettlement into the community. On the other hand, they may have given rise to the need for hospital admission initially.

Significantly more abnormal T-L personalities were found amongst individuals who sustained *"active"* epilepsy and in those who received polypharmacy of anticonvulsants. This suggests a relationship between severe epilepsy and abnormal T-L personality. The higher rate of personality disorders amongst community residents with epilepsy than their non-epileptic controls may have reflected the general trend for higher rates of personality disorders to be found amongst individuals with epilepsy. The high inter-informant reliability of the T-L personality inventory shows part of this to be a reliable instrument for use in individuals with mild to moderate mental handicap. However its validity in detecting personality types specific to individuals with epilepsy remains to be demonstrated.

8.5 <u>SUMMARY</u>

The scores on the two personality questionnaires (the SAP scale and the T-L scale) were compared between epileptic and non-epileptic individuals with mild to moderate degrees of mental handicap. Twenty-six per cent of the total population had an abnormal personality according to the SAP scale. In 18.6% of cases the abnormality was considered to be severe enough to receive a diagnosis of personality disorder. Forty-five per cent of hospitalized individuals as opposed to 7% of the community-based individuals had a diagnosis of an abnormal personality. This difference was statistically significant. However, there was no difference between the epileptic and the non-epileptic group in the prevalence of the SAP personality disorders. Twenty-three (15%) of the total population had an abnormal personality according to the T-L scale. Individuals with epilepsy had a slightly higher prevalence of T-L personality abnormality compared to individuals without epilepsy.

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<u>CHAPTER 9</u>

SEVERE MALADAPTIVE BEHAVIOUR AND MENTAL DISORDER

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9.1.1 INTRODUCTION

The difficulty of diagnosing mental disorder in people with mental handicap is well known. Sovner & Hurley (1986) highlighted four "pathoplastic" factors which are the distorting effects of personality and intelligence upon the presentation of mental disorders. "Intellectual distortion" refers to the effects of the mentally handicapped individuals' reduced ability to think in abstract terms and thus communicate intelligibly. This results in the inability of the individual with mental handicap to label his own experiences and "Psychosocial masking" refers to the impoverished report them. social skills and life experiences which give rise to an unsophisticated presentation of psychiatric symptoms in mentally handicapped individuals. Inappropriate behaviours, such as lack of poise during the interview, nervousness and silliness, could be misinterpreted as features of mental disorder. "Cognitive disintegration" refers to the effects of the stress-induced disruption of information-processing which can cause a bizarre presentation, such that psychotic-like states may be misdiagnosed as schizophrenia. "Baseline exaggeration" refers to the increase in the severity of pre-existing cognitive deficits and maladaptive behaviours, due to a mental disorder. This creates difficulties in establishing the features of a mental illness, the target symptoms, and measures of outcome.

All 300 individuals were rated according to the 13 subsections of the maladaptive behaviour section of the Profile of Abilities and Adjustment (PAA) schedule. Each of these 13 behaviours could have a score of 1 to 6. A score between 1 and 3 indicated a severe behaviour problem, whereas a score between 4 and 6 indicated either a mild problem or no problem at all. Each individual was then rated according to the number of maladaptive behaviours on which they scored severe ratings (eg., 1 to 3 score). Therefore each individuals could score 0 to 13 on "severe maladaptive behaviour" ratings, depending on how many of the 13 maladaptive behaviours they scored severe ratings (eg., 1 to 3 score). Scores for severe maladaptive behaviour they score severe ratings (eg., 1 to 3 score). Scores for severe maladaptive behaviour were then compared between the epileptic and non-epileptic groups, including their subgroups according to the Wilcoxon signed rank paired test.

A diagnosis of 'mental disorder' was also made if an individual had severe maladaptive behaviour and/or psychiatric illness and/or abnormal personality according to the SAP scale. The presence or absence of mental disorder was compared between the epileptic and the non-epileptic subgroups according to the Chi Square test or Fisher's exact probability test wherever appropriate.

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9.1.2 <u>RESULTS</u>

Severe maladaptive behaviour as measured by the PAA scale was found to be related to the degree of mental handicap. Of the total population studied (n=300), 165 (55%) individuals showed severe maladaptive behaviour. Amongst those with severe mental handicap (n=150), 100 (67%) individuals showed severe maladaptive behaviour compared to 66 (44%) individuals with mild to moderate handicap (Chi-Square=14.69; d.f.=1; P<0.001). Most severe maladaptive behaviours were found in the hospital population. Thirty-five individuals (70%) in hospital compared to 28 of those who lived in the community (28%) showed severe maladaptive behaviours (Chi-Square=43.70; d.f.=1; P<0.001).

Severe maladaptive behaviour was found to be equally common in both sexes. Fifty-three per cent of the total male population, and 58% of the female population showed severe maladaptive behaviour. Age had little effect. Fifty-seven per cent of the younger individuals (aged less than 40 years) and 53% of older individuals (aged 40 years and over) had such behaviour. These differences were not statistically significant (see table 9.1).

Severe maladaptive behaviour was related to psychiatric illness. Fifty-two (69%) of those who had a diagnosis of a psychiatric illness compared to 114 (51%) of those without a psychiatric illness showed severe maladaptive behaviour (Chi-Square = 6.62; d.f. = 1; P < 0.01). Severe maladaptive behaviour was also related to abnormal

personality. Forty-seven per cent of those who had an abnormal personality according to the SAP scale, compared to 8% of those without an abnormal personality showed evidence of severe maladaptive behaviour (Chi-Square = 4.326; d.f. = 1; P < 0.001)(see table 9.1).

Aggressive personality disorder was most commonly related to severe maladaptive behaviour. Of those with an aggressive personality (according to the SAP scale) 37% had evidence of severe maladaptive behaviour. However 5% of those who did not have such a diagnosis also showed severe maladaptive behaviour (Chi-Square = 4.36; d.f. = 1; P < 0.001).

9.1.3 <u>SEVERE MALADAPTIVE BEHAVIOUR IN INDIVIDUALS</u> <u>WITH EPILEPSY</u>

Amongst epileptic individuals, severe maladaptive behaviour was related to the level of mental handicap. Sixty-seven per cent of those with severe handicap compared to 49% with mild/moderate mental handicap showed severe maladaptive behaviour (Chi-Square = 3.94; d.f. = 1; P<0.05)(see table 9.2).

Severe maladaptive behaviour was particularly prevalent in the hospital population. Seventy-one per cent of those in hospital, compared to 32% of those resident in the community showed severe maladaptive behaviour (Chi-Square = 19.24; d.f. = 1; P < 0.001)(see table 9.2).

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Many of those with severe maladaptive behaviour had a psychiatric illness. Seventy-six per cent of those with a diagnosis of a psychiatric illness showed severe maladaptive behaviour compared to 54% of those without (Chi-Square = 3.84; d.f. = 1; P < 0.05)(see table 9.2).

This was unrelated to the sex of the patients. Fifty-six per cent of males and 60% of females showed severe maladaptive behaviour. Similarly, current age had little effect. Sixty per cent of the younger individuals (aged less than 40 years) and 55% of the older individuals (40 years of age and over) showed severe maladaptive behaviour. These differences were not statistically significant (see table 9.2).

9.1.4 <u>SEVERE MALADAPTIVE BEHAVIOUR IN</u> INDIVIDUALS WITHOUT EPILEPSY

Amongst individuals who had no history of epilepsy, 67% of those with severe mental handicap as opposed to 39% of those with mild to moderate handicap showed severe maladaptive behaviour (Chi-Square = 10.70; d.f. = 1; P<0.002). Sixty-seven per cent of those who were in hospital, compared to 24% of those who were in the community, showed severe maladaptive behaviour (Chi-square = 23.03; d.f. = 1; P<0.001)(see table 9.3).

Eighty-two per cent of those who had an abnormal personality, according to the SAP scale, and 31% of those who did not, showed severe maladaptive behaviour (Chi-square = 28.40; b.f. = 1; P<0.002). Forty-nine per cent of males as opposed to 56% of females showed severe maladaptive behaviour (see table 9.3).

Fifty-four per cent of the younger individuals (below 40 years) and 51% of the older individuals (40 years and over) showed severe maladaptive behaviour. Sixty-four per cent of those who had a diagnosis of psychiatric illness compared to 48% of those without such a diagnosis showed severe maladaptive behaviour. These differences were not statistically significant (see table 9.3).

Altogether 98 (33%) individuals out of the total population showed only severe maladaptive behaviour. Twenty-one individuals (17%) had a diagnosis of only a psychiatric illness. Five individuals (2%) had a diagnosis of abnormal personality alone according to the SAP scale. Thirty-six (12%) showed severe maladaptive behaviour as well as a psychiatric illness. Two individuals (1%) had a combined diagnosis of a psychiatric illness and a personality disorder. Fifteen (5%) had a combined diagnosis of severe maladaptive behaviour, a psychiatric illness and a personality disorder. Seventeen (6%) showed severe maladaptive behaviour and also had a personality disorder (see table 9.4).

9.1.5 <u>COMPARISON OF ALL INDIVIDUALS WITH AND</u> WITHOUT SEVERE MALADAPTIVE BEHAVIOUR

A slightly higher proportion of individuals with severe maladaptive behaviour sustained epilepsy. There was a slightly higher proportion of females than males amongst individuals with severe maladaptive behaviour. None of these differences was statistically significant. In the group with severe maladaptive behaviour, there was a higher proportion of individuals with a severe degree of mental handicap (Chi-square = 14.687; d.f. = 1; P < 0.001)(see table 9.5).

9.1.6 <u>COMPARISON OF EPILEPTIC INDIVIDUALS WITH</u> AND WITHOUT SEVERE MALADAPTIVE BEHAVIOUR

There was no difference in the sex distribution amongst the epileptic individuals with and without severe maladaptive behaviour. However, in the epileptic group with severe maladaptive behaviour, a higher proportion was male. There were proportionately more younger individuals (aged less than 40 years) in both groups of epileptic individuals with and without severe maladaptive behaviour. None of these differences was statistically significant. There was a higher proportion of individuals with severe maladaptive behaviour (Chisquare = 3.941; d.f. = 1; P < 0.05)(see table 9.6).

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There was a higher proportion of individuals who sustained "active epilepsy" in both groups of epileptic individuals with and without severe maladaptive behaviour. In both groups of epileptic individuals there was a higher proportion of individuals who sustained a single type of seizure (see table 9.6).

There was a higher proportion of individuals who sustained "frequent" seizures in those with and without severe maladaptive behaviour. There was a higher proportion of individuals who sustained generalized epilepsy in both groups. However, none of these differences was statistically significant (see table 9.6, 9.7).

There was a higher proportion of individuals whose EEG showed focal epileptiform changes in both groups of epileptic individuals with and without severe maladaptive behaviour. A higher proportion of individuals received monopharmacy of anticonvulsants amongst those with severe maladaptive behaviour (Chi-square = 6.541; d.f. = 1; P < 0.02)(see table 9.7).

Various aspects of the PAA such as vision, hearing, speech, mood, co-operativeness, irritability, chronic illness, stereotyped behaviour, echolalia, social behaviour and social interaction were compared between those who did and did not show severe maladaptive behaviour. Using the Mann Whitney test, it was found that individuals who showed severe maladaptive behaviour also had severe speech impairment (P<0.005), lower mood (P<0.001), more irritability (P<0.001) and less co-operativeness (P<0.001).

9.2.1 INDIVIDUALS WITH OVERALL MENTAL DISORDER

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Of the total population (n=300), 194 (64.66%) had an overall diagnosis of mental disorder. These included severe maladaptive behaviour and/or psychiatric illness and/or personality disorder (according to the SAP scale). Mental disorder was more common amongst those with severe mental handicap compared to individuals with mild to moderate handicap. The rate of mental disorder remained the same in both sexes. Older individuals (aged 40 years and over) showed a slightly higher rate of mental disorder compared to the younger individuals (aged below 40 years)(69% and 61% respectively). None of these differences was statistically significant. Seventy-five per cent of individuals resident in hospital compared to 44% of individuals resident in the community had a diagnosis of a mental disorder (Chi-Square = 38.34; d.f. = 1; P<0.001)(see table 9.8).

9.2.2. PREVALENCE OF MENTAL DISORDER IN THE EPILEPTIC SUBGROUPS

Individuals with epilepsy had a higher prevalence of mental disorder in the following subgroups;

a) females

b) individuals resident in hospital

- c) individuals with mild to moderate degree of mental handicap
- d) individuals aged less than 40 years

e)	individuals who sustained "non-active" epilepsy
f)	individuals who sustained multiple types of seizures
g)	individuals whose epilepsy commenced after the age of 9
	years
h)	individuals whose EEG showed only slow background
	activity
i)	individuals who received monopharmacy of
	anticonvulsants
j)	those who received monopharmacy of carbamazepine
k)	those who received monopharmacy of sodium valproate

None of these differences was statistically significant (see tables 9.9,

9.10, 9.11, 9.12).

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Individuals with epilepsy had a lower prevalence of mental disorder in the following subgroups;

a)	individuals	with	severe	mental	handicap
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- b) individuals who sustained "active epilepsy"
- c) those who sustained a single type of seizure only
- d) those who sustained generalized epilepsy
- e) those who sustained partial epilepsy
- f) individuals whose epilepsy commenced before 10 years of age
- g) individuals who sustained frequent seizures
- h) individuals whose EEG showed generalized epileptiform changes
- i) those whose EEG showed focal epileptiform activity
- j) individuals who received no anticonvulsants

 k) those who received polypharmacy of anticonvulsants
individuals who received either phenobarbitone or phenytoin monopharmacy.

None of these differences was statistically significant (see tables 9.9, 9.10, 9.11, 9.12).

The prevalence of mental disorder was the same in both groups with and without epilepsy in the following subgroups;

a) males

- b) individuals resident in the community,
- c) individuals aged 40 years and over (see table 9.9)

9.3. DISCUSSION

The prevalence figure of 64.66% for all mental disorders in the total cohort is comparable with other studies (Melanoscino & Stark, 1984). The significant relationship between severe maladaptive behaviour, lower IQ and hospitalization, found in this study, had been reported before (Corbett, 1979). It is of interest that this does not appear to be influenced by either the presence or absence of epilepsy.

The significant relationship between an increased prevalence of psychiatric illness and severe maladaptive behaviour is in contrast to Fraser et al's (1986) study. It is considered that psychiatric illness may have produced maladaptive behaviour in some individuals with mental handicap: in some cases the maladaptive behaviour may have been symptomatic of psychiatric illness.

The association between severe maladaptive behaviour and personality disorder is interesting, in that most personality disorder was of the *"aggressive"* type. This highlights the difficulty of drawing a distinction between interictal aggressive behaviour disorder and aggressive personality disorder.

When the prevalence of individual categories of mental disorder was considered, the commonest category was found to be of severe maladaptive behaviour. Only a minority had a diagnosis of personality disorder on its own, although several had a diagnosis of psychiatric illness alone.

The significant relationship between severe maladaptive behaviour and speech impairment, lower mood, irritability, and uncooperativeness, has implications for patient-management and the design of services for people with mental handicap and maladaptive behaviour.

Specific causes of mental handicap are known to be associated with certain mental disorders. Self-injurious behaviour is associated with mental handicap syndromes such as Lesch-Nyhan, Cornelia de Lange, Riley-Day, Rett and Prader-Willie (Oliver et al., 1987). Some authors have suggested an association between Fragile X syndrome and autism (Gillberg et al., 1987). Payton et al., (1989) however argued against this association. Behaviours, such as hyperactivity, attentional deficit, handflapping and biting, gaze-avoidance etc., are reported to be associated with the Fragile X syndrome (Hagerman,

1989). Cantú et al., (1990) found only 1.5% out of 67 institutionalized adults with moderate to severe degree of handicap with autistic behaviour (according to DSM-III) to have the Fragile-X syndrome (see for review, Turk, 1992). Certain behaviour characteristics, such as passive aggressiveness, episodic confusion, paranoia and schizophreniform disorders are claimed to be associated with certain sex chromosome abnormalities such as Klinefelter's syndrome and Turner's syndrome (Forssman & Hambert, 1963). The XYY abnormality has been suggested to be associated with mental handicap and aggressive behaviours. However, this claim has not been substantiated by others (Parker et al., 1970). Adults with Down's syndrome are also known to develop Alzheimer's type neuropathology frequently (Oliver & Holland, 1986).

Parsons et al., (1984) reviewed the historical aspects of mental disorders in mentally handicapped people and found that in the past psychoses were divided into types, such as "hyperkinetic", "hypokinetic", "apathetic" and "excitable" (biting, destructive, aggressive, etc). Some proposed that psychosis does not occur in persons with mental handicap; some held the view that psychosis is the same as that in non-mentally handicapped person; others have suggested that psychosis is different in people with mental handicap and have employed the term "pfropfschizophrenia" (Milici, 1937)(first coined by Bleuler in 1924). Gordon (1918) in 37 cases of psychoses in mentally handicapped people found 15 with schizophrenia, 12 with depressive disorder, 3 with paranoid disorders and 7 with delirious or confusional states. Terms like "manic depressive equivalents" or

"affective storms" were used. Milici (1937) commented, "One of the most common psychoses in mentally retarded individuals was transitory excitement alternating with depression". This comment is interesting in view of the fact that in the current study mood swing was found to be common.

Reid et al., (1978) using the modified Manifest Abnormality Scale of the Clinical Interview Schedule of Goldberg et al., (1970) tried to identify behavioural syndromes amongst severely and profoundly mentally handicapped adults in institutions. Reid et al., (1984) followed up these individuals after 6 years and found the behavioural symptoms to be remarkably persistent. In both surveys, Reid et al., (1984) found at least half of the population to suffer from psychiatric illness and a similar proportion also showed maladaptive behaviour. They concluded that symptoms such as hyper- or hypo-activity, distractability, labile mood, irritability etc. could be regarded as phenomena associated with brain damage. It is expected that nearly all severely and profoundly handicapped individuals will have major structural brain abnormality (Crome & Stern, 1972).

Reid et al., (1984) argued that abnormalities of social responsiveness such as withdrawal, flattening of affect and eye avoidance were features of the autistic syndrome. However in some individuals this could be seen as no more than shyness, indicating a need for privacy and personal space. Histrionic or attention seeking behaviour in these individuals was explained either by ingrained abnormalities of personality or underlying psychiatric illness. In some it would have

been seen to be normal within the family situation. However, it was clearly abnormal in the setting of an overcrowded, understaffed ward.

Reid et al., (1984) also tried to explain the phenomena of stereotypy and self-injury in this population. Stereotypy was seen as being induced by boredom or else as an imitative phenomenon as a result of early childhood autism. Goodall & Corbett (1982) reported an increase in stereotypy with certain types of stimuli. Self-injury was explained as a form of self-stimulatory behaviour related to an arousal control mechanism (Corbett, 1975). Others have viewed self-injury as being due to a neurophysiologically determined alteration in the perception of pain (Coid et al., 1983).

Fraser et al., (1986) in a study of 133 mentally handicapped adults found aggressive conduct and self-injury to be more frequent in hospital subjects. None of these behavioural disturbances was related to age or sex. Surprisingly, in their study, the overlap between psychiatric and behaviour disorder was minimal.

Fraser et al., (1986) used two rating scales. First was Ballinger et al's (1975) adaptation of the Clinical Interview Schedule (Goldberg et al., 1970) which consists of a standardized psychiatric interview (SPI), during which the psychiatrist rates the interviewee on 25 scales. The ratings of scales 1-13 are based on the subject's report whereas ratings on scales 14-25 are of manifest clinical features. The SPI characterised psychiatric problems in the mentally handicapped along eight dimensions: depression, neurasthenia,

psychoticism, phobias, histrionic elation, hypochondriasis, mental retardation and medication effects. They also used the Behaviour Disturbance Scale (BDS)(Leuder et al., 1984) to measure maladaptive behaviours along six dimensions: aggressive conduct, mood disturbance, withdrawal, antisocial conduct, idiosyncratic mannerisms and self-injury.

Fraser et al., (1986) found that communicative subjects were less intellectually handicapped and less disturbed overall: however they scored highly on the neurasthenia scale which was diagnosed from the subjects' verbal reports. The neurasthenia factor, in this study, was very similar to that which Kielholtz (1973) described as 'masked' or 'somatised' depression. He thought that the duller the person, the more likely it was for that person's depression to be expressed by a physical complaint. Similarly, Jacobsen (1982) and Reiss (1982) reported that depression was diagnosed more frequently in mildly retarded than in severely retarded individuals. Craft (1979), on the other hand, regarded somatised depression as a form of chronic institutional neurosis. However, Fraser et al., (1986) did not find that condition more prevalent in the hospitalized subjects.

In Fraser et al's (1986) study there was a significant relationship between phobia and aggression. Gray et al., (1983) suggested that non-verbal indices of fear and aggression were often confused both by psychiatrists and nurses. Depression of a neurotic variety was highly marked in 10% of subjects. Only 2% of subjects scored highly on *"psychoticism"* which included symptoms such as

"hallucinations", "flattened and incongruous effect", "suspicion and defensiveness". Unlike the current study, they did not attempt to reach definite psychiatric diagnoses.

In a Danish population survey, Lund (1985b) studied 302 mentally handicapped adults using the MRC Handicap, Behaviour and Skills schedule (HBS)(Wing, 1980) which was supplemented by a list of psychiatric items. Overall 85 individuals (27.1%) received a psychiatric diagnosis. Five per cent had a diagnosis of psychosis of uncertain type, 10.9% showed behaviour disorder, 3.6% had a diagnosis of dementia and early childhood autism, 1.7% suffered from affective disorder, 1.3% had schizophrenia and 2% had neurosis. No cases of alcohol or drug abuse were found. Fifty-five (18.2%) of the subjects had a lifetime history of epilepsy and 25 (8.3%) had sustained a seizure within the previous year. In 52% of those subjects who had sustained a seizure in the past year, a present state psychiatric diagnosis was established, compared to 26% of subjects who did not have seizures. A positive correlation existed between epilepsy and psychiatric disorder. Especially marked was the relationship between behaviour disorders and epilepsy. Amongst epileptic individuals, one person had a diagnosis of schizophrenia. That patient also sustained partial seizures with secondary generalisation. None had a diagnosis of affective disorder. Of those who showed psychiatric disorders, 3% sustained primary generalized, 5% secondarily generalized, and 6% other types of seizures. None had focal seizures.

Jamil et al., (1991) studied all 292 adults in a hospital for the mentally handicapped and found that 72 (24.66%) people sustained seizures but showed no aggression, 58 (19.86%) showed paroxysmal aggressive episodes but did not sustain seizures, and 31 (10.62%) sustained seizures as well as showing paroxysmal aggressive episodes. Altogether 103 (35.27%) people sustained seizures. Thirty per cent of epileptic individuals as opposed to 26.48% of the non-epileptic individuals showed paroxysmal aggression. This difference was not statistically significant. The frequency of aggression in non-epileptic individuals did not correlate significantly with its type or direction, or with drug therapy. Paroxysmal aggression in epileptic individuals was more likely to be directed against property and be unprovoked. There was a correlation between the increased frequency of seizures and increased incidents of aggression. The authors suggested that paroxysmal aggression in people with epilepsy could be ictal in origin.

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9.4 <u>SUMMARY</u>

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Severe maladaptive behaviour was estimated on the basis of the scores on the PAA scale. Fifty-five per cent of the total population showed severe maladaptive behaviour. A significantly higher proportion of individuals with severe mental handicap showed severe maladaptive behaviour compared to individuals with mild to moderate handicap. Hospital residents showed significantly more severe maladaptive behaviour. There was a positive correlation between the presence of psychiatric illness, personality disorder and severe maladaptive behaviour. Overall 64.6% of the total population had a diagnosis of mental disorder (severe maladaptive behaviour, and/or psychiatric illness, and/or personality abnormality). Mental disorders were more common amongst hospitalized individuals and those with severe degrees of mental handicap. There was no significant difference in the prevalence of mental disorders between epileptic and non-epileptic individuals.

CHAPTER 10

EEG FEATURES AND PSYCHOPATHOLOGY

10.1 INTRODUCTION

Spiers et al., (1986) reviewed the relationship between temporolimbic epilepsy and behaviour. They commented that many abnormal behaviours are commonly associated with ictal phenomena; an association has also been suggested between interictal abnormalities of behaviour and temporolimbic epilepsy. As a possible hypothesis they discussed the role of intermittent temporolimbic discharges and kindling in directly causing the chronic behaviour changes. Seizure activity is usually associated with sensory-limbic 'misconnections', which may either enhance or inhibit affect-laden sensory-limbic associations.

In animal models, a paroxysmal depolarization shift (PDS) of the neuronal cell membrane, along with a brief high-frequency train of action potentials are seen as the hallmark of focal epilepsy (Dichter & Spenser, 1969; Prince, 1978). Electrical records generated by the synchronous activity of a large number of neurones simultaneously, could be recorded by the surface EEG in the form of spikes (Ayala et al., 1973). There is a temporal correlation between these cell membrane activities and the spikes seen on the surface EEG (Ayala et al., 1973). One hypothesis is that these neuronal activities trigger recurrent inhibitory circuits of the hippocampus, involving basket cells as the inhibitory interneuron (Ben-ari et al., 1979: Schwartzkroin, 1983) and mediated by gamma aminobutyric acid (GABA)(Ben-ari & Krnjevic, 1981).

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It was possible to obtain EEG recordings for only 100 epileptic individuals. This produced two major shortcomings in this section of the study. These do not automatically invalidate the findings of this section but certainly limit their interpretation.

Firstly, the primary reason for not obtaining an EEG recording in many individuals with epilepsy was their refusal. This may have eliminated certain epileptic individuals with behaviour disorders including overactivity from having an EEG recording.

Secondly, an EEG was not performed on those individuals without epilepsy. This restricted an analysis of the relationship of EEG abnormalities to behaviour disorders in non-epileptic mentally handicapped individuals.

However, for ethical reasons it was not felt justified to undertake EEGs on those individuals who either refused or were uncooperative.

10.2.1 DESCRIPTION OF THE POPULATION

There were 100 individuals with epilepsy in whom an EEG was undertaken. Their ages ranged between 20-77 years (mean 41 years, SD14). Fifty-two were male and 48 females. Sixty-five individuals lived in the hospital and 35 in the community. Thirty-seven were mildly, 23 moderately, and 40 severely handicapped. Sixty-two had *"active"* epilepsy and 38 non-active epilepsy. Fifty-six had a single type of seizure whilst 27 sustained multiple types of seizures. In 17 individuals the seizure type remained undetermined. Of those in whom the type of seizure sustained was determined, 67 had generalized epilepsy. Sixteen had either complex partial or secondarily generalized epilepsy.

Of the 62 individuals with active epilepsy, 24 had frequent seizures, whilst in 37, seizures were *"less frequent"*. In one individual, the frequency of seizures could not be determined. In 56 individuals the age at which epilepsy had commenced was prior to the age of 10 years and had been present for over 19 years. In 28 individuals the age at which epilepsy had commenced was at or after 10 years of age. In these, epilepsy had been present for less than 20 years. Seven individuals were not in receipt of anticonvulsant medication and 32 received polypharmacy of anticonvulsants. Of the 61 individuals receiving monopharmacy, 39 received carbamazepine, 11 sodium valproate and 11 received either phenobarbitone of phenytoin. (For the distribution of individuals between hospital and community population see tables 10.1 and 10.2.)

10.2.2 INDIVIDUALS WITH ONLY SLOW BACKGROUND WAVE IN THE EEG

Individuals with epilepsy in whom the EEG showed only excessive slow background wave abnormality (n=48) were compared to matched controls without epilepsy (n=48). Thirty-six individuals with epilepsy (74%) and 33 without epilepsy (68%) had a diagnosis overall of mental disorder. Sixteen individuals (33%) with epilepsy and 15 (31%) without epilepsy had been diagnosed as having a psychiatric illness. Eight individuals (17%) with epilepsy and 3 (6%) without epilepsy had a diagnosis of T-L personality disorder. Thirteen individuals (28%) both with and without epilepsy had a diagnosis of abnormal personality according to the SAP scale. In addition 30 individuals with epilepsy (61%) and 27 without epilepsy (56%) showed severe maladaptive behaviour. None of these differences was statistically significant.

When the group with slow EEG background wave activity alone was compared with the remainder of the mentally handicapped adults with epilepsy, no significant difference emerged in the degree of handicap or in drug factors such as polypharmacy, serum anticonvulsant level or dosage.

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10.2.3 INDIVIDUALS WITH ANY EPILEPTIFORM CHANGES IN THE EEG

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Individuals in whom the EEG showed any epileptiform changes (n = 43) were compared with their matched control without epilepsy (n = 43). Overall 25 individuals with epilepsy (58%) and 28 without epilepsy (65%) had an overall diagnosis of mental disorder. Eight individuals with epilepsy (19%) compared to 16 without epilepsy (37%) had a diagnosis of psychiatric illness. Thirteen individuals with epilepsy (31%) and 8 without epilepsy (19%) had a diagnosis of T-L personality disorder. A personality disorder according to the SAP scale was found in 15 individuals with epilepsy (35%) compared to 13 individuals (31%) without epilepsy. Twenty-two individuals (51%) both with and without epilepsy showed severe maladaptive behaviour. None of these differences was statistically significant.

10.2.4 INDIVIDUALS WITH GENERALIZED EPILEPTIFORM CHANGES IN THE EEG

Individuals in whom the EEG showed generalized epileptiform changes (n = 12) were compared with their matched controls without epilepsy (n = 12). Overall 7 individuals with epilepsy (58%) compared to 8 without epilepsy (66%) had a diagnosis of mental disorder. Four individuals (33%) both with and without epilepsy had a diagnosis of psychiatric illness. Three individuals (28%) both with and without epilepsy had a T-L personality disorder. Three individuals with epilepsy (28%) and 2 without epilepsy (14%) had an abnormal

personality according to the SAP scale. Seven individuals with epilepsy (58%) and 6 without epilepsy (50%) showed severe maladaptive behaviour. None of these differences was statistically significant.

10.2.5 INDIVIDUALS WITH FOCAL EPILEPTIFORM CHANGES IN THE EEG

Individuals in whom the EEG showed a focal epileptiform abnormality were compared to a matched control group without epilepsy. Overall 12 individuals with epilepsy (67%) and 14 without epilepsy (78%) had a diagnosis of mental disorder. Three individuals with epilepsy (17%) and 10 without epilepsy (55%) had a diagnosis of a psychiatric illness (Chi-Square = 4.128; d.f. = 1; P < 0.05). Six individuals with epilepsy (36%) compared to 2 without epilepsy (9%) had a diagnosis of T-L personality disorder. Eight individuals with epilepsy (45%) compared to 6 without epilepsy (36%) had an abnormal personality according to the SAP scale. A similar number of individuals with and without epilepsy (50% and 55% respectively) showed severe maladaptive behaviours. Apart from the instance of psychiatric illness, no significant differences were demonstrated between epileptic patients and their non-epileptic controls. The prevalence of various mental disorders between the groups with generalized and focal EEG changes are compared in table 10.3. These findings are described in a separate paper (Deb & Hunter, 1992a).

10.3 DISCUSSION

Stevens (1977) stated that EEG spikes were recorded more frequently in individuals with behaviour disorders and psychosis than in the general population. The relationship between the EEG and the mental state in adults with epilepsy is complex and may not be related entirely either to the localisation or the distribution of epileptiform activities in the EEG (Fenton, 1986). Edeh & Toone (1987), in a recent community survey, demonstrated a trend for psychiatric morbidity to be greater in individuals with temporal lobe epilepsy.

The concept that specific behavioural syndromes and personality types are associated with temporal lobe epilepsy, was initially proposed by Gibbs (1951) and reformulated by Geschwind (1979). An attempt by Bear & Fedio (1977) to demonstrate this through the use of a specially designed personality inventory failed to draw an unequivocal conclusion (Hermann & Whitman, 1984).

In the present study, although individuals with epilepsy and focal EEG abnormalities had a higher rate of T-L personality disorder, compared to individuals without epilepsy, this failed to reach significance. Rodin et al., (1976) compared age-, sex- and IQ-matched samples of individuals with temporal lobe epilepsy (TLE) and non-temporal lobe epilepsy. They showed that individuals with TLE had more psychopathology. However, they also demonstrated that a high proportion of patients with TLE also sustained other types of seizures.

In the present study, no significant difference in the prevalence of psychopathology was demonstrated between individuals with focal EEG changes and those with generalized EEG changes. This contradicts the view proposed by some (e.g. Edeh & Toone, 1987) that individuals with epilepsy associated with a temporal lobe EEG focus show higher rates of psychopathology than epileptic individuals without such EEG changes.

Rodin & Schmaltz (1984) compared epileptic individuals who showed diffuse spike-and-wave discharges in the EEG to those who showed focal temporal lobe EEG abnormalities. They examined the prevalence of personality disorders according to the Bear & Fedio personality inventory (1977) in each group, but found no difference between them. Hermann & Whitman (1984) highlighted the problems associated with such comparisons. They considered that temporal lobe epilepsy consisted of a heterogeneous group of conditions. Generalized epilepsy, by definition, also involved the temporal lobe area and thereby contaminated such studies.

Dodrill & Batzel (1986) reviewed the literature, and stated that individuals with epilepsy showed more emotional and behaviour problems compared to both individuals without epilepsy, and those with chronic physical illness, unlike those with chronic neurological disorders. Individuals with temporal lobe epilepsy do not in general show more behaviour problems than individuals with other types of epilepsy. There is however, a slight tendency towards an association between emotional problems and impairment on neuropsychological

tests. This may suggest a relationship between maladaptive behaviour and epilepsy which may be primarily determined by underlying brain damage rather than epilepsy per se.

In the present study the control group of the mentally handicapped non-epileptic adults did not have an EEG done because consent could not be secured from this group. This caused an ethical problem. However, epileptiform changes are not commonly found in the EEG's of people with a mental handicap who do not have a history of epilepsy (Andriola, 1983; Gibbs et al, 1960).

10.4 SUMMARY

The prevalence of different mental disorders was estimated in individuals with various EEG abnormalities. Seventy-four per cent of epileptic individuals whose EEG showed only slow background wave abnormality had a mental disorder compared to 68% of the non-epileptic control group. Fifty-eight per cent of epileptic individuals whose EEG showed epileptiform activities had a mental disorder compared to 65% of the non-epileptic control group. Fifty-eight per cent of epileptic individuals whose EEG showed generalized epileptiform activities had a mental disorder compared to 65% of the non-epileptic control group. Fifty-eight per cent of epileptic individuals whose EEG showed generalized epileptiform activities had a mental disorder compared to 66% of the non-epileptic control group. Sixty-seven per cent of epileptic individuals whose EEG showed focal epileptiform changes had a mental disorder compared to 78% of the non-epileptic control group. None of these comparisons was statistically significant.

CHAPTER 11

EFFECTS OF ANTICONVULSANT MEDICATION ON BLOOD INDICES AND PSYCHOPATHOLOGY

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11.1 INTRODUCTION

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Collacott et al., (1989) reported on a four year prospective study on anticonvulsant medication of 172 mentally handicapped epileptic inpatients of a group of hospitals in Leicestershire. Overall, a significant reduction in the use of polypharmacy of anticonvulsants was achieved. Associated with the reduction of polypharmacy was the significant reduction of seizure-frequency in some groups, although in a minority of patients seizure-control remained difficult. There was a significant increase in the use of carbamazepine and a significant decrease in the use of phenobarbitone, sodium valproate, ethosuximide, phenytoin, sulthiame and primidone by the end of the four year period.

Sheppard et al., (1987) compared the use of anticonvulsants in mentally handicapped in-patients of a Dundee hospital on one day in 1972 and on the same date in 1982. They found a significant decrease in the use of phenobarbitone and primidone, a significant increase in the use of carbamazepine and an increase in the use of phenytoin and sodium valproate after 10 years. Unlike Collacott et al's (1989) study there was no active programme of reduction of polypharmacy in these patients, which was reflected in the nonsignificant difference on the use of polypharmacy and monopharmacy of anticonvulsants over the 10 year period.

11.2.1 <u>RESULTS</u>

The effect of different anticonvulsants on haemoglobin concentration, Mean Corpuscular Volume (MCV), and serum folate and vitamin B12 level was examined. No single anticonvulsant had a significant effect on any of these indices apart from individuals receiving sodium valproate monopharmacy. Such individuals were found to have a significantly higher level of serum folate than those receiving monopharmacy of other anticonvulsants (P<0.05). No significant difference emerged when those receiving polypharmacy of anticonvulsants were compared to the monopharmacy group.

The total monopharmacy subgroup of patients (this included all the anticonvulsants collectively) whose serum level was in excess of the therapeutic range, had a significantly lower level of serum folate (P < 0.005) compared to those in whom the serum level was within the therapeutic range. There was no difference in the serum folate level between those subgroups in which the anticonvulsant level lay within the normal range, and that in which the anticonvulsant level was subtherapeutic.

The monopharmacy subgroup (this included all anticonvulsants collectively) which received anticonvulsant medication in a daily dose within the BNF recommended range was compared with the subgroup who received anticonvulsant medication outside that range. No difference emerged between the subgroups in respect of haemoglobin concentration, MCV, serum folate or vitamin B12. There was no

difference either in the prevalence of different aspects of psychopathology, including maladaptive behaviour, psychiatric illness and personality disorder.

When the carbamazepine monopharmacy group was further analysed, no direct relationship was observed between the serum level of the drug and the prevalence of psychopathology, apart from SAP personality disorder. SAP personality disorder was found to be more prevalent in the group in whom carbamazepine serum levels were higher than the laboratory therapeutic level.

Individuals who received monopharmacy of anticonvulsant were compared with individuals who received polypharmacy. Overall 66 (76%) of the monopharmacy group and 27 (52%) of the polypharmacy group had a diagnosis of mental disorder (P<0.001). Twenty-three individuals (26%) of those who received monopharmacy and 5 (10%) of those who received polypharmacy had a diagnosis of psychiatric illness (P<0.05). Fifty-nine (68%) of the а monopharmacy group and 23 (44%) of the polypharmacy group showed severe maladaptive behaviour. Twenty-four individuals (28%) in both groups were shown to have an SAP personality abnormality whilst 16 (18%) of the monopharmacy group and 13 (25%) of the polypharmacy group had a T-L personality disorder. None of these differences was statistically significant.

The numbers of individuals in various subgroups receiving either monopharmacy or polypharmacy of anticonvulsants are shown in table 11.1. Polypharmacy was significantly more common in younger individuals (aged below 40 years), individuals who sustained *"active"* epilepsy, those who sustained frequent seizures, those with several types of seizures, and individuals who had partial epilepsy. These findings are published in a separate paper (Deb & Hunter, 1992b).

11.2.2 GROUPS ACCORDING TO THE SERUM FOLATE LEVELS

Individuals with epilepsy in whom the serum folate level fell below the reference range (n=5) were compared to their corresponding matched controls without epilepsy (n=5) in respect of maladaptive behaviours and the co-operativeness, irritability and mood subscales of the PAA. Similarly those individuals with epilepsy in whom the serum folate level fell within the normal reference range (n=110), were compared with their corresponding controls without epilepsy (n=110). No statistically significant differences were observed in any of these comparisons.

The 110 individuals whose serum folate level lay within the normal range were compared with their controls without epilepsy. Seventy-eight individuals with epilepsy (71%) and 75 without epilepsy (68%) had a diagnosis of mental disorder. Twenty-two individuals with epilepsy (20%) and 34 without epilepsy (31%) had a diagnosis of psychiatric illness. Seventy individuals with epilepsy (64%) and 64 without epilepsy (58%) showed severe maladaptive behaviour.

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Thirty-seven individuals with epilepsy (34%) had a diagnosis of an abnormal personality according to the SAP scale, compared to 30 individuals without epilepsy (27%). No statistically significant differences were observed between the individual groups.

The mean serum folate level was compared between the following groups of individuals with epilepsy;

- (a) individuals with and without severe maladaptive behaviour
- (b) individuals with and without abnormal personality according to the SAP scale
- (c) individuals with and without a psychiatric illness
- (d) individuals with and without an overall diagnosis of mental disorder.

The Mann Whitney test revealed that those epileptic individuals who had a personality abnormality had a significantly higher serum folate level compared with those without a personality abnormality (P < 0.02). No other comparison revealed a significant difference. These findings are described in a separate paper (Deb & Hunter, 1992c).

11.3 DISCUSSION

Anticonvulsants are commonly prescribed for mentally handicapped people owing to the high prevalence of epilepsy in this population. The effect of anticonvulsant medication on the cognition and behaviour of individuals without mental handicap has been studied elsewhere (Thompson & Trimble, 1982; Trimble & Reynolds, 1976;

Trimble & Corbett, 1980). However, little is known about the effect of anticonvulsants on the behaviour of individuals with mental handicap.

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Fishbacher in a prospective study of 36 individuals with mental handicap demonstrated not only a positive relationship between a reduction of polypharmacy and a reduction of seizure frequency, but also an improvement in behaviour (Fishbacher, 1982). The advantages of monopharmacy of anticonvulsants over polypharmacy are well recognised (Richens & Houghton, 1974).

Anticonvulsant toxicity can be classified into three types;

(i) hypersensitivity

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(ii) acute dose-related toxic effects of encephalopathic type

(iii) chronic toxic effects.

Both acute and chronic toxic effects may manifest themselves in subtle and unusual forms in individuals with mental handicap. This problem is compounded by the fact that many individuals with mental handicap find difficulty in expressing their symptoms. Close and constant monitoring of individuals with mental handicap who receive anticonvulsant medication is mandatory.

Although most toxic effects of anticonvulsant treatment have been attributed to the high serum levels of these drugs, cases have been demonstrated where these side-effects were manifested where the serum anticonvulsant level was within the so-called 'therapeutic range' (Reynolds & Travers, 1974).

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Sodium valproate monopharmacy was not shown to lower the serum folate level in this study population, possibly because of its lack of liver enzyme induction properties. This is consistent with the findings of a previous study (Deb et al., 1987). An inverse relationship existed between serum anticonvulsant level and serum folate level. It is of interest that no difference emerged either between the polypharmacy and monopharmacy groups, or between different anticonvulsant monopharmacy groups in terms of haemoglobin level, MCV and serum vitamin B12 level. The actual dosage of anticonvulsant medication did not have any direct relationship on the level of haemoglobin, MCV, serum folate or vitamin B12 levels.

Anticonvulsant monopharmacy in general, and of carbamazepine in particular, seems to have some protective effect against aggressive behaviour in individuals with epilepsy and mental handicap. This effect does not appear to be directly related to the serum level. When the polypharmacy group was directly compared with the monopharmacy group they were more likely to have active epilepsy, multiple types of seizure, frequent seizures or partial seizures. The polypharmacy group was significantly younger than the These findings are similar to those of monopharmacy group. Sheppard et al., (1987), although it is recognised that these two groups (polypharmacy and monopharmacy) were not matched.

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Espie et al., (1989) found more maladaptive behaviours in a group of poorly-controlled epileptic patients with mental handicap. Similarly Jamil et al., (1991) found a higher rate of aggression amongst mentally handicapped epileptic patients who sustained more frequent seizures. These authors have argued that aggression was a feature of frequent ictal phenomena rather than an interictal event. The absence of similar findings in the current study could be explained by the fact that those who sustained frequent seizures also received more anticonvulsant medications, and in higher dosage. In a study of 149 epileptic individuals within an institution for mentally handicapped people, Jawad et al., (1991) found that patients who sustained more frequent seizures were more likely to receive polypharmacy of anticonvulsant medication.

Failure to demonstrate a direct relationship between different levels anticonvulsants, doses prescribed, anticonvulsant and generation psychopathology, suggests that the new of anticonvulsants including carbamazepine has less effect on the mental state of individuals with epilepsy. Previous studies have shown that individuals with epilepsy have higher rates of psychopathology. However, this may be attributed to the side-effects of the older generation of anticonvulsants, such as phenobarbitone and phenytoin, on the mental state (Trimble & Corbett, 1980).

Most anticonvulsants apart from sodium valproate, tend to lower the serum folate level (Maxwell et al., 1972; Deb et al., 1987). In individuals treated with anticonvulsant medication, the serum vitamin B12 level is usually normal, except in exceptional cases where significant depression may occur (Reynolds, 1976a).

Low serum folate levels have been shown in psychiatric patients (Ĉarney, 1967; Hallstrom, 1969). It has been suggested that prolonged drug-induced folate deficiency may lead to psychiatric disorders in individuals with epilepsy (Reynolds et al., 1971). This view had been challenged by Jensen & Olesen (1970). Ralston et al., (1970) failed to show any significant effect on aggressive behaviour after a 3 month trial of dietary folate supplements in individuals with epilepsy. Weckman & Lehtovaara (1969) failed to show any significant differences in CSF folate levels between individuals with and without epilepsy.

A very small percentage of individuals in this study had a serum folate level below the normal range, whilst in the majority, the serum folate level was within the low normal range. The normal reference level varies from one laboratory to another. It is estimated on the basis of a mean ± 2 SD, therefore 4% of the normal population will automatically fall outside this range through statistical chance alone. A low serum folate level has been found in between 27 and 91 per cent of individuals receiving anticonvulsant medication (Reynolds, 1976b). Low levels of serum folate are considered to be associated with polypharmacy, particularly in the presence of phenytoin and, to a

lesser extent, phenobarbitone and primidone (Reynolds, 1976b). In contrast, the low serum folate level, in a small proportion of the studied population, may be explained by the fact that the majority received monopharmacy of carbamazepine or sodium valproate.

An attempt was made to demonstrate a genuine relationship between the serum folate level and psychopathology. Overall, the findings failed to support this relationship. This is in contrast to some previous findings (Carney, 1967; Reynolds et al., 1971) but consistent with others (Jensen & Olesen, 1970; Deb et al., 1987).

Reynolds et al., (1971) suggested that a long duration of folate deficiency may cause neuropsychiatric complications. Compared to other studies, individuals in this study were regularly monitored for folate deficiency, and folic acid supplements subsequently prescribed. The potential for prolonged folate deficiency to affect neuropsychiatric difficulties, as postulated by Reynolds (1976b), was therefore minimal.

11.4 SUMMARY

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The prevalence of various mental disorders was estimated in the various anticonvulsant groups. Overall 76% of those who received monopharmacy of anticonvulsant had a diagnosis of mental disorder compared to 52% of those who received polypharmacy. Polypharmacy was significantly associated with a younger age group (aged below 40 years), active epilepsy (seizure sustained within the past year), frequent seizures (one or more seizure per month), multiple types of seizures, and partial epilepsy. The prevalence of various mental disorders in epileptic individuals whose serum folate lay within normal limits or below the normal range was compared with that of the non-epileptic control group. No association was found between the serum folate level and the prevalence of mental disorder.

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CHAPTER 12

SUMMARY

Controversy regarding the relationship between mental disorders and epilepsy was first mentioned in the medical literature of the classical Greek period and has continued to the present day. In spite of numerous studies, a relationship between mental disorders and epilepsy has not been unequivocally proven. Although most individuals with epilepsy have a normal mental state, epileptic individuals as a group tend to show increased interictal psychopathology, compared to the non-epileptic general population. However this difference tends to disappear when compared to individuals with other chronic physical illnesses.

Major methodological problems exist. These have concerned the definitions of both mental disorders and of epilepsy, patient selection and the selection of appropriately matched control groups. An association between schizophrenia-like psychosis and temporal lobe epilepsy has been suggested, but remains unproven.

A relationship between epilepsy and mental handicap has, on the other hand, been recognised for some time. The prevalence of epilepsy in mentally handicapped people remains much higher than that of the non-mentally handicapped population. In addition, in some individuals with epilepsy, deterioration in intellectual abilities over a period of time has been recognised.

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Some earlier studies showed a higher prevalence of various types of maladaptive behaviour in individuals with mental handicap and epilepsy; however recent studies have failed to establish this. The methodological problems of previous studies, particularly the lack of a properly matched control group, render many of the results inconclusive. The need for further research has been justified.

The aim of this study has been to investigate a group of individuals with a combined diagnosis of both mental handicap and epilepsy. They have been compared to a carefully matched control group of mentally handicapped individuals without epilepsy, for the prevalence of mental disorders, including various aspects of maladaptive behaviour, psychiatric illness and personality disorder.

One hundred and fifty adults with a combined diagnosis of both mental handicap and epilepsy were randomly selected from two major hospitals in Leicester for people with a mental handicap and from two Local Authority Day Centres. A control group of 150 mentally handicapped adults without epilepsy was selected from the same hospitals and Day Centres. The two groups were matched according to age, sex, level of mental handicap, level of communication, sensory impairment, living environment and associated chronic physical illness.

All 300 subjects and their carers were seen individually by a single investigator for a research interview. This comprised an assessment with the Profile of Abilities & Adjustment scale, the Standardized Assessment of Personality, and the T-L Personal Behaviour Inventory. A psychiatric diagnosis was obtained, using DSM III-R criteria on the basis of direct interview, observation, and case notes study. Medical case notes of these individuals were scrutinised for further information regarding epilepsy, the aetiology of the mental handicap, and details of anticonvulsant medication. In 100 individuals with epilepsy an EEG recording was carried out. Blood was withdrawn from individuals who received anticonvulsants and sent to the laboratory for analysis of serum anticonvulsant level, serum folate, vitamin B12 level, and full blood count.

There was a similar number of male and female individuals amongst those with a combined diagnosis. Amongst hospital residents, there was a significantly higher proportion of older individuals, and individuals with severe mental handicap compared to the community based individuals. About two thirds of the individuals with epilepsy had sustained seizures within the year prior to the study. The number of individuals who sustained a single-type of seizure was twice the number of individuals who sustained multiple types of seizures.

The majority of epileptic individuals sustained generalized epilepsy. EEG recordings demonstrated epileptiform activity in less than half, of whom, the majority showed focal abnormalities. Presumably therefore, the majority of generalized seizures were due to secondary generalization. Fewer individuals with epilepsy had an abnormal pattern of chromosomes to account for the presence of mental handicap. On the other hand, controls without epilepsy had sustained a higher rate of post-natal pathology. This was explained by the relative absence of epilepsy amongst individuals with Down's Syndrome and the high prevalence of epilepsy in individuals with focal or extensive brain damage.

Fifty-eight per cent of individuals with epilepsy, and 53% without epilepsy, showed severe maladaptive behaviour. There was no statistically significant difference between the two groups either in the overall severe maladaptive behaviour rating or the individual maladaptive behaviour. There was a significantly higher rate of severe maladaptive behaviour amongst individuals resident in hospital compared to those living in the community. Those who received monopharmacy, particularly carbamazepine showed less aggressive behaviour. Amongst individuals who were resident in the community, those epileptic individuals with mild to moderate mental handicap showed significantly more destructiveness and irritability compared to those without epilepsy.

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Changeable mood was common amongst the total population of individuals with mental handicap. This was significantly more common amongst individuals in hospital. The prevalence of psychiatric illness was significantly higher amongst individuals without epilepsy (31% compared with 19%). Both schizophrenia and delusional disorders were more common amongst individuals with erilepsy. No individual without epilepsy had such a diagnosis. Affective disorders, on the other hand, were more common amongst the group without epilepsy. In this case, no individual with epilepsy had a diagnosis of bipolar affective disorder.

Of the total cohort of individuals with mild to moderate handicap (n = 150), 26% showed some personality abnormality. There was no significant difference in the prevalence of personality disorder in individuals with or without epilepsy, although individuals in hospital showed a significantly higher rate of personality difficulties compared to the group who resided in the community. There was no statistically significant difference in the prevalence of T-L personality disorders in individuals with or without epilepsy, although individuals in hospital showed a significantly higher rate of personality difficulties compared to the group who resided in the prevalence of T-L personality disorders in individuals with or without epilepsy, although individuals in hospital showed a significantly higher rate of personality difficulties compared to the group who resided in the community. However, in some subgroups, such as those resident in the community, those with active epilepsy or those in receipt of polypharmacy, T-L personality disorder was significantly more common.

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Of the total population of individuals studied, (n = 300), 65% had a mental disorder. This included severe maladaptive behaviour and/or psychiatric illness and/or personality disorder. Although individuals with severe handicap and those in hospital had significantly higher rates of mental disorder, this was not related to the presence or absence of epilepsy.

The overall finding of this study was a negative one in the sense that it did not reveal major differences in the rates of psychopathology between the groups. However the question remains as to what the significance of these findings is and how relevant they are to the other people with epilepsy, particularly those with a mental handicap.

A sample of people with mental handicap collected from the general population should be representative of the entire population. A general population based sample in mental handicap should also include long-stay residents in hospital because a relatively high proportion of adults with a mental handicap still reside there. In the current study, apart from profound mentally handicapped residents, almost all the adults with epilepsy resident in mental handicap hospitals in Leicester were included. It was not possible to include <u>all</u> adults with a mental handicap and epilepsy who lived in Leicester for the following reasons:- Firstly, there was no comprehensive district register available for people with a mental handicap, at that time. Secondly, if included, the size of the population studied would have exceeded the capacity of the current study. However, the population selected from the community in the current study was as

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representative as possible of the general population of individuals with a mental handicap. Almost all the mentally handicapped adult epileptic patients were included (apart from those who were profoundly mentally handicapped) who were members of two Adult Training Centres in Leicestershire. The largest A.T.C. within the city centre area was included together with another A.T.C. from a rural suburb. This was done in order to eliminate social class bias as much as possible, and to obtain a representative mix of clients from within the community.

Subsequent analysis of the data did not reveal any significant differences on the various epilepsy variables (eg., seizure-type, age of onset of epilepsy etc.) between the hospital-based and the community-based population. This consistency in epilepsy variables in different experimental groups could arguably prove the study population to be representative of the general population. This also proved useful in comparing hospital and community groups in respect of different rates of psychopathology.

How representative, however, is the study population of a population of epileptic patients with average intelligence? It is often said that seizures are symptomatic of underlying brain pathology and that all patients with epilepsy could be expected to have a degree of underlying brain damage. Compared with mentally handicapped population, brain damage in the non-mentally handicapped people is often subtle. Gross structural brain damage could be expected in a high proportion of the mentally handicapped adults in the current

study (both experimental and the control group). In that respect the current study population may not be representative of the general population with average intelligence.

It is now well known that the lower the intelligence of a person, the higher is the chance of that person having brain-damage. Subsequently there is an inverse relationship between the level of intelligence and prevalence of behaviour disorder. Of many factors influencing the behaviour of a mentally handicapped person, brain damage is an important one. It was therefore necessary to include epileptic patients of all levels of mental handicap, so that the possible effect of underlying brain damage remained the same in both groups.

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A high proportion (about half) of the total cohort showed behaviour problems. The seriousness of the maladaptive behaviour varied from aggression on the one hand to behaviour such as wandering and disturbing others at night on the other.

There are a number of scales available to rate maladaptive behaviour in people with a mental handicap, but which cover similar ground. The P.A.A. scale was used in the current study for two reasons. Firstly, it is an observer rated scale for which information could be gathered from carers. Secondly, this scale underwent very rigorous test-retest, inter-rater and inter-informant reliability tests and was found to have high reliability score.

The choice of a standard psychiatric diagnostic schedule was more difficult. DSM-III-R is a well-accepted schedule for the classification and diagnosis of psychiatric illness in people with average intelligence. Although superficially it appears that mentally handicapped adults suffer from same range of psychiatric illnesses as do people with average intelligence, it is unclear whether the same diagnostic criteria can be applied. However, DSM-III-R axis I categories were successfully used in this study for those with good communication skills. In some severely mentally handicapped patients who had poor communication skills, DSM-III-R categories proved difficult to apply. The prevalence of psychiatric illness may have been lower in the study population as a result.

DSM-III-R categories were not used in the current study for the diagnosis of personality disorders because it has no observer-rated scale. In addition its reliability for use in the mentally handicapped population has not been fully tested. On the other hand, both the SAP and the T-L inventory that were used in this study have observer-rated versions. Inter-rater, inter-informant and test-retest reliability of both these scales have been found high in populations of average intelligence. The reliability of the SAP scale was found to be high when used in mentally handicapped populations (Reid & Ballinger, 1987). The reliability of the T-L inventory was tested in the current study and in some categories were found to be good. The concept of personality disorder particularly in the mentally handicapped population is controversial. Hence two observer-rated

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scales with good reliability were used and only for those adults with mild to moderate degree of mental handicap.

The overall prevalence of maladaptive behaviour was slightly higher in the group with epilepsy compared to the control group, although this failed to reach a level of statistical significance. As expected, maladaptive behaviour was found to be more frequent in the hospital group compared to those resident in the community. In addition, maladaptive behaviours were more common in those with severe mental handicap compared to the mildly handicapped group. For those resident in the community, no difference was found in the rates of maladaptive behaviour between the group with epilepsy and the control group. However, when various subgroups of those with epilepsy were compared to their controls, maladaptive behaviour was found to be more prevalent amongst those with epilepsy, in a proportion of cases.

What is the significance of this finding? It may be a genuine finding. This could reflect the tendency in a general population of mentally handicapped adults. Unlike many previous studies, a population based sample has been used together with a control group. The control group was individually matched with the experimental group for variables which could give rise to behaviour problems in people with a mental handicap.

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However, there could be other explanations for this non-significant difference. Firstly, the underlying brain damage which may cause behaviour problems in epileptic patients remained a constant factor in both the experimental group and the control group. Thus its effect on both groups was nullified.

Secondly, a high proportion of epileptic individuals received new generation antiepileptic medication, particularly Carbamazepine and Sodium Valproate which have less behavioural side-effects.

Thirdly, although mentally handicapped people tend to be particularly affected by psychosocial factors, these are different from those which are thought to affect those without a mental handicap (viz, social stigma, financial & vocational concerns, life-events etc.).

The prevalence of psychiatric illness was found to be significantly higher in mentally handicapped adults without epilepsy. However, there are two points worth emphasising. Firstly, there were 4 epileptic individuals who had a diagnosis of delusional disorder or schizophrenia, whereas there were none in the non-epileptic group. It is difficult to draw a conclusion from this owing to the small number of patients concerned. Secondly, mild or moderately mentally handicapped people showed a higher rate of psychiatric illness than adults with severe mental handicap. This finding could be explained by the fact that the diagnosis of psychiatric illness remains difficult in severely mentally handicapped people whereas epilepsy is more

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prevalent. This could also explain the significantly higher prevalence of psychiatric illness in non-epileptic patients.

There was little difference in the prevalence of personality disorder between the group with epilepsy and those without. There was however a significantly higher proportion of personality disorder in the hospital population compared to the community-based population. The commonest personality disorder was of aggressive type. The T-L personality types, particularly the "persistence and repetitiveness" type was significantly more prevalent in the community based epileptic group and in those epileptic patients who had sustained seizures within the 12 months period of the study. They were also more common amongst those who received polypharmacy of antiepileptic drugs. The significance of this finding is unclear because the number of patients in these groups was small and because behaviour such as "persistence and repetitiveness" may be manifestations of autism, underlying brain damage or chronic psychiatric illness, as well.

The observed positive relationship between severe maladaptive behaviour and communication problems, psychiatric illness, personality disorder, severe mental handicap and hospitalization highlights the many factors which are responsible for causing such difficulties in individuals with mental handicap.

<u>TABLES</u>

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Summary Table 1.1

Distribution of mental disorder amongst 335 women with epilepsy studied by Esquirol (1838)

Tγpe of mental disorder	n
Hysteria	46
Monomania	12
Mania	30
Fury	34
Dementia	145
ldiots	8
Periodic loss of memory	50
Peculiarities of character	60

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Summary Table 2.1

Neuroepilepsy hypothesis:

Age of onset of epilepsy Frequency of seizure Severity of seizure Duration of disorder Type of seizure Multiple seizure types Aetiology of epilepsy Type of aura Neuropsychological status

Neurophysiological status (EEG, CT scan etc)

"Hermann & Whitman" (1984)

Summary Table 2.2

Psychosocial hypothesis:

Fear of seizures Perceived stigma Perceived discrimination Adjustment to epilepsy Locus of control Life event changes Social support Socioeconomic status Childhood environment

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"Hermann & Whitman" (1984)

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Summary Table 2.3

Medication hypotheses:

Number of anticonvulsants

Dosage of medication

Serum level of anticonvulsant

Type of medication

Serum folate level

"Hermann & Whitman" (1984)

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Summary Table 2.4

Community surveys of mental disorder

amongst individuals with epilepsy

Authors	Psychiatric illness
(Year)	
Pond & Bidwell (1959)	29% psychological problem 48.6% neurosis 14.3% behaviour problem in children 15.7% epileptic personality
Krohn	35% psychic disturbance
(1961)	2% history of psychosis
Gudmmundsson	54.5% mental abnormalities
(1966)	7% history of psychoses
Rutter et al	58% psychiatric disorder
(1970)	in children
Fenton et al	Increased minor psychiatric
(1986)	morbidity in male epileptics
Edeh & Toone (1987)	People with temporal lobe epilepsy showed more psychopathology

Summary Table 2.5

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Controlled studies on general psychopathology

	oui general psychopatholo	A P	
Authors	Groups	Instruments used	Results
Guerrant et al (1962)	TLE, GM, chronic illness	MMPI + psychiatric interview	No difference between TLE and NTLE group on MMPI score. TLE had more psychosis compared with chronic illness group
Small et al (1966)	Individuals with epilepsy from medical facility and psychiatric facility.	Psychiatric diagnosis	No difference between TLE and NTLE.
Small & Small (1967)	Individuals with epilepsy (TLE, GM, Jacksonian), psychiatric patients without epilepsy	Psychiatric diagnosis	Individuals with epilepsy had more chronic brain syndrome and psychiatric patients more functional psychoses.
Matthews & Klove (1968)	Individuals with epilepsy, chronic neurological disorder other than epilepsy, chronic non-neurological disorder	MMPI	No major difference in between groups.
TLE = Temporal MMPI = Minnesc	Lobe Epilepsy; ta Multiphasic Personality I	NTLE = Non-T nventory GM = Grand Mai Ep	emporal Lobe Epilepsy; ilepsy

Summary Table 2.6

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Controlled studies on general psychopathology

Authors Standage & TLE, GE, Fenton (1975) physical il	Groups	Instruments used	Results
Standage & TLE, GE, Fenton (1975) physical il than enile	•		
	FE, chronic Illness other epsy	PSE, Eysenk Personality Inventory	No difference between individuals with epilepsy and other chronic physical illness or between TLE and NTLE.
Kogeorgos et GE, FE, n at (1982) patients	leurology	GHQ, CCEI	No difference between individuals with epilepsy and other neurological condition or between TLE and NTLE.
Strauss et al TLE (Righ (1982) GE, chron illness hee volunteer	it & Left), nic physical althy	Fear Inventory	No overall difference in between groups.
Whitman et al TLE, GE, ((1984) neurologic chronic nc physical il	other epilepsy, cal patients, inn-neurological	MMPI, GSDS	No overall difference between groups or different types of epilepsy.

TLE = Temporal Lobe Epilepsy;NTLE = Non-Temporal Lobe Epilepsy;GE = Generalized Epilepsy;FE = Focal Epilepsy;PSE = Present State Examination (Wing);GHQ = General Health Questionnaire;CCEI = Crown-Crisp Experiential Index:MMPI = Minnesota Multiphasic Personality Inventory;GSDS = Goldberg Sequential Diagnostic System.

<u>Summary †able 2.7</u>

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Studies of aggression in epilepsy

Authors	Subjects	Instruments Used	Result
Guerrant et al (1962)	Individuals with epilepsy, other illness group	Self-rated and observer- rated aggression questionnaire	Individuals with epilepsy had higher score, no difference between TLE and NTLE.
Serafetinides (1965)	TLE referral to neurosurgical unit	Reported incidence of aggression	36% of patients had reported incidents of aggression.
Taylor (1971)	TLE referral to neurosurgical unit	Retrospective casenotes study	27% of patients had history of aggression pre-operatively.
Standage & Fenton (1975)	Individuals with epilepsy, other chronic illness group	PSE (Wing)	No difference between groups.
Cairns (1974)	Individuals with epilepsy, healthy volunteers	Hostility questionnaire	No TLE/, NTLE difference.
TLE = Temporal	Lobe Epilepsy; NTLE = Non-7	Temporal Lobe Epilepsy;	SE = Present State Examination

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Summary Table 2.8

Mood disorder in epilepsy

Authors	Subjects	Results
Betts (1974)	Psychiatric admission of people with epilepsy	Depression was most common psychiatric diagnosis
Dalby (1971)	TLE patients	Depression was most common
Currie et al (1971)	TLE patients	Depression and anxiety most common
Guerrant et al (1962)	TLE, GE patients	Depression and anxiety most common
Gunn (1977)	TLE, GE patients	Depression and anxiety most common
Mittan & Locke (1982)	Individuals with epilepsy	80% reported depression
Palia & Harper (1990)	Individuals with epilepsy	32% serious depression
Robertson & Trimble (1983)	Individuals with epilepsy	Endogenous depression most common
Fenton et al (1986)	Individuals with epilepsy in primary care	Increased minor psychiatric morbidity

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<u>Table 5.1</u>

Number of individuals with epilepsy and mental handicap in different sex, age and IQ groups

		(n = 150)	
÷	Sex:	Male Female	77 73
	Age:	Below 40 40 & over	83 67
	IQ:	(70-50) (49-35) (Below 35)	49 26 75
		Hospital bas (n = 100)	ed
	Sex:	Male Female	48 52
	Age:	Below 40 40 & over	47 53
	IQ:	(70-50) (49-35) (Below 35)	22 16 62
		Community ba (n = 50)	ased
	Sex:	Male Female	29 21
	Age:	Below 40 40 & over	36 14
	10:	(70-50) (49-35) (Below 35)	27 10 13

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<u>Table 5.2</u> Presumed aetiology of mental handicap in total epileptic population compared with controls

Aetiology	Individuals with epilepsy (n = 150)	Controls without epilepsy (n = 150)
Chromosomal disorders	4	19
Pre-natal causes	12	6
Peri-natal causes	29	21
Post-natal causes	29	5
Unknown causes	76	99

Aetiology of mental handicap in hospital residents with and without epilepsy

Aetiology	Individuals with epilepsy (n = 100)	Controls without epilepsy (n = 100)
Chromosomal disorders	3	12
Pre-natal causes	7	5
Peri-natal causes	21	17
Post-natal causes	17	2
Unknown causes	52	64

Aetiology of mental handicap in community residents with and without epilepsy

Aetiology	Individuals with epilepsy (n = 50)	Controls without epilepsy (n = 50)
Chromosomal disorders	1	7
Pre-natal causes	5	1
Peri-natal causes	8	4
Post-natal causes	12	3
Unknown causes	24	35

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<u>Table 5.3</u>

Individuals with epilepsy in various groups according to the different epilepsy variables

Epilepsy	Total Hospi	tal Comm	nunity
	Population	based	based
	(n = 150)	(n = 100)	(n = 50)
Active	92	60	32
Non-active	58	40	18
Frequent	56	36	20
Less frequent	35	24	11
Single type	85	59	26
Multiple type	38	25	13
Age of onset before 10 years after 9 years	84 31	49 21	35 10
∡ Duration less than 20 years more than 19 years	37 78	22 48	15 30

<u>Table 5.4</u> Types of seizure sustained by 150 mentally handicapped adults

Seizure type	Total (n = 1 no. (1	R 50) %)	esidents In Hospital (n = 100)	Community (n = 50)
Generalized tonic-clonic	102	(83)	73	29
Absence	26	(21)	15	11
Tonic	11	(9)	9	2
Atonic	3	(2)	1	2
Myoclonic	10	(8)	6	4
Complex partial	17	(14)	11	6
Partial seizure, secondarily generalized	13	(11)	11	2
Generalised seizure only	100	(81)	67	33
Partial seizure or secondarily generalised seizures only	23	(19)	17	6
Unknown	27	(18)	16	11

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<u>Table 5.5</u>

EEG findings of one hundred mentally handicapped people with epilepsy

Type of EEG abnormality	n
Normal	9
Excessive slow background activity with or without other abnormality	77
Only diffuse low voltage slow background activity	48
Epileptiform activity either alone or with slow background activity	43
Bilateral generalised epileptiform activity	12
Focal epileptiform activity (Bilateral focal = 9, Left sided focal = 5, Right sided focal = 4)	18
Mixture of focal and generalised epileptiform activity.	13

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<u>Table 5.6</u> Individuals on different anticonvulsant medications

Drugs	n = 150	%
Phenobarbitone or Phenytoin (in combination)	37	24.66
Phenobarbitone (alone)	10	6.66
Phenytoin (alone)	4	2.66
Sodium Valproate (in combination) (alone)	26 16	17.33 10.66
Carbamazepine (in combination) (alone)	37 56	24.66 37.33
Ethosuximide (alone)	1	0.66
Monopharmacy	87	58.00
Polypharmacy	52	34.66
No anticonvulsant	11	7.33

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<u>Table 5.7</u>

BNF dose-ranges of anticonvulsant prescriptions (n = 195)

Drugs	Below the reference range	Within the reference range	Above the reference range
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Phenobarbitone	2	23	6
Phenytoin	3	17	0
Sodium Valproat	e 1	40	1
Carbaṁazepine	8	78	7
Primidone	1	3	0
Ethosuximide	1	4	0
Total	16 (8%)	165 (85%)	14 (7%)

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<u>Table 5.8</u>

Serum anticonvulsant levels related to laboratory reference therapeutic range (n = 195)

E Drugs r	elow the eference range	Within the reference range	In excess of the reference range
Phenobarbitone	8	19	4
Phenytoin	6	11	3
Sodium Valproate	12	24	6
Carbamazepine	9	71	13
.' Primidone	2	2	0
Ethosuximide	3	2	0
Total	40 (21%)	129 (66%)	26 (13%)

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Distribution of haemoglobin, MCV, serum folate and vitamin B12 levels according to the local laboratory reference range

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Investigation	Laboratory Normal Range	Below normal Range n (%)	Within normal Range n (%)	Above normal Range n (%)
Haemoglobin	11.5 - 18.0 g/dl	5 (5)	91 (95)	0
MCV	80 - 99 fl	4 (4)	89 (93)	3 (3)
Serum folate	1.7 - 10 uG/L	5 (4)	110 (96)	0
Serum vitamin B12	170 - 800 nG/L	2 (2)	92 (80	21 (18)

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<u>Table 6.1</u>

PAA ratings in the individuals with epilepsy (n = 150) and without epilepsy (n = 150)

PAA categories	Total population (Wilcoxon test 2 z	(n = 150) -tailed P
Maladaptive behaviours:		
Physical aggression	-1.44	0.149
Destructiveness	-1.09	0.276
Overactivity	-0.12	0.908
Attention seeking behaviour	-0.99	0.322
Wandering	-0.09	0.930
Screaming & other noises	-0.33	0.741
Temper tantrums	-0.06	0.955
Disturbing others at night	-0.24	0.814
Self-injury	-0.63	0.528
Objectionable personal habits	-0.13	0.897
Throwing objects aimlessly	-0.24	0.812
Anti-social behaviour	-0.66	0.512
Sexual delinquency	-0.64	0.523

<u>Table 6.2</u>

PAA ratings in the individuals with epilepsy (n = 150) and without epilepsy (n = 150)

PAA categories	Total population Wilcoxon test z	n (n = 150) 2-tailed P
Vision	-1.61	0.108
Hearing	-0.27	0.788
Speech	-1.17	0.243
Co-operation	-0.81	0.419
Mood	-0.15	0.879
Irritability	-1.20	0.229
Chronic physical illness	-0.63	0.526
Social relationship	-0.82	0.414
Social interaction	-0.57	0.568
Stereotype behaviour	-0.73	0.466
Echolalia	-1.87	0.620

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<u>Table 6.3</u>

PAA ratings in the individuals with active epilepsy (n = 92) and the control group without epilepsy (n = 92)

PAA categories	Wilcoxon test z	2-tailed P
Physical aggression	-1.25	0.209
Destructiveness	-1.42	0.155
Overactivity	-0.49	0.620
Attention seeking behaviour	-1.21	0.226
Wandering	-0.25	0.800
Screaming & other noises	-0.92	0.356
Temper tantrum	-1.03	0.304
Disturbing others at night	-0.47	0.639
Self-injury	-0.71	0.475
Objectionable personal habits	-0.54	0.589
Throwing objects aimlessly	-0.35	0.723
Anti-social behaviour	-0.09	0.927
Sexual delinquency	-0.71	0.477
Co-operation	-2.21	0.027
Mood	-0.55	0.581
Irritability	-1.72	0.085
Social relationship	-1.42	0.155
Stereotype behaviour	-1.71	0.088
Echolalia	-2.36	0.018

Table 6.4

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Results of statistically significant differences between two groups in maladaptive behaviour (EP = Epileptic group; NEP = Non-epileptic group)

Group	c	M Behaviour	filcoxon test z	2-tailed
Severely mentally handicapped	75	EP less aggressive than NEP	-1.97	0.049
Single type seizure	85	EP less aggressive than NEP	-2.29	0.022
Only slow background EEG activity	48	EP less aggressive than NEP EP less overactive than NEP	-2.53 -2.01	0.011 0.044
Only generalised epileptiform EEG activity	12	EP more temper tantrum than NEF EP more irritable than NEP	-2.47 -2.42	0.013 0.016
Monopharmacy	87	EP less aggressive than NEP	-2.10	0.035
Carbamazepine monopharmacy alone	56	EP less aggressive than NEP	-2.49	0.013

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Table 6.5

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Statistically significant differences between hospitalized individuals with epilepsy (EP) and without epilepsy (NEP)

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Group	Behaviour	Wilcoxon t z	est 2-tailed P
Single type seizure $(n = 58)$	NEP more aggressive than EP	-2.08	0.037
Slow background wave in EEG (n=33)	NEP more aggressive than EP NEP more irritable than EP	-2.43 -2.21	0.014 0.027
Generalised epileptiform activity in EEG $(n = 6)$	EP more irritable than NEP	-2.52	0.012
Monopharmacy (n = 65)	NEP more aggressive than EP	-2.51	0.012
Carbamazepine monopharmacy (n=48) ر	NEP more aggressive than EP	-2.52	0.012

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Table 6.6

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Significant differences between epileptic (EP) and non-epileptic (NEP) mentally handicapped individuals resident in the community

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Group	Wi Behaviour	ilcoxon test z	2-tailed P	
Mild mental handicap (n=37)	EP more destructive than NEP EP more irritable than NEP	-2.37 -2.04	0.037	
Duration of epilepsy less than 20 years (n = 15)	EP more aggressive than NEP EP more destructive than NEP EP more self-injurious than NEP EP more irritable than NEP	-2.02 -2.02 -2.20	0.043 0.043 0.043 0.028	
Multiple types of seizures (n=12)	EP more self-injurious than NEP	-2.02	0.043	
Generalised epileptiform activity in EEG $(n = 6)$	EP more tantrum than NEP	-2.31	0.021	
Frequent seizures (n = 20)	EP more self-injurious than NEP	-2.02	0.043	
<u>Table 7.1</u>

Psychiatric illness on the basis of the presence or absence of epilepsy in the total study population

	Individuals		
Psychiatric illness	with epilepsy (n=150) n (%)	without epilepsy (n = 150) n (%)	
Group:			
Total psychiatric illness	29 (19.33)	47 (31.33) *	
Psychotic illness	11 (7.33)	16 (10.66)	
Neurotic illness	15 (10)	22 (14.66)	

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*P<0.05

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<u>Table 7.2</u>

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Psychiatric illness on the basis of the presence or absence of epilepsy in the total study population

Psychiatric illness	Individu with epilepsy (n = 150) n (%)	uals without epilepsy (n = 150) n (%)
Cyclical behaviour and/or mood change	6 (4)	6 (4)
History of psychiatric illness	0	5 (3.33)
Major depression	1 (0.66)	4 (2.66)
Bipolar disorder	Ο.	6 (4) *
Schizophrenia	2 (1.33)	0
Delusional disorder	2 (1.33)	0
Dementia	3 (2)	4 (2.66)
Generalized anxiety disorder	1 (0.66)	0
Hypochondriasis	7 (4.66)	8 (5.33)
Obsessive compulsive disorder	2 (1.33)	4 (2.66)
Simple phobia	5 (3.33)	10 (6.66)

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*P<0.05

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<u>Table 7.3</u>

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Psychiatric illness in the total study population by residence

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Psychiatric illness	Hospitalized Individuals (n = 200)	Community Individuals (n = 100)
Group:		
Total psychiatric iiiness	55	21
Psychotic illness	19	8
Neurotic illness	30	7
Cyclical behaviour and/or mood change	. 8	4
History of psychiatric illness	2	3
Major depression	2	3
Bipolar disorder	6	0
Schizophrenia	1	, 1
Delusional disorder	2	0
Dementia	4	3
Generalized anxiety disorder	1	0
Hypochondriasis	13	2
Obsessive compulsive disorder	5	1
Simple phobia	11	4

<u>Table 7.4</u>

Total psychiatric illness in various groups of the whole population (n = 300)

Group	n(%)	Р
Male Female	34 (22) 39 (27)	NS
IQ <50 >50	26 (17) 48 (32)	<0.01
Age <40 >39	33 (20) 46 (34)	<0.001
Hospital group Community group	54 (27) 20 (20)	NS

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<u>Table 7.5</u>

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Psychotic illness in various groups of the total population (n = 300)

Group	n(%)	р
Male Female	14 (9) 13 (9)	NS
IQ >50 <50	22 (15) 9 (6)	<0.05
Age <40 >39	10 (6) 19 (14)	NS
Hospital group Community group	18 (9) 9 (9)	NS

<u> Table 7.6</u>

Neurotic illness in various groups of the total population (n = 300)

Group	n(%)	р
Male Female	15 (10) 20 (14)	NS
IQ >50 <50	23 (15) 14 (9)	NS
Age >40 <40	20 (15) 17 (10)	NS
Hospital group Community group	28 (14) 7 (7)	NS

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Table 7.7

Statistically significant difference between the subgroups of individuals with epilepsy and matched controls without epilepsy (NEP = without epilepsy; EP = with epilepsy)

0.005 0.001 0.05 0.05 0.05 0.05 0.01 0.05 0.05 0.05 0.01 ۷ م d.f. ----**~~** 4.567 4.005 5.048 3.956 4.128 6.649 5.149 6.976 4.699 8.001 Chi Square 19.057 **Direction of Difference** NEP more than EP EP more than NEP NEP more than EP NEP more than EP NEP more than EP NEP more than EP Age of onset of epilepsy before 10 yrs Age of onset of epilepsy before 10 yrs Duration of epilepsy more than 19 yrs Duration of epilepsy less than 20 yrs Epileptics on polypharmacy Total Psychiatric illness Focal change in EEG Single type seizure Age over 39 years Frequent seizure Active epilepsy Neurotic illness Subgroups Male

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<u>Table 7.8</u>

Distribution in categories of mood for the total study population (based on PAA scores)

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	Individuals		
Mood	with epilepsy (n = 150)	without epilepsy (n = 150)	
Flat	3	7	
Unhappy	2	1	
Very changeable	14	12	
Changeable	53	43	
Нарру	78	87	
Flat/Unhappy	5	8	
Changeable	67	55	

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<u>Table 7.9</u>

Distribution in different categories of mood by places of residence (based on PAA scores)

Mood	Hospitalized Individuals (n = 200)	Community Individuals (n = 100)
Flat	6	4
Unhappy	· 1	2
Very changeable	22	4
Changeable	81	15
Нарру	90	75
Flat/Unhappy	7	6
Changeable	103	19

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<u>Table 8.1</u>

Distribution of different types of personalities according to SAP Schedule by place of residence

SAP personalities	Individuals in hospital (n = 76) n(%)	Individuals in community (n = 74) n(%)
Total abnormal personality (disorder or accentuation)	34 (44.7)	5 (6.7) *
Total personality disorders only	27 (35.5)	1 (1.35) *
Two personality disorders together	4 (5)	0
Three personality disorders together	2 (2.6)	0
Aggressive personality abnormality (disorder or accentuation)	26 (34)	3 (4) *
Aggressive personality disorders	18 (23.6)	1 (1.35) *

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* P<0.001

<u>Table 8.2</u>

Distribution of different types of personalities according to SAP scale

SAP personality disorder only	Hospitalized Individuals (n = 76) n(%)	Community based Individuals (n = 74) n(%)
Cyclothymic	2 (2.6)	0
Obsessional	1 (1.3)	0
Anxious	2 (2.6)	0
Aggressive	13 (17)	1 (1.3)
Psychopathic	1 (1.3)	0

<u>Table 8.3</u>

Distribution of different types of personalities according to SAP scale

SAP personalities accentuation only	Hospitalized Individuals (n = 76) n(%)	Community based Individuals (n = 74) n(%)
		-
Cyclothymic	0	0
Obsessional	1 (1.3)	0
Anxious	0	1 (1.3)
Aggressive	5 (6.6)	1 (1.3)
Psychopathic	1 (1.3)	0

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<u>Table 8.4</u>

Distribution of different types of personalities (according to the SAP scale) in the different age groups of individuals with a mental handicap

SAP Personality	People below age of 40 (n = 74) n(%)	People 40 yrs and over (n = 76) n(%)
Total personality abnormality (disorder or accentuation)	14 (19)	25 (32.9)
Absence of any SAP personality	60 (81)	51 (67.1)
Aggressive personality abnormality (disorder or accentuation)	11 (14.9)	18 (23.7)
Aggressive personality disorder	9 (12.2)	10 (13.15)

No statistically significant differences between the groups

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<u>Table 8.5</u>

Distribution of different types of personalities according to SAP by sex

SAP Personalities	Wale (n = 88) n(%)	Female (n = 62) n(%)
Total personality abnormality (disorder or accentuation)	20 (22.7)	19 (30.6)
Absence of any SAP personality	68 (77.3)	43 (69.4)
Aggressive personality abnormality (disorder or accentuation)	13 (14.8)	16 (25.8)
Aggressive personality disorder	11 (12.5)	8 (12.9)

No statistically significant differences between the groups

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<u> Table 8.6</u>

Distribution of different types of personalities according to SAP schedule in individuals with and without epilepsy

	Individuals	
SAP personalities	with epilepsy (n = 75) n(%)	without epilepsy (n = 75) n(%)
Total abnormal personality (disorder or accentuation	20 (26.77)	19 (25)
Total personality disorders	13 (17.3)	15 (20)
Two disorders together	2 (2.6)	2 (2.6)
Three disorders together	1 (1.3)	1 (1.3)-
Aggressive personality abnormality (disorder or accentuation)	17 (22.6)	12 (16)
Aggressive personality disorders	11 (14.7)	8 (10.6)

<u>Table 8.7</u>

Distribution of different types of personalities according to SAP scale

SAP personality disorders only	Individuals with epilepsy (n = 75) n(%)	without epilepsy (n = 75) n(%)
Cyclothymic	1 (1.3)	1 (1.3)
Obsessional	1 (1.3)	0
Anxious	0	2 (2.6)
Aggressive	8 (10.6)	6 (8)
Psychopathic	0	1 (1.3)

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<u> Table 8.8</u>

Distribution of different types of personalities according to SAP scale

SAP personalities accentuation only	Individuals with epilepsy (n = 75) n(%)	without epilepsy (n = 75) n(%)
Cyclothymic	0	0
Obsessional	1 (1.3)	0
Anxious	0	1 (1.3)
Aggressive	5 (6.6)	1 (1.3)
Psychopathic	0	0

<u>Table 8.9</u>

SAP personality amongst the different subgroups of individuals with epilepsy and mental handicap and their matched controls

Subgroups	Individua with epilepsy (%)	als without epilepsy (%)
Sex:		
Male Female	22 34	22 28
IQ:		
Mild-moderate mental handicap	27	26
Age:		
Below 40 years 40 years and over	16 35	21 29
Hospitalized population Community based population	47 5	42 8
Epilepsy:		
Active Non-active	24 28	24 25
Туре:		
Single type of seizure Multiple types of seizures Generalised epilepsy alone Partial epilepsy	29 20 24 29	26 20 22 29

No statistically significant difference between the groups

<u>Table 8.10</u>

SAP personality amongst the different subgroups of individuals with epilepsy and mental handicap and their matched controls

Subgroups	In with epilepsy (%)	dividuals without epilepsy (%)
Age of onset of epilepsy:		
Before age 10 After age 9	28 22	26 28
Duration of epilepsy:		
For 19 years or less For 20 years or more	23 28	23 28
Severity:		
Less frequent seizures Frequent seizures	19 29	31 21
EEG:		
Only slow background activity	30	33
epileptiform activity	25	8
epileptiform activity	37	37
Anticonvulsant drugs:		
Polypharmacy Monopharmacy Carbamazepine Sodium Valproate Phenobarbitone/Phenytoin	29 27 32 0 27	14 34 44 13 27

No statistically significant difference between the groups

<u>Table 8.11</u> Distribution of T-L personality types in different groups

T-L personality types	Indi with epilepsy without (n = 75) n(%)	viduals epilepsy (n = 75) n(%)
Absence of any personality ty	vpe 60 (80)	67 (90)
Presence of any personality ty	ype 15 (20)	8 (10)
One personality type	8 (10)	5 (7)
2 personality types together	4 (5)	2 (3)
3 personality types together	3 (4)	1 (1.3)
Excessive writing tendency of	nly 2 (3)	0
Hyposexuality only	0	1 (1.3)
Interest in detail only	0	1 (1.3)
Persistence and repetitiveness only	6 (8)	3 (4)
Religiosity only	0	0

<u>Table 8.12</u> Distribution of T-L personality types in different groups

T-L personality types	Indivi in hospital in col (n = 76) n(%)	duals mmunity (n = 74) n(%)
Absence of any personality type	61 (80)	66 (90)
Presence of any personality type	15 (20)	8 (10)
One personality type	8 (10)	5 (7)
2 personality types together	4 (5)	2 (3)
3 personality types together	3 (4)	1 (1.3)
Excessive writing tendency only	0	2 (3)
Hyposexuality only	1 (1.3)	0
Interest in detail only	1 (1.3)	0
Persistence and repetitiveness only	6 (8)	3 (4)
Religiosity only	0	0

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<u>Table 8.13</u>

Distribution of total abnormal personality according to the T-L scale amongst the different subgroups of individuals with epilepsy and mental handicap and their matched controls

Subgroups	lr with epilepsy %	dividuals without epilepsy %
Sex:		
Male Female	18 22	9 13
IQ:		
Mild-moderate mental handicap	20	15
Age:		
Below 40 years 40 years and over	16 23	8 13
Epilepsy:		
Active Non-active	18 22	2 * 22
Туре:		
Single type of seizure Multiple types of seizures Generalised epilepsy alone Partial epilepsy	17 25 18 24	10 5 11 0
Age of onset of epilepsy:		
Before age 10 years After age 9 years	21 17	13 6
Duration of epilepsy:		
For 19 years or less For 20 years or more	14 23	18 7

<u>Table 8.14</u>

Distribution of total abnormal personality according to the T-L scale amongst different subgroups of individuals with epilepsy and mental handicap and their matched controls

Subgroups	lr with epilepsy %	ndividuals without epilepsy %
Severity:		
Less frequent seizures Frequent seizures	19 18	6 0
EEG:		
Only slow background activity	. 17	7
epileptiform activity	25	17
epileptiform activity	32	16
Anticonvulsant drugs:		
Polypharmacy Monopharmacy Carbamazepine Sodium Valproate Phenobarbitone/Phenytoin	25 18 20 25 20	0 * 18 32 0 0
Hospitalized population Community based population	18 21	21 0 *

*P<0.05

<u>Table 9.1</u>

Prevalence of severe maladaptive behaviour in various subgroups

Subgroup	Individuals with severe maladaptive behaviour %
Male	53
Female	58
Epileptic individuals	52
Non-epileptic individuals	48
Hospital residents	70
Community residents	28 **
Mild/Moderate handicap	44
Severe handicap	67 **
Below 40 years of age	57
Over 39 years of age	53
Individuals with a psychiatric illness	69
Individuals without a psychiatric illness	51 *
Individuals with an abnormal personality	47
Individuals without an abnormal personality	8 * *

* P<0.01; ** P<0.001.

<u>Table 9.2</u>

Distribution of severe maladaptive behaviour in various subgroups of individuals with epilepsy

Groups	Individuals with epilepsy (%)
Male	56
Female	60
Hospital residents	71 **
Community residents	32
Mild/Moderate handicap	49 *
Severe handicap	67
Younger age group (under 40 years)	60
Older age group (40 years and over)	55
Individuals with a psychiatric illness	76 *
Individuals without a psychiatric illness	54

* P<0.05; ** P<0.001

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<u>Table 9.3</u>

Distribution of severe maladaptive behaviour in various subgroups of individuals without epilepsy

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Groups	Individuals without epilepsy (%)
Male	49
Female	56
Hospital residents	67 **
Community residents	24
Mild/Moderate handicap	39 *
Severe handicap	67
Younger age group (under 40 years)	54
Older age group (40 years and over)	51
Presence of psychiatric illness	64
Absence of psychiatric illness	48
Presence of abnormal personality	82 *
Absence of abnormal personality	31

* P<0.002; ** P<0.001

<u>Table 9.4</u>

Combinations of mental disorder in the total population (n = 300)

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Mental disorder	n	(%)
Personality disorder only	5	(2)
Severe maladaptive behaviour only	98	(33)
Psychiatric illness only	21	(7)
Psychiatric illness + Severe maladaptive behaviour	36	(12)
Psychiatric illness + Personality disorder	2	(1)
Personality disorder + Severe maladaptive behaviour	17	(6)
Psychiatric illness + Personality disorder + Severe maladaptive behaviour	15	(5)

<u>Table 9.5</u>

Comparison of all the individuals (n = 300) with or without severe maladaptive behaviour $\left(\frac{1}{2} \right) = 0$

	Individuals			
Groups	with seve mala beha	re daptive iviour (%)	without severe maladar behavio	otive ur
Epilepsy	87	(52)	63 (4	47)
No epilepsy	79	(48)	71 (§	53)
Male	81	(49)	73 (§	54)
Female	85	(51)	61 (4	46)
Below 40 years	95	(57)	71 (§	53)
Over 39 years	71	(43)	63 (4	47)
Mild/Moderate handicap	66	(40)	84 (6	52)
Severe handicap	100	(60)	50 (3	38) *

*P<0.001

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<u>Table 9.6</u>

Comparison of all the individuals with epilepsy (n = 150) and with or without severe maladaptive behaviour

Groups	Individuals with ep with severe maladaptive behaviour n (%)		pilepsy and without severe maladaptive behaviour n (%)	
Male	43	(50)	34	(54)
Female	44	(50)	29	(46)
Below 40 years	50	(57)	33	(52)
Over 39 years	37	(43)	30	(48)
Mild/Moderate handicap	37	(43)	38	(60)
Severe handicap	50	(57)	25	(40) *
Active epilepsy	49	(56)	43	(68)
Non-active epilepsy	38	(46)	20	(32)
Single seizure-type	44	(64)	41	(76)
Multiple seizure-types	25	(36)	24	(13)
Frequent seizure	29	(35)	27	(44)
Less frequent seizures	20	(24)	36	(15)

*P<0.05

<u>Table 9.7</u>

Comparison of all the individuals with epilepsy (n = 150) and with or without severe maladaptive behaviour

Groups	Individuals with er with severe maladaptive behaviour n (%)		pilepsy and without severe maladaptive behaviour n (%)	
Generalized epilepsy Partial epilepsy	57 12	(83) (17)	43 11	(80) (20)
EEG:				
Generalized epileptiform change Focal epileptiform change	12 15	(21) (26)	9 16	(21) (37)
Anticonvulsant therapy:				
Monopharmacy Polypharmacy	59 23	(68) (26)	28 29	(44) (46) *

* P<0.05

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<u>Table 9.8</u>

Prevalence of mental disorder in various groups

Group	n	(%)
Mild mental handicap	89	(59)
Severe mental handicap	105	(70)
Male	98	(64)
Female	96	(66)
Individuals below 40 years	101	(61)
Individuals 40 yrs and over	93	(69)
Hospital group	150	(75)*
Community group	44	(44)

* P<0.001

<u>Table 9.9</u>

Distribution of mental disorder in various groups of individuals with and without epilepsy

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	Individuals			
Groups	with epilepsy %	without epilepsy %		
Male	64	64		
Female	67	64		
Hospital population	78	76		
Community population	40	40		
Mild/moderate mental handicap	61	57		
Severe mental handicap	69	71		
Younger age group (below 40 years)	63	60		
Older age group (over 40 years)	69	69		

<u>Table 9.10</u>

Prevalence of mental	disorder	in individuals wi	th epllepsy	(EP)
and without epilepsy	(NEP) in	various epllepsy	subgroups	

Group		n	(%)
Active epilepsy:	EP	55	(60)
	NEP	59	(64)
Non-active epilepsy:	EP	43	(74)
	NEP	37	(64)
Single type of seizure:	EP	50	(60)
	NEP	53	(63)
Multiple types of seizures:	EP	28	(71)
	NEP	27	(68)
Generalized epilepsy:	EP	64	(64)
	NEP	65	(65)
Partial epilepsy:	EP	14	(61)
	NEP	15	(65)

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<u>Table 9.11</u>

Prevalence of mental disorder in individuals with epilepsy (EP) and without epilepsy (NEP) in various epilepsy subgroups

Group		n	(%)
EEG:			
Slow Background activity	EP	36	(75)
	NEP	33	(69)
Generalized epileptiform activity	EP	7	(62)
	NEP	8	(67)
Focal epileptiform activity	EP	10	(58)
	NEP	12	(64)
Onset of epilepsy before 10 years	EP	50	(60)
	NEP	54	(64)
Onset of epilepsy after 9 years	EP	21	(68)
	NEP	19	(61)
Frequent seizures	EP	33	(59)
	NEP	35	(62)
Less frequent seizures	EP	22	(63)
	NEP	24	(68)

<u>Table 9.12</u>

Distribution of mental disorder in various groups of individuals with and without epilepsy

Groups	Individuals with without epilepsy epilepsy % %	
Polypharmacy	52	58
Monopharmacy	76	69
Carbamazepine alone	86	77
Sodium Valproate alone	62	56
Phenobarbitone or Phenytoin alone	50	55
No anticonvulsant	45	54

<u>Table 10.1</u>

Distribution of 100 individuals with epilepsy who had an EEG recording divided into hospitalized and community based population

		Hospital (n = 65)	Community (n = 35)
Age:			
Sex:	Age range (years) Mean±SD	23-77 44±3	$\begin{array}{c} 20\text{-}67\\ 36\pm3 \end{array}$
	Male Female	33 32	19 16
Handica	p:		
	Mild Moderate Severe	18 15 32	19 8 8

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No statistically significant difference
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<u>Table 10.2</u>

Distribution of 100 individuals with epilepsy who had an EEG recording divided into hospitalized and community based population

		Hospital (n = 65)	Community (n = 35)			
Epilepsy:	Epilepsy:					
	Active Non-active Multiple seizure types Single seizure type Generalized seizures Partial seizures Less frequent seizures Frequent seizures	38 27 15 41 44 12 22 16	24 11 12 15 23 4 15 8			
Age of onset:						
	Before 10 years 10 years or after	32 19	24 9			
Duration:						
	More than 19 years Less than 20 years	33 18	23 10			
Anticonvulsant therapy:						
	No anticonvulsant Polypharmacy Monopharmacy Carbamazepine Sodium Valproate Phenytoin or Phenobarbitone	4 16 45 33 6 6	3 16 16 6 5 5			

No statistically significant difference

Table 10.3

Mental disorders in individuals whose EEG showed generalized epileptiform change and whose EEG showed focal epileptiform changes

	Individuals with epileptiform changes in the EEG		
	Gen (n = n	eralized 12) (%)	Focal (n = 18) n (%)
Mental disorder	7	(58)	12 (66)
Psychiatric illness	4	(33)	3 (17)
Severe maladaptive behaviour	7	(58)	9 (50)
SAP personality disorder	3	(28)	8 (45)
T-L personality disorder	3	(28)	6 (36)

No statistically significant difference

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<u>Table 11.1</u>

Comparison of individuals on monopharmacy (n=87) and those receiving polypharmacy (n=52) of anticonvulsant medication

Group	Mon	opharmacy	Poly	pharmacy
	n	(%)	n	(%)
Male	42	(48)	30	(58)
Female	45	(52)	22	(42)
Below 40 years	42	(48)	36	(69)
Over 39 years	45	(52)	16	(31) *
Mild/moderate handicap	43	(49)	27	(52)
Severe handicap	44	(51)	25	(48)
Active epilepsy	48	(55)	44	(85)
Non-active epilepsy	39	(45)	4	(15) **
Frequent seizures	21	(24)	27	(70)
Less frequent seizures	35	(31)	8	(16) **
Single seizure type	52	(78)	26	(54)
Multiple types of seizure	15	(22)	22	(46) *
Generalized epilepsy	60	(90)	33	(67)
Partial epilepsy	7	(10)	15	(33) *
EEG:				
Generalised epileptiform activity	10	(16)	7	(22)
epileptiform activity	15	(29)	16	(50)

* P<0.05; ** P<0.001

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1. A.

<u>APPENDICES</u>

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RESEARCH QUESTIONNAIRE

Name:	No :	Wd/DC	d.o.b.	Computer Code
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Epilepsy:		• •		
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Duration:				
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Dose :				
Se. Level :				
Se. Vit B12 :				
Se. Folate :				
F.B.C. :				
Cause of Mental Handica	p:			

E.E.G.:

ROFILE OF ABILITIES AND ADJUSTMEN MRC SOCIAL PSYCHIATRY UNIT INSTITUTE OF PSYCHIATRY LONDON SE5 8AF

Compiled from

(1) Holmes, N., Shah, A., and Wing, L. (1982)

The Disability Assessment Schedule, <u>Psychological Medicine</u>, 1982 12, 879-890.

(2) Williams, C. (1982)

The Star Profile: Social Training Achievement <u>Record</u>. Kidderminster: BIMH, 1982.

Items taken from the Star Profile are marked with an asterisk,

	PROFILE OF ABILITIES AND ADJUSTMENT		
f'r u	liect Number	G	
Car	d Nuabar		2
Տան	leet Number	3	4
Int	criview Numbor	56	7
	NOTE: in all gestions, if an item is not applicable, code '9' or '99'		
		18 dia 49 dia 49 dia 49 dia 40 mila.	
•••	•Standing		
	I Newda support for standing must be bain		
	 Can support wolf with help of chair or frame Can stand without support 		
	Mobility (Is he able to walk by himsolf?)		
	1. Non mobile or needs help walking on flat		
·	2. Needs help upstairs but walks unaided on flat (without <u>human</u> aid)		
	3. Needs help only because is blind or has fits 4. Fully mobile in a wheelchair or walking frame 5. Walks unaided everywhere (without <u>human</u> aid)		
	PHand Use (How well can be use his hands?)		
	1. Does not use either hand		
	a. Con use one or both hands for <u>Arges</u> movements only, including grasping 3. Due one or both hands for Alan apple interesting		
	a cup, picking up a sweet, finger and thumb opposition	•	
	1. Five to seven times a week 2. Three or four times a week		
	4. Once woakly at less		
	(If very variable, average over three months)		
	b) Soiling Nights (code as above)		
	c) Wetting Days (code as above)		
	i) Soiling Days (cade as shave)		
	e) Folletting Habits		
	1. Needs daily toiletting (if verbal prompt needed, code i)		
	2. Asks to go 3. Goes alone (If regularly toiletted - ask what happens in times between and code 13 - 16 accordingly)		
a	€) Hygiana		
	1. Needs to be wiped by others to remain clean		
	2. Holps with Wiping Solt 3. Wipes solf clean with paper, but needs checking 2. Wipes solf clean with paper, but needs checking		
	4. WINES SELV Independencity and Washes Hands Without Femiliering		
		an an an an an an an an an	
111	 Wipes salv independencity and washes mands without remining DRESSING If unable to dross/undress bocause of physical handicap, note on scoring shoet. 	*	
111	 4. Wipes surv independently and washes mands without reminding DRESSING If unable to dress/undress because of physical handicap, note on scoring shoet. a) Item Checklist (Fick each item from the following lists that can be <u>put on</u> independently, note number of items in coding column) 	 19	20
	 4. Wipes salv independently and washes mands without reminding DRESSING If unable to dross/undress bocause of physical handicap, note on scoring shoet. a) Item Checklist (flex oach item from the following lists that can be <u>put on</u> independently, note number of items in coding column) MEN (f) independent (f) independent (f) independent 	19	20
111	4. Wipped Sulv independently and washes mands without reminding DRESSING 1f unable to dross/undress because of physical handicap, note on scoring shoot. a) Item Checklist (filek cach item from the following lists that can be <u>nut on</u> independently, note number of items in coding column) MEN (h) vest (F) jacket ! (h) vest (G) shirt (k) pante (G) shirt	19	20

b) Getting Drossed (Is he able to put on his clothes?)	21
 Needs to be dressed Puts on a few items by self, any two from checklist. Completely dresses self using any six appropriate items from checklist, but needs checking for fastenings and 	
nostness 4. Completoly drassos solf indapendantly	
c) Doing up Fastenings	22
 Neods to have all fastenings done up 2. Can manage some fastenings, is at least one out of button, zip, bra hook 3. Can manage all fastenings 	· ·
d) Undressing (Can he take off his clothes?)	23
 Noods to be undressed Takes off a fow items only by self, any two from checklist Completely undresses solf using any six items from checklist Completely undresses self independently 	
o) Undoing Fastenings (Can he undo fastenings such as button, zip, bra hook?)	24
 Needs to have fastenings undere Can undo some fastenings, for example, at least one from the aforementioned three Can undo all fastenings 	
+IV. FEEDING	a a a a a a a a a a a a a a a a a a a
i) Eating (i) Finger Feeding 1. Needs to be finger fed 2. Uses finger feeding, but for inappropriate foods 3. Uses finger foeding for appropriate foods	23
(ii) Spaan i. Neads to be fed 2. Needs help to use a spaan 3. Uses a spaan without help but with same spilling 4. Uses a spaan with no help and without spilling	26
(iii) Fork 1. Noeds to be fed 2. Needs help to use a fork 3. Uses a fork without help	27
(iv) Knife 1. Needs to have food cut up .2. Needs help to use a knife 3. Uses a knife without holp only to hold and push food	20
4. Usos knife without holp to hold, push, cut and spread food	
 chewing Neods to have food liquidiged can then soft foods can then all foods 	27
:) Swallowing 1. Noods to bo holped to swallow 2. Swallows food, but dribblos sallva 3. Swallows food, but doos not dribble .	30
 i) Drinking i. Noods to be given drink by another person 2. Holps with holding cup while being given drink 3. Drinks by self using one or both hands, much spilling 4. Drinks by self using both hands, little or no spilling 5. Drinks with holp using one hand only, little or no spilling 	31

Drinks wi spilling

•)

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	V. PERSONAL HYDIENE	
ė	a) Hashing 1. Needs to be washed 2. Helps with washing 3. Hashes hands and face, but needs checking or reminding 4. Washes hands and face independently	25
b	 Dathing Needs to be bathed Helps with bathing Baths solf, but needs checking or reminding Baths solf independently 	33
C) Drying self 1. Needs to be dried 2. Helps with drying 3. Dries self but needs checking or reminding 4. Dries self independently	34
d) Washing hair 1. Mair neods to be washed 2. Helps with washing hair 3. Washes hair but neods checking 4. Washes hair independently	33
i the	er) Brushing toeth 1. Needs to have teeth brushod 2. Helps with brushing teeth 3. Drushos teeth but needs checking or reminding 4. Brushos teeth independently	36 37
61	False teeth 5. Does not look after false teeth 6. Helps look after false teeth 7. Looks after false teeth but needs checking or reminding 6. Looks after false toeth independently	
e)	No teeth 9. Does not use mouthwash 10. Helps with using mouthwash 11. Uses mouthwash but needs checking or rominding 12. Uses mouthwash independently	
4)	Blowing nose 1. Needs to have nose kept clean 2. Helps with Hiping nose 3. Blows or Hipss own nose but needs checking or reminding 4. Keeps nose clean independently	38
g)	Nail care 1. Nails need to be cut or filed 2. Helps with cutting or filing nails 3. Cuts or files own nails but needs chocking or rominding 4. Cuts or files own nails independently	39
h)	Hair care 1. Hair needs to be combod or bruched by staff 2. Helps with combing or bruching of hair 3. Combs or bruches own hair but needs checking or reminding 4. Combs or bruches hair independently	. 30
1)	Grooming aids e.g aftershave, tale 1. Noods to have alds applied by others 2. Holps with using alds 3. Uses own alds but needs checking or reminding 4. Uses own alds independently	41
ther j)	Monstruction 1. Noods to be cared for during period 2. Helps with monstrual care 3. Cares for solf during period but needs chocking or reminding 4. Cares for solf during period independently	42
(ز	Shaving ' 5. Noods to be shaved 6. Helps with shaving 7. Shaves, but needs checking or reminding 8. Shaves solf independently	
		• • • •

FERSONAL HYGIENE 3 Jaching 1. Needs to be washed 2. Helps with washing
1.	VISTON, HEARING, COMMUNICATION	
	a) Visioni - rate with spectacles if worn 4 (is he able to see normally?) J. Dind or almost 2. Poor	43
	S. Normal	
t) Hearing: - rate with hearing aid if worn '' (is he able to hear normally?)	40
1	· Deaf or almost	44
2	2. Pour	
3	Normal	
c) Method of Communication (how does he let you know what he wants?) News one set read and that he wants?)	

1118 VOCAL COMMUNICATION

- VOCAL COMMUNICATION Receptive

 Shows no response to sound
 Shows basic alarting response to sound turns to locate source of sound from rattle
 Shows no response to any spoken words (including own name) --turns to the spoaker
 Shows response to <u>own name only</u> turns to spoaker
 Follows simple spoken instructions such as "come here" "sit down"
 Follows more complex spoken instructions such as "bring the ball", "find the book" etc.

 Follows spoken instructions involving sequences of at least two actions such as "go to the box and bring me the ball"; "go to the cupboard and give John a towel"

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Expressive

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- Expressive
 Makes no sound
 Makes babbling sounds only
 Makes babbling sounds only
 Can only say single words by imitation, eq. copies someone saying 'mama'
 Can only say single words, ag ball, own name
 Can name familiar objects by name, eq. if asked "what's this?" would name objects such as nose, cup, ball
 Can ask for familiar objects by name, eq. if asked "what do you want?" would raphy using words uch as some, drinkt, ball
 Can use two-word combinations, eq. "more drink"; "sweet ploase"
 Uses simple sentences (3-5 words) in reply to questions
 Uses simple sentences (3-5 words) to initiate and respond to questions
 Initiates and responds to conversation using more complex sentences (five or nore words)

- c) Clarity of Spooch

 Not enough spontaneous spooch to rate, or only meaningloss echolalia
 pifficult to understand, oven by acquaintances, impossible for strangers
 Easily understood, even by close acquaintances, difficult for strangers
 Clear enough to be understood by everyone

46 47

45

NON-VOCAL	COMMUNICATION

Р

Receptive
Recoptive
Shows no response to signs, symbols or gestures
Shows basic alerting response to signs or symbols
 -turns to look
Follows basic pointing and beckening gestures
Follows simple signed instructions, for example "come here",
 "sit down", "stand up"
Points to common objects when signed - for example "where-ball"
 "where-car" - when four or more objects are available
Follows complex signed instructions involving at least five signs
 to indicate a sequential task, eg. "Eq to the <u>table</u>, find the
 <u>ball</u> and <u>bring</u> it here"
Can understand speech, no need for signs 49 Expressive 1. Does not use any signs or gestures for communication 2. Can only use reaching and grasping to indicate wishes 3. Can only use pointing to indicate wishes 4. Will initiate two simple hand movements, eg. clap, wave 5. Will initiate at least four basic signs, eg. food, drink, car, cup 50 51 Will imitate at least four basic signs, by the common objects cup
 Will use signs or symbols to label at least five common objects eg. to the question "what is this?", would give the correct sign for 'car', 'ball', 'book', 'cup', 'bed'.
 Will use signs or symbols to ask for familiar objects, eg. to the question "what do you want?" would reply 'drink', 'food', 'book'
 Will use two sign (or symbol) combinations, for example "drink please", "my ball", "me sweet"
 Uses simple contences (3-5 signs or symbols) in reply to questions 9. Uses simple contences (3-5 signs or sympols; in ruply to questions
10. Uses simple contences (3-5 signs or symbols) to initiate and respond to questions
11. Initiates and responds to sign (or symbol) conversation using more complex contances (five or more signs or symbols)
12. Can use speech, no need for signs 1 Clarity of signing - rate on spontaneous signing 52 Not enough spontaneous sign to rate
 Difficult to understand even by close acquaintances, impossible for strangers
 Easily understood by close acquaintances, difficult for strangers
 Close enough to be understood by anyone
 Uses speech, no need for signs Social content of communication - speech, gesture, drawing etc. (can be ask for things be wants? Can be talk about things be bas done?) 53 Little or nothing - meaningless scholalia
 Uses a few words or signs (eq. hells, bye-bye, drink)
 Uses words, signs, or other method for practical needs
 Uses words, signs, or other method comment on his own personal experience (eq. tells people that he has been on an outing) that someone has done something wrong etc.)
 Can converse, in words, signs or other method about things sutside his own personal experience (eq. makes comments about items in the news, or about the family of someone he knows.

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des 1.	for items a to n re . Sovere behaviour problem and frequent occurrence (more than	
2. 3.	three times a week) Less severe behaviour problem but frequent occurrence Severe behaviour problem, less frequent occurrence (three times	
4.	a week or less) Lesser monagement problem Potential (controlled in propent environment but very likely	
۵.	to recur as severe problem if environment changes) Does not occur	
9)	. Physically aggrossive to others	ទីវី
6)	. Dostructivo ~ paper, furniture, clothing, windows etc.	33
e I	Oversetive a press up and down days not all still	
6,7		30
d)	Soeks attention - pesters staff or others	5 7
@)	Solf-injury - head banding, picking sores, biting ate.	
	······································	รือี
ſ),	Manders or runs away if unsupervised	รีจี
g).	Screams or makes other disturbing noises - shouts, grunts,	
	uncontrollable laughtor etc.	60
h).	Tamper tantrums or verbal abuse	
		61
1).	Disturbs others at night	62
J).	Difficult or objectionable personal habits - opits, sewars,	
	self-induced vomiting, sats rubbish, continuous sating or drinking, inappropriate swearing or sevual bohaviour, hoards rubbish etc., include difficult/objectionable habits with menstruation	. 63
۴J.	Scattors or throws objects around - creates chaos almlessly	ธีจึ
1).	Anti-social, dolinquent - steals, lies, bullies, incites others etc.	
		65
m).	Sexual delinquency or other problems with social awareness - if no social awareness, code under j.	55
n).	Other - specify	67
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t. DEHAVIOUR PROBLEMS (Dues he have any behaviour problems? How do you manage when this behaviour occurs? How often does it happen?)

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COUPERATION	. /	
Degree of Cooperation -	code the person's best degree of cooperation	***
 Is actively uncooper tasks or refuse to c Is posively uncooped does not take an act Is posively coopera og. lifts arms when place without diffic Is actively cooperat asked Is cooperative witho and needs little gui- in most circumstance 	ative - will physically resist help in opperate rative - will allow self to be helped but ive part himself in kelping tive - will help in simple tasks, being dressed, can be led from place to uity ive - will follow simple instructions when ut prompting - will initiate own activities dance as to what is the appropriate action s	ι.
Degree of Concletency 1. Is cooperative less 2. Is cooperative betwee 3. Is cooperative botwee 4. Is cooperative more t	than a quarter of the time en a quarter and half of the time en half and three-quarters of the time than three-quartors of the time	- 67
Initiative 1. All'activities need (2. Follows others in eve 3. Decides own simple ac 4. Can plan own activiti of activity, plans ab	o be organised by someone also ryday activities tivities, for example, walks, telovision es and take decisions concerning choice read and creates own choices	. 70

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lecf Nnupe. Associational and a second and a	
d Nunbor	. 3 3 4
Ject Numbar	ĩã ĩõ ĩỡ ĩã
ervica Number	
PSYCHIATRIC AND PHYSICAL CONDITIONS	ਖ਼ਗ਼ਖ਼ਖ਼ਖ਼ਲ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ਸ਼ ਸ਼
Abnormalities of Mood Mon would you doscribo his genoral mood?.	រ៍ទ័
 Rathor flat and anotionloss Unhappy or misorable most of the time Vory changeable - one minute he is happy, the next minute he is misorable Sometimes happy, cometimes misorable Usually happy, or at losst appears contented 	
irritability In he prome to portoda of irritability or touchinoss?	11
1. Vory often 2. Occasionally 3. In the past - not now (note when) 4. Raraly or never	
Deprosoion Doos he over have long periods of unexplained and undue unhappiness or crying, perhaps associated with loss of appetite or sleep?	
1. Vary aften 2. Occasionally 3. In the past - not now (noto when) 4. Raroly or novor.	
Hanie or hypomania Doos he ever have long periods of unexplained excitement or elation?	13
1. Verv often	

	a) Anxlety state Is he ever anxious without apparent reason?'	14
	1. Very often 2. Occasionally 3. In the past - not now (note when) 4. Rarely or nover	
f) Hypochondriamis Is he preoccupied with his own health or body?	15
	1. Very often 2. Occasionally 3. In the past - not now (note when) 4. Rarely or never	
9) Obsessional Neurosis leg handwashing — must have developed in adelescance or adulthood in a <u>sociable</u> mentally retarded porson)	16
	1. Very often 2. Decasionally 3. In the past - not now (note when) 4. Rarely or never	
hl) Other neurocis (including phobias) Does he hava unduc fears of harmless things? Does he worry a lot ar have any other nervous troubles?	17.
	1. Very often 2. Occasionally 3. In the past - not now (note when) 4. Rarely or never	
1)) Schizophrenia Do you know if he ever talks to or hears imaginary volces? Does he ever complain that people are controlling him, or affecting him in some strange way?	10
	1. Very often 2. Occasionally 3. In the past - not now (note when) 4. Karely or never	
11	Other psychosis/paranold state .	e g
	i. Very often 2. Occasionally 3. In the past - not now (note when) 4. Rarely or never	19
k)	Porsonality disorders	20
	1. Very often 2. Occasionally 3. In the past - not now (note when) 4. Rarely or nover	
1)	Other psychiatric problems	20 71
	1. Vory often 2. Occasionally 3. In the past - not not (note than) 4. Rarely or nover	5.
m)	Organic domontia or confusional stato	22
	1. Vary often 2. Occasionally 3. In the past – not not (note then) 4. Rarely or never	
n)	Epiloptic fits	7 3
	1. Has frequent fits (monthly or more) 2. Has fits less than monthly 3. On anti-opiloptic modication 4. No fits.	
c)	Chronic physical ilinosoos	24
	1. Marked offect on adaptability 2. Some effect on adaptability 3. Present, but controlled 4. Nong.	
р)	Chronic physical handicaps 1. Markod offect on adaptability 2. Some offect on adaptability 3. Freesont, but does not offect independence 4. None.	23

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-7-

- Relating to individuals. I. Actively resists contact with other individuals, for example when approached by an individual, moves away, prefere to spend most free time by self
- Will respond to another person if approached, but will not initiate such interaction
- Will respond to another person if approached, and will initiate such interaction
- 4. Established and maintains friendships with individuals
- •
- Relating to groups 1. Actively rosists joining in with groups of Individuals – profors to spend most free time by solf
- 2. Will join a group when prompted, but remains passive
- 3. Nill join a group when prompted, and takes an activo part in the group
- Will join a group without prompting, and plays an active part in the group
- Relating to strangers
- Actively withdraws from contact with strangors, o.g. looks away, will not reply to questions
- Shows passive rejection of contact with strangers makes no move to look or talk
- 3. Is over-friendly with strangers for example, kisses and hugs
- Greets strangers by saying "hello" and shakes hands when approached

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5. Greets strangers as in item 3 and develops an appropriate social relationship, such as holding a conversation

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III. QUALITY OF SOCIAL INTERACTION

Choose one of the following ratings which best describes the graon. The informant should consider the behaviour shown towards wople the person does not know well. Some very aloof retarded Juits and children may become attached to someone who works close ith them, but this soction is concerned with social interaction ith acquaintances and people in general. closelv

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the friendly with age-peers? See he make the first approach? See he join in actively or pactively? The is left alone, does he book out company or is he quite Content to be by himself, even for very long periods of time? The fieldly to staff? See he go to people he knows but ignore strangers?

- 1. Does not interact ~ mainly aloof and indifferent
- 2. Interacts to obtain needs otherwise indifferent
- 3. Responds to and may initiate physical contact only
- 4. Does not initiate social contact, but responds passively if other people make approaches.
- 5. Does make social approaches, but these are poculiar, naive or even bizzarrs. The person does not modify his behaviour in the light of the responses, needs or interests of these when he approaches. The interaction is one-sided and dominated by the person being rated.
- 5. Is of vory low lovel of development, enjoys having others around would be unhappy without company. Smiles and shows positive response to interaction makes eye contact with people when approached and spoken to

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- 7. <u>Children</u> Is shy, but social interaction appropriate once shyness is overcome (as for description given under 8 below). Do not confuse shyness with alcofness)
- Adults Interacts sometimes in an appropriate way but, in general, is not gregarious prefers his own company (also use for people who are withdrawn as a result of temporary illness, but who are usually peciable)
- B. Makes social approaches to other people. Looks up with interest, smiles when approached by others. Enjoys social contact with companions in the ward/contre/school, as well as with the staff. Aspends to other peoples' ideas and interests, as well as "approximation to the best of his ability."
- otes.) A rating of 7 or 8 can be given if a child interacts normally with other <u>children</u> of his own age, oven if his contacts with adults are unusual in some way, so if the child refuces to reply to questions from adults, but converses casily with other children. (Similarly, adults in hospital or training contro may interact with residents/trainees but not with staff).
-) Some of the more compotent retarded adults interact well with mental age poors and staff, but not with themas of lower levels of ability. In these cases, code 7 or 8 as appropriate
- .) Even in the profoundly retarded, responsive pleasure and interest in social contact can be recognized when it is present if so, rate in the sociable category

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XIV.	STEREOTYPED BEHAVIOUR	
NDTE	} Storectyped behaviour may have been mentioned under the behaviour problems section. Examples are almisss pacing, repetitive self-injury, hoarding rubbish etc. If these occur they should be rated as storectypics as well.	
	then set applied blog	Note but do
a) Lho (what	does he usually do if allowed to choose hijs own activity?)	not code
1. 2. 3. 4.	Nothing (including "watching" TV without real interest) Sometimes nothing, sometimes storeotyped Always storeotyped Sometimes storeotyped, sometimes constructive or appropriate	
5. 6.	recreational activity Sometimes constructive, sometimes nothing (elderly people who are mildly ropetitive because of carly domentia - code 5) Always constructive or appropriate recreational activity, eg domestic work, locking at books, talking to others, listening to radio or watching TV with some interest, knitting etc. (snoosing in the daytime counted as appropriate for an elderly person)	
b) Simp (Do Noa fao twi lit	ple derootypies bes he have any simple ropetitivo activities, eg rocking, srding undifforentiated rubbish, teeth grinding, tapping his ce or body, flicking his fingers, flicking pieces of string, isting and turning objects in his hand, gazing at lights, stening to simple sounds, feeling surfaces etc?)	30
1. 2. 3.	This behaviour is marked, especially when unoccupied, although may be controlled by close supervision or being tept fully occupied Present, but minor aspect of behaviour pattern Minimal or none	
:) Elab (Do ag no tra	orate routines es he have any repetitive activities requiring some skill, arranging objects in lines, collecting one type of object for reason, insisting certain routines are for lowed, talking about in timetables etc.?)	31 .
2. 1	Has elaborate routinos of the kind and intensity found in early childhood autism Has minor routings, or obsessional behaviour such as handwashing. Also use for tendency to repotitive behaviour seen in old people with carly domentia, encousive tidiness in personal possessions, refugal to be parted from shopping bag, day or night etc.	
	HOLALIA. REPETITIVE SPEECH	n la u la
1 1 mmac 1000	diate ocholalla 28 ho over ropeat words he has just heard - like a parrot?)	32
9. N 1. E 2. L 3. F	No spaech Echolalia occurs daily Loss than daily Rarely or nover	
) Delay (Doc agai	ved echolalia as he have "pet" words or phrases that he uses over and over an - things he may have heard or said himself in the past?)	33
Codo ag	s 260vo)	
Repet (Doo samo	itive spacch s he go on talking about the same things, or asking the e questions over and over, even if you give him an anomer?)	. 34
9. N 1. M 2. G (lot onough conversational speech to rate larkod repotitive speech lane tendency, but can be distracted to other topics. linclude here the tendency for some elderly people to roturn to the same memories of the past.)	•

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	-12-	
XVI. DOMESTIC SKILLS Note: If ward routine of threa tasks, code 5	does not permit 9.	
Ded Haking 1. Needs to have bed made 2. Helps with making bed 3. Makes own bed, noeds checking 4. Makes own bed independently	ÿ 3 3	
Fable Laying 1. Needs to have table laid 2. Helps with laying table 3. Lays table, needs checking 4. Lays table independently		
) Washing and Drying Dishes 1. Needs to have dishes washed 2. Helps with washing and drying 3. Washes and dries, needs checking 4. Washes and dries independently	37	
) Hashing Clothes (underwear, shirts, socks) 1. Needs to have clothes washed 2. Helps with washing clothes 3. Washes clothes, needs checking 4. Washes clothes independently by hand	30	
 Food Proparation (bread and butter, teast, tea Needs to have all food prepared Helps with proparing simple foods Prepares simple foods, needs checking Prepares simple foods independently 	a, coffaa, soup)	
ł		
 There appropriato, tick which of the following it repared independently: [code number of items] A) Cup of tea/coffee B) cold snacks - bread and butter C) hot snacks - bread and butter D) complete meals 	toms can be 40.41	
E) Chick/Pakery F) grillod itema G) rostod itema H) fried itema T) boiled itema J) stowed itema		
 General Cleaning Noods to have living area cleaned Helps with cleaning living area Cleans living area, needs checking Cleans living area independently 		

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-13-	
*XVII. INDEPENDENT ACTIVITY	90 47
l. Needs constant prompting to do anything 2. Completes tasks with help 3. Completes tasks only when supervised 4. Completes tasks independently	93
•XVIII. USE OF EQUIPMENT Notel If ward routing does not permit use of <u>Any</u> of these, code 99.	********
Tick those items which can be used independently: [code number of items]	සෝ පත
(A) vacuum cleaner (B) iron (C) washing machine (D) scissors (E) toola (merawdelver)	44 45
(F) needle and thread (sew on a button) (G) cooker (H) tin opener (I) clothes line (J) cleaning materials	
<pre>*XIX. USE OF FUBLIC AMENITIES Note: 14 word routing does not permit <u>Any</u> of those, code 99. Tick each of the following that can be used independently (code number of items)</pre>	
 (A) public telephone (B) emergency services (fire, police, ambulance) (C) doctor, dentist (D) welfare rights (uncomployment benefit, pension) (E) postage for letters (F) savings (post office or bank) (G) public entertainment (cinema) (H) pub, cafe (I) shops (J) vending machings 	
 (K) public convaniences (L) launderette (M) voting rights (N) hairdressers (O) public transport 	
XX. ORIENTATION How far can s/he find way round without help?	40
1. Cannot find way round, even inside realdence 2. Can find way round residence only 3. Can find way round residence and immediate environe (garden, grounde) 4. Can find way to local shops/town 5. Can find way to local shops/town 5. Can travel longer distances on ακπ.	

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XXI. COMMENTS

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	STILLS		
Sh.	phue.	C1 47	
1 2 3 4 5	Cannot do simple three-plece inset puzzle for shape - circle, square, triangle. Can do simple three-plece inset puzzle for shape - circle, square, triangle. Can de six er anne pleces on nine plece inset puzzle. Can de simple Jigsan puzzle - nine pleces. Can de complem Jigsan puzzle - 20 er mere pleces.	49	
Col	aurs (rud, blue, yotlaw, green, black, orange, brown, whitu)	@ 0	
1 2 2 4 5	Dues not know colours. Can match any two colours from above list. Can point to any three colours from above list when asked. the name or sign any three colours from the above list. Can name or sign any six colours from the above list.	50	
SI :			
	Cannot do elepto Inset pozzia for sizo. Can do elepto Inset pozzia for size: big, Geall. Can point to big and email objecto when where at loost five objects of different size. .Can place five objects in order of size. Can place seven objects in order of size.	51	
fin z	ding.	66	
1. 7. 4. 5. 6. 7.	Connot name common objects in picturus. Con name any three common objects in pictures, for memple, hall, trou, cat, house. Can recognise own first name out of four others. Can recognise signs for "Ladlos" and "Gents". Can read any sim simple words, for usample, cat, ball, trou, car, dog, house, apple, cup, buy, girl. Can read and understand at least simple books and comics.	₽	
Wr i	ting.	80 60 80 81	
1.2. 3.4. 5. 7. 8. 7. 8. 9.	Can make marks on paper when helped. Can make marks on paper without help. Can trace over simple shapes - circle, square, triangle. Can copy simple shapes - circle, square, triangle. Can trace over simple words - cat, hall, own name. Can trace over simple words - cat, hall, own name. Can write simple words independently. Can write sentences of 3 - 5 words in length. Can write sentences of up to sight words in length to form a luter.	53 54	
Huel	147 8.		
1. 2. 3. 4. 5. 7. 11. 7.	Nows not know numbers. Resites numbers muchanically. Can count objucts one by one up to ten. Can give you thread these from a group of ten similar items. Can point to sets of items having 2,3,5 and 8 chjects. Can correctly add items, eg, two apples from she apples. Can correctly add items, eg, two apples from she apples. Can correctly add numbers up to a maximum of 20, eg. 0477 6411. Can correctly subtract numbers (row a maximum of 20, eg. 05-01 11-4.	55 56	
Col	16.		
1. 2. 3. 5. 5. 7. 11.	Does not know culn values. Can correctly name uld culns only. Can name docinal culns, but not correctly. Can correctly name ducinal culns. Can add ip and 2p. Can add ip and 2p. Can add iop and 3p. Can add combinations of coins up to 1, for example 16p+14p; 25p+35p. Can add combinations of coins up to 1, for example 16p+14p; 25p+35p. Can add combinations of coins up to 1, for example 16p+14p; 25p+35p.	57	
110			
1. 2. 3.	Cannol toll time from the clock. Can tell time to the nearest hour. Can tell time to the nearest half hour.	20	

4. Can tell time in hours and minutes. 5. Can tell time from a digital clock.

STANDARDIZED ASSESSMENT OF PERSONALITY (Mann et all, 1988)

Name Date Length of acquaintance We are interested in the sort of person is, who

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is old.

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How would you describe as a rule? (i.e. when she is not physically or psychiatrically ill)

Probe Questions

Α.	How does he/she get on with other people?
в.	How many friends does he/she have?
с.	What is his/her mood like?
D.	What sort of standards does he/she have? (at home, at work, for
	example)
Ε.	Is he/she a calm sort of person, takes life as it comes?
F.	How does he/she cope with the normal demands of life?
G.	What is his/her temper like?
Н.	Is he/she a responsible sort of person?
I.	Does he/she respect others feelings and ideas?
J.	Does he/she tend to overdramatise things?

Discontinue at this point if no marked traits emerge.

Probe in all areas to check that:-

- 1. A characteristic is pronounced (Grade II)
 - i.e. a) is considered somewhat out of the ordinary by the
 informant;
 - b) extends to more than one circumstance on subject's life.
- 2. The characteristic is present, but less prominent (Grade I) Check specifically for the durability of the characteristic.
- If A.B. proceed as follows:

If A. Explore for sensitveness:

Shy? Sensitive to others opinion? Easily upset by remarks made about him? Blushes easily? Feels awkward in company? Worries whether he/she will stand out amongst others? Avoids meeting people - has to be pushed to do this?

If B. Explore for being Schizoid/Paranoid.

Prefers own company? Lives in a dream/own world? A bit eccentric? Cranky ideas at times? Rather a cold person! Suspicious of others? Easily slighted/wroned? Defends his own rights? Goes against people easily? If C. Explore mood

Does the mood vary a lot? More up than down, or vice versa? Low periods for no reason? Gloomy outlook? Cheers up sometimes? Perpetually satisfied with life? Always optimistic? Vëry energetic? Occasionally down?

If D. Explore obsessionality

Very neat and tidy? Always cleaning? Can't relax until its done? Re-does things several times? High standards? Dislikes rules being broken? Never clear what to do? Always sees both sides of the question? Doubts her/himself?

If E. Explore Anxiety

Always worrying? **Called a worrier by family or friends**? Never relaxed? Always something on mind? Always afraid something will go wrong? Upset by the unexpected? Worry over health, family, accidents?

If F. Explore Neurasthenia

Rather passive? Can't stand up to normal demands of life? Not much energy? Easily tired? Gets headaches easily? Dislikes noise/crowds? Many aches and pains? If G. Explore Explosive traits.

Aggressive to people?

Easily loses temper?

Gets into fights?

Often in trouble?

Sudden outbursts of aggression, but normal in between?

If H. Explore psychopathic traits.

Irresponsible about things - money, family, others? Always manipulates situation in her/his favour? Uses people for her/his benefit? Never seems to learn from consequences? Cold and callous to other people? Never bothers about others feelings?

If I. Explore Hysterical traits.

Over dramatises things?

Over dependent on people? Pester people around him/her? Craves love and attention?

Unreliable in personal relationship?

T-L PERSONAL BEHAVIOR INVENTORY (to be completed by Rater)

- -

by

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David M. Bear, M.D. and Paul Fedio, Ph.D.

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Personal Behavior Survey

INSTRUCTIONS

.

On the following pages there are statements about personal habits, preferences, feelings, and beliefs. For each statement, please indicate whether the statement seems more true or more false about the person you are describing.

On the basis of your experiences with the patient, please give your first and most honest response to each item, leaving no blanks. There are no right or wrong answers -- no ratings of better or worse -- so please be guided by your memory and your impressions.

We appreciate your sincere cooperation in completing the Survey.

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1. PERSONAL BEHAVIOR SURVEY

All information is strictly confidential and will never be used with your name or t of the patient. It is for purposes of statistical research only.

ase fill in:

		1-3
e of the rerson fou are bescribing		4
		- <u>4</u> ⁵
		. 6
r Name		7
r Relation to the Patient		<u>-</u> ·
r Sex	••••••••••••••••••••••••••••••••••••••	
r Age	Augustantina and a shift for the sec	- 11
hest Grade You Completed in School		12–13
ber of Years You Have Known the Patient	Name	- - .

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2.

Personal Behavior Survey

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		<u>Tru</u> 1	e	<u>Fal</u>	se)	IV	
Writ	ing Tendency						
1.	Believes it would make good sense to keep a detailed diary.	(>	()	14	
2.	Keeps a daily record or diary.	(>	()	15	
3.	Writes down many things, copies passages from books, and so forth.	()	(>	16	
4.	Records details about personal experiences and thinking.	(.)	()	17	
5.	Speaks about or is writing a book.	()	()	18	
Feel	ings About Sex						
6.	Seems preoccupied with thoughts about sex.	()	()	19	
7.	Sexually attracted by new or different things.	()	()	20	
8.	Sexual activity has decreased.	()	()	21	
9.	Strongly attracted to members of own sex.	(>	()	22	
10.	Has trouble becoming sexually aroused.	()	(>	23	. '
Sens	e of Law and Order, Morality						
11.	Personally very upset when people disobey the law.	()	(>	24	
12.	Often believes he or she is the only one who is right.	()	()	25	
13.	Infuriated by cases where justice has not been done.	()	· ()	26	
14.	Goes out of the way to make sure the law is followed.	()	()	27	
15.	Despises people who try to break the rules.	()	()	28	
Reli	gious Convictions						
16.	Religious beliefs have undergone major changes.	۲)	()	29	
17.	Believes the Bible has special meaning which he or she can understand.	(>	(>	30	

3. <u>True</u> <u>False</u> 1 0 18. Has had some very unusual religious experiences. $\langle \rangle$ ()31 19. Very religious (more than most people) in own way. 32 () $\langle \rangle$ 20. Religion and God are more personal experiences than for most people. () ()33 Anger and Temper 21. Gets into trouble because of temper. ()()34 22. Loses control of temper frequently. ()()35 23. When angry, often explodes. ()()36 24. Has a tendency to break things or hurt people when angry. ()()37 25. Often said to be hotheaded. ()()38 Orderliness 26. Has a habit or counting things or memorizing numbers. 39 · () ()27. Seems more sensitive to distractions than most people. ()()40 28. Becomes upset if things are not just right. ()()41 29. Mind gets stuck on so many different ideas that he 42 or she cannot make a decision or do anything ()()30. Tends to get bogged down with little details. ()() 43 Fearfulness, Suspicion 31. Interprets things more deeply than most people. ()()44 32. Believes that powerful forces beyond control are 45 working with his or her life. ()()33. Feels that fate is working against him or her. () ()46 34. Open to attack from many sides. () 47 ()35. Believes that people tend to take advantage of 48 () him or her. ()

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		<u>Tru</u> 1	e	<u>Fal</u> 0	se		4.
Feel	ings of Guilt						
36.	Can never forgive themselves for some of the things they have done.	(>	(>		49
37.	Much of the time feels as if he or she had done something wrong or harmful.	(Ś	(>		50
38.	Believes he or she has not lived the right kind of life.	()	()		51
39.	After accidently hurting someone's feelings, cannot forgive themselves for a long time.	(>	(>		52
40.	Really suffers after even a small mistake.	()	()		53
Sens	e of Humor						
41.	Finds few things really funny.	()	(>		54
42.	People do not seem to appreciate his or her jokes.	()	· ()		55
43.	Feels that people should think about the point of many jokes more carefully instead of just laughing at them.	()	(>	•.	56
44.	Feels that most jokes are not funny.	()	(5		57
45.	Says that there is too much foolishness in the world today.	()	()		· 58
Sadn	ess						
46.	Has periods of weeks or months when he or she could not get going.	Ċ)	(>		59
47.	Feels that life is a strain much of the time.	()	(>		60
48.	Really down in the dumps most of the time.	()	()		61
49.	Has often felt close to ending his or her life.	()	Ċ)		62
50.	Feels that the future is hopeless.	()	()		63
Emot	ions						
51.	Feelings often take the place of thinking.	(>	()		64
52.	Almost everything triggers some emotional reaction.	()	Ċ)		65

		<u>Tru</u> 1	e	<u>Fal</u> 0	se	5.
53.	Emotions control his or her life.	()	()	66
54.	Subject to big shifts in mood from very happy to very sad.	(>	(>	67
55.	Emotions have been so powerful that they have caused trouble.	(>	()	68
Inte	rest in Details	,		~		
56.	Sometimes gets terrible confused by little details.	(>	()	69
57. _.	Rarely tells people something without giving them all the details.	() .	(>	70
58.	Needs to know every detail before making a decision.	()	()	71
59.	Needs more details than most people to understand something.	(>	()	72
60.	Has trouble getting to the point because of all the details.	¢).	()	73
Phil	osophical and Intellectual Interests					1
61.	Believes that nothing is more important that trying to understand the forces that govern this world.	(>	(>	74
62.	Spends a lot of time thinking about the origins of the world and life.	()	(Š	75
63.	Places faith in astrology, meditation or other spiritual ways of relating to the universe.	(>	()	76
64.	Believes he or she understands the real meaning or nature of this world.	(>	()	77
65.	More preoccupied than most people with the order and purpose of life.	(>	()	78
Sens	e of Personal Destiny					
66.	Feels people would learn a lot from the story of his or her life.	(>	()	79
67.	Thinks that he or she has a special mission in life.	(>	()	80
68.	Believes that powerful forces are acting through him or her.	()	."()	V 7

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		<u>Tru</u> 1	<u>ie</u>	<u>Fal</u> 0	se	6.
69.	Seems sure there is a significant meaning behind personal suffering.	()	())	-
70.	Feels that their illness has been given to them so that they would meet certain people at the right time.	()	()	9 · · ·
Pers	istence, Repetitiveness					
71.	Cannot get off the point sometimes.	()	(>	10
72.	Sometimes gets stuck on one idea so that he or she cannot make a decision or do anything.	()	()	11
73.	When talking to someone, has trouble breaking off.	C)	(>	12
74.	Sometimes keeps at a thing so long that others may lose their patience.	()	()	13
75.	Is bothered for days by the same thoughts.	()	(>	14
Depe	ndency				•	,
76.	Feels like a pawn in the hands of others.	()	(>	15
77.	Has gotten people angry by asking them to do so much.	(>	(>	16
78.	Seems to depend on other people for many things.	()	(>	17
79.	Sometimes feels so helpless that he or she wants people to do everything.	(>	()	18
80.	Feels fortunate to receive so much help from people.	()	()	19
Нарр	iness				۰.	·
81.	Has stronger feelings of happiness than most people.	()	(>	20
82.	Often does foolish things while in a good mood.	. (>	()	. 21
83.	Sometimes feels so good that ideas come into mind faster than he or she can handle them.	()	()	22
84.	Has had periods so full of pep that sleep did not seem necessary for several days.	()	()	23
85.	Sometimes feels excitedly happy, on top of the world, without any reason or even when things are going wrong.	(>	.(>	24

		True 1	False 0	7.
Host	ile Feelings, Bearing a Grudge			
86.	Little things make him or her angrier than they used to.	$\langle \rangle$	()	25
87.	Feelings of hatred can be very intense.	()	()	26
88.	Talks about ripping some people to shreds.	()	()	27
89.	Preoccupied with thoughts of revenge.	()	$\langle \rangle$	28
90.	Infuriated by some of the things people have done to him or her.	()	()	29
Gene	ral Behavior		•	
91.	Never gets angry.	()	$\langle \rangle$	30
92.	Never gossips.	$\langle \rangle$	$\langle \rangle$	31
93.	Table manners are just as good at home as when out in company.	()	()	32
94.	Never puts off until tomorrow what ought to be done today.	Ċ	()	33
95.	At elections, never votes for men about whom he or she knows very little.	· . ()	()	34
96.	Likes everyone.	()	$\langle \rangle$	35
97.	Always tells the truth.	()	()	36
98.	Never laughs at a dirty joke.	()	$\langle \rangle$	37
99.	Reads every editorial in the newspaper every day.	()	· · · · · ·	38
100	Never feels like swearing.	(•)	$\langle \rangle$	39

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Thank you for your honest and patient completion of the Survey. Would you please check to be sure that all questions were answered.

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		OBSERVATION SHEET FOR SEIZURES
	Name Date Ward	Age: Sex: Type of seizure:
	1.	Time of seizure
	2.	Duration
	3.	Did he lose consciousness
	4.	Duration of unconsciousness
	5.	Did he appear confused/disorientated
	6.	Were there convulsive movements
	7.	Were the movements widespread
	8.	Were the movements confined to one area
ç	9,	Did they start in one area and spread
	10.	Duration of convulsion
	11.	Was he incontinent of urine/faeces
	12.	Did he fall
	13.	Did he have a blank stare for a few seconds
	14.	Was there any sudden/momentary jerk of whole body
	15.	Any sudden extension movement of arms
	16.	Any semi-purposive automatic movement (duration)
	17.	Any strange behaviour (before/during/after) fit
	18.	Any incidence of masterbation
	19.	Was he rousable
2	20.	Did he respond to his name
	21.	Any emotional disturbance
	22.	Any perceptual disturbance
	23.	Any disturbed behaviour (before/during/after) fit
	24.	Any injuries received
	25.	Any aura
	26.	Any other comments
		1

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British Journal of Psychiatry (1991), 159, 822-826

Psychopathology of People with Mental Handicap and Epilepsy I: Maladaptive Behaviour

S. DEB and DAVID HUNTER

One hundred and fifty mentally handicapped people (100 from hospital and 50 from the community) with epilepsy were studied along with an individually matched control group of 150 (100 from hospital and 50 from the community) non-epileptic mentally handicapped people. Behaviour was studied using the Profile of Abilities and Adjustment Schedule. Of the total population, 55.3% showed some type of severe behaviour problem. Although the epileptics showed slightly more severe behaviour problems than the non-epileptic group, there was no statistically significant difference between the two groups. Some differences emerged between the groups when subgroups of epileptics were studied.

The literature on interictal maladaptive behaviour and aggression is confusing. In many studies, the definition of aggression and maladaptive behaviour is unclear. Despite the common belief that aggression and maladaptive behaviour are more common among epileptics, controlled investigations have consistently reported no overall increase. The only two controlled studies among epileptic prisoners have also failed to detect raised levels of violence (or seriousness of crime) (Gunn, 1977; Hermann & Whitman, 1984). However, recent reviews of the literature suggest that the relationship between aggressive behaviour and epilepsy is due to nonspecific factors which are common to both violent populations and patients with epilepsy, the most significant of which is associated brain damage (Fenwick, 1986).

The literature on the psychopathology of mentally handicapped epileptics is sparse and has many loopholes. Eyman et al (1969) studied the mental handicap population in three large hospitals in the USA and showed hyperactivity along with other factors such as aggression, speech problems and difficulties in eating/dressing to be more common among the institutionalised mentally handicapped epileptics. In another study, Capes & Moore (1970) compared 21 factors of maladaptive behaviour between 229 epileptic and a non-matched control group of 511 non-epileptic mentally handicapped people in Arizona Children's Colony. Significant differences were found in 16 out of 21 factors (mainly hyperactivity, withdrawal and aggression directed to others, self or objects). However, Corbett (1981), in the Camberwell study, did not find any significant difference in the frequency of behaviour disturbance between epileptic and non-epileptic children with severe mental handicap. This finding was also supported by our previous study (Deb *et al*, 1987) where we were unable to find any significant difference in the rate of maladaptive behaviour between epileptic adults and a matched control group of non-epileptic adults in a mental handicap institution. One recent controlled study conducted by Espie *et al* (1989) involving residents in a hospital for people with a mental handicap concluded that "disturbed behaviour was not associated with epilepsy *per se*... [although] a small sub-group of subjects who have poorly controlled epilepsy do present greater behavioural management problems". Similar observations were made by the same authors when they compared behaviour among people with mental handicap and epilepsy who lived in the community and attended day centres (Gilles *et al*, 1989).

The evidence for a correlation between maladaptive behaviour and epilepsy among the mentally handicapped is poor. The commonest fault in such studies is the lack of adequate controls. When used, many apparent differences disappear (Kligman & Goldberg, 1975; Stevens & Hermann, 1981). We therefore studied psychopathological aspects of mentally handicapped people with epilepsy under the headings of (a) Maladaptive Behaviour, (b) Psychiatric Illness and (c) Personality Disorders, and compared them with an individually matched control group of mentally handicapped people without epilepsy.

Method

All epileptic residents of two hospitals in Leicester, UK, for people with mental handicap were included (n = 100). These two hospitals have different wards for adults with varying degrees of handicap with or without associated physical and/or behavioural problems. All the epileptic attenders of two day centres for mentally handicapped adults (n = 50) were also included. A control group of 100 non-epileptic mentally handicapped residents of the same

PSYCHOPATHOLOGY IN MENTAL HANDICAP AND EPILEPSY: I

hospitals and 50 non-epileptic mentally handicapped attenders of the same day centres was also studied. The nonepileptic controls were individually matched with the epileptic mentally handicapped group on the basis of their (a) age, (b) sex, (c) level of intelligence as measured by various psychometric tests, (d) level of communication (expressive speech, comprehension and clarity of speech), (e) sensory impairment (vision and hearing), (f) living environment (in the case of hospital patients, a similar ward setting; in the case of community patients, either a hostel, or home with relatives), (g) length of hospital stay or attendance at day centre, and (h) associated chronic physical illnesses.

Intelligence was tested by various psychometric tests (WAIS, WAIS-R, Raven's progressive matrices, Peabody Picture Vocabulary Test, Vineland Social Maturity Scale) and was expressed in terms of IQ. In almost all the cases, IQ measurements were recorded from the psychologist's reports in the medical records. Level of communication, sensory impairments and chronic physical illness were measured by 'Profile of Abilities and Adjustment' schedule (PAA). Classification of mental handicap was undertaken according to The Ninth Revision of the International Classification of Diseases (mild mental handicap, IQ 70-50; moderate mental handicap, IQ 49-35; severe mental handicap, IQ below 35) (ICD-9; World Health Organization, 1978).

As much information as possible was gathered from medical case records and carers regarding the cause of mental handicap.

Epilepsy was defined according to Gunn & Fenton's (1969) operational criteria of at least three epileptic seizures in two years. Drug-induced epilepsy and febrile convulsions were excluded. We divided the epileptic group into 'active' (those who had sustained seizures during the previous 12 months) and 'non-active' epileptics (those who had not sustained any seizures within the previous 12 months). Classification of epilepsy was undertaken on the basis of clinical signs and according to the International Classification of Epileptic Seizures (The Commission on Classification and Terminology for the International League Against Epilepsy, 1981). A detailed description of epileptic attacks was obtained from an eye-witness and where necessary a 'behaviour check-list during seizure' was completed. Information about the age of onset of epilepsy and total duration of epilepsy was obtained from case records, carers and relatives. Severity of epilepsy was measured according to the frequency of seizures. It was classified as 'frequent' if seizures occurred more than once a month and 'less frequent' if the frequency was less than one per month. Where patients sustained more than one seizure type it was the most frequent type of seizure that was considered. However, status epilepticus was discounted. Information concerning seizure frequency was obtained from carers, or, in the case of the hospital population, from nursing records. The seizure frequency was estimated for the previous 12 months.

Electroencephalogram (EEG) recordings were available on 100 out of 150 epileptic patients. However, less than half of the patients had an EEG recording within the previous 12 months. For the remaining patients, an EEG was undertaken during the study period. In these cases, the consultant who reported on the EEG was unaware of each patient's seizure type. Spike, polyspikes, spike wave, sharp wave, sharp and slow waves were accepted as epileptiform activities in EEG.

Information concerning type and dosage of anticonvulsants was obtained from the medical records. Anticonvulsant drug levels were estimated approximately 12 hours after administration of the last dose.

Aspects of behaviour (including maladaptive behaviour) were measured with the PAA scale. The PAA was designed by Dr Lorna Wing and her colleagues from the MRC Social Psychiatry Unit, London. This scale was created by the combination of two scales, the Disability Assessment Schedule (Holmes *et al*, 1982) and the Star Profile (Williams, 1982). Holmes *et al* (1982) undertook an extensive reliability study of the Disability Assessment Schedule and found high inter-rater, inter-informant and test-retest reliability. Reliability scores on the maladaptive behaviour section were between 78% and 93%.

The following sections of the PAA schedule were used in our study: VI Vision and hearing; VIII Vocal communication; IX Maladaptive behaviour which includes (a) physical aggression, (b) destructiveness, (c) overactivity, (d) attention seeking behaviour, (e) self-injury, (f) wandering, (g) screaming and other noises, (h) temper tantrum, (i) disturbing others at night, (j) objectionable personal habits, (k) throwing objects aimlessly, (l) antisocial behaviour and (m) sexual delinquency; X Co-operation; XI Psychiatric and physical condition (this includes subsections such as mood, irritability, chronic physical illness, and various psychiatric illnesses); XII Social relationship; XIII Social interaction; XIV Stereotyped behaviour; and XV Echolalia.

Sections of the PAA used in our study were scored on a ranked scale. The PAA is an observer-rated scale. The informant was either a senior member of the ward nursing staff or, in the case of the community-based population, a relative or carer who had known the patient for at least three years. Each of the 13 maladaptive behaviour subscales was rated on a sliding scale of 1 to 6. A score between 1 and 3 signified severe problem and between 4 and 6 signified mild to no problem in each behaviour category. Each person was then rated according to the number of maladaptive behaviour subscales on which they scored severe rating (i.e. 1 to 3). Each person could, therefore, score between 0 and 13 on 'severe behaviour' rating.

Data were analysed by computer using the SPSSX package. Variables among the epileptic population were compared with the matched control group using the Wilcoxon matched pairs signed rank test (2-tailed), Mann–Whitney (2-tailed) or χ^2 (after Yates' correction) and Fisher's exact probability test, where appropriate.

Results

The epileptic group contained 77 men and 73 women. Mild mental handicap was diagnosed in 49, 26 were moderately handicapped, and 75 were severely handicapped. The mean age was 40 years (s.d. 13 years) with a range of 20–77 years. Those aged below 40 years numbered 83; 67 were over

DEB AND HUNTER

the age of 40. In the hospital there was a significantly higher proportion of severely handicapped people ($\chi^2 = 15.87$, d.f. 1, P < 0.001) and older age group (Z = -4.075, P < 0.001) compared with the community population, but no such difference emerged in the distribution of sex.

No statistically significant difference emerged between the epileptic and the non-epileptic group when the variables used for matching the two groups were compared. The number of male, female and the different categories of mental handicap (i.e. mild, moderate, severe) remained the same in both groups.

Both groups had a mean age of 40 years (s.d. 13 years). Results of some of the comparisons between the groups are as follows: vision (Z = -1.61, P = 0.108), hearing (Z = -0.27, P = 0.788), speech (Z = -1.17, P = 0.243), chronic physical illness (Z = -0.63, P = 0.526).

There were 92 'active' epileptics and 58 'non-active' epileptics. Eighty-four patients sustained one type of seizure, 39 suffered from more than one type of seizure, and in 27 cases the seizure type remained unclear. Description of seizures is given in Table 1. In 84 patients the age of onset of epilepsy was between one and nine years of age, in 31 cases after nine years, and in 35 cases it was unknown. There were 78 people who had suffered from epilepsy for more than 20 years and 37 for less than 20 years. In 35 cases the duration of epilepsy was unknown. Of 92 'active' epileptics, 35 suffered from 'less frequent' and 56 suffered from 'frequent' fits. In one case, the frequency of fits was unclear.

Only nine of 100 EEG recordings were normal, 48 showed only excessive slow background activity whereas the remaining 43 showed some type of epileptiform activity with or without slow background activity. Of 43 with epileptiform activities, 12 had shown bilateral, diffuse, generalised activities (including 3 Hz abnormality), 18 had shown focal activities in the temporal region (five left sided, four right sided and nine bilateral) and the remaining 13 had shown both focal temporal and generalised epileptiform activities.

Table 1 Number of mentally handicapped people suffering from different types of epilepsy

Epilepsy type	Total (<i>n</i> = 150)	Hospital based (n = 100)	Community based (n = 50)
Generalised			
tonic-clonic	102 (83%)	73	29
Absence	23 (19%)	15	8
Complex absence	3 (2%)	0	3
Tonic	11 (9%)	9	2
Atonic	3 (2%)	1	2
Myoclonic	10 (8%)	6	4
Complex partial	17 (14%)	11	6
Secondarily			
generalised	13 (11%)	11	2
Generalised			
seizure only	98 (65%)	67	31
Partial seizure or secondarily generalised			
seizure only	25 (17%)	17	8

The majority of the epileptic patients (n = 139) received anticonvulsant medication. Of these, 87 received monopharmacy and 52 received polypharmacy of anticonvulsant medications. Of the patients who received monopharmacy, 56 were on carbamazepine, 16 on sodium valproate, 10 on phenobarbitone, four on phenytoin and only one on ethosustimide.

In most of the cases, cause of mental handicap was unknown (76 epileptics, 99 non-epileptics). Causes were divided into (a) Chromosomal (Down's syndrome, trisomy 18, XXY syndrome) (4 epileptics, 19 non-epileptics); (b) Prenatal (toxaemia of pregnancy, congenital rubella, cytomegalovirus infection, epiloia, moebius syndrome, deLange syndrome, phenylketoneuria, hypoprolinaemia) (12 epileptics, 6 non-epileptics); (c) Perinatal (perinatal injury) (29 epileptics, 21 non-epileptics); (d) Post-natal (cerebral infection and head injury) (29 epileptics, 5 nonepileptics). There was significantly higher proportion of chromosomal abnormalities in the non-epileptic group ($\chi^2 = 9.229$, d.f. 1, P < 0.01) and significantly higher postnatal abnormalities in the epileptic group ($\chi^2 = 17.547$, d.f. 1, P < 0.001).

No statistically significant difference was detected on any of the ratings of the PAA when the whole epileptic group (n = 150) was compared with the whole non-epileptic control group (n = 150) or when segregated into in-patient controls or community controls. When active epileptics (n = 92) were compared on PAA ratings with the non-epileptic control group (n = 92), statistically significant differences were found on two variables: co-operation and echolalia. The epileptic group was less co-operative (Z = -2.21, P = 0.027)and more echolalic (Z = -2.36, P = 0.018) than the nonepileptic group. No statistically significant difference was found when non-active epileptics (n = 58) were compared with their matched control non-epileptic counterpart.

No statistically significant difference was found when the epileptic group (n = 150) was compared with the non-epileptic group (n = 150) for 'severe behaviour' ratings on the maladaptive behaviour subscales of PAA although a slightly higher percentage of epileptic patients (58%) had severe behaviour ratings as compared with the matched control non-epileptics (52.7%). In a minority of cases there was evidence of exacerbation of interictal behaviour problems in peri-ictal phases. Of the total population (n = 300), 55.3% had severe behaviour rating on any of the maladaptive behaviour subsections of PAA.

Patients with mental handicap and epilepsy were further subdivided according to sex, age, IQ, seizure type, age of onset of epilepsy, duration of epilepsy, severity of epilepsy, EEG type and the different types of anticonvulsant medication taken. These subgroups were compared with their corresponding control group of non-epileptic patients for different aspects of maladaptive behaviour and the significant findings are shown in Table 2.

When different subgroups of in-patient epileptics were each compared with their non-epileptic matched control group, they showed significant difference in behaviour problems in the following subgroups: (a) less aggression in the single seizure groups (n = 58), (b) less aggression and irritability in the EEG group who had shown only slow background wave (n = 33), (c) more irritability in the EEG

PSYCHOPATHOLOGY IN MENTAL HANDICAP AND EPILEPSY: I

Table 2

Results of statistically significant differences between the two groups in maladaptive behaviour (EP = Epileptic group, NEP = Non-epileptic group)

Group n		Behaviour	Wilcoxon test		
			Ζ	2-tailed P	
Severely mentally handicapped	75	EP less aggressive than NEP	- 1.97	0.049	
Single type seizure	84	EP less aggressive than NEP	- 2.29	0.022	
Only slow background EEG activity	48	EP less aggressive than NEP	- 2.53	0.011	
, , ,		EP less overactive than NEP	- 2.01	0.044	
Only generalised epileptiform EEG activity	12	EP more temper tantrum than NEP	- 2.47	0.013	
		EP more irritable than NEP	- 2,42	0.016	
Monopharmacy	87	EP less aggressive than NEP	-2.10	0.035	
Carbamazepine monopharmacy alone	56	EP less aggressive than NEP	- 2.49	0.013	

group who had shown generalised epileptiform activity (n=10), (d) less aggression in the monopharmacy group (n=65) and the carbamazepine only group (n=48).

When different subgroups of community-based epileptic patients were each compared with their non-epileptic matched control group, they showed significantly more behaviour problems in the following subgroups: (a) more destructiveness and irritability in the mild mental handicap group (n = 37), (b) more aggression, destructiveness, self-injury and irritability in the group whose duration of epilepsy was less than 20 years (n = 15), (c) more self-injury in the group who suffered from multiple seizures (n = 12), (d) more self-injury in those who suffered from frequent seizures (n = 20).

Discussion

The overall findings of our study support the idea that in spite of widely held beliefs that epileptics as a group show more aggression and behaviour problems, scientific evidence is lacking. Previous studies have failed to match appropriate controls. In this study we have been able to match two groups according to variables which could have effects on a person's behaviour.

In our epileptic population, contrary to the expected preponderance of males, we found an almost equal sex ratio. Although the overall ratio between severe mental handicap and mild to moderate mental handicap remained the same, among inpatient epileptics there were more severely handicapped people and among the community population the reverse was the case. In the overall group of epileptics, slightly more than half were below the age of 40, whereas the community-based epileptics remained mainly young - two-thirds were under 40. However, there was a slightly higher number of elderly patients (over 40) among the in-patient epileptics; this is in keeping with the findings of Corbett's Camberwell Study (1981). As expected, the vast majority of the epileptics had onset of seizures before the age of nine.

The majority of the epileptics had suffered from epilepsy for 20 years or more. In the cases where the frequency of epilepsy was known, roughly one-third suffered from infrequent seizures. Although the majority were having regular fits, a high proportion had not had any fits in the previous 12 months.

The majority of the epileptics sustained only one seizure type while less than half that number sustained multiple seizure type, supporting the previous finding of Corbett (1981) that mentally handicapped epileptics often suffer from more than one type of seizure. The epileptics suffered from all types of seizures, the vast majority being generalised tonic-clonic seizures. Complex partial seizure was quite common among the epileptics. Absence seizure, myoclonus and secondarily generalised seizures were equally common.

The distribution of various types of fits was similar in in-patient and community epileptics. There was a higher proportion of generalised tonic-clonic seizures and secondarily generalised seizures among the in-patients. No complex absences occurred in the in-patients while a very few occurred in the community. Simple partial seizures are difficult to diagnose in mentally handicapped people and may have been underestimated. Only a very few epileptics had normal EEG. A high proportion of abnormal slow background activities could be explained either by the underlying brain damage or the effect of medication. In spite of the high proportion of clinically diagnosed generalised tonic-clonic fits, only a few had shown equivalent EEG changes; on the other hand, although a high proportion had shown focal changes in the EEG recording, only a minority had suffered from partial and secondarily generalised fits. The reason for this may be the difficulty of diagnosing focal fits in mentally handicapped people; equally some of the generalised fits are possibly secondarily generalised.

The use of anticonvulsant medications reflects the modern trend towards monopharmacy. Barbiturates

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are in little use now because of their long-term sideeffects. The high usage of carbamazepine may reflect the personal choice of the doctor, local trends or an attempt to treat epilepsy as well as stabilise mood in the same patient.

The high proportion of chromosomal abnormalities among the non-epileptics could be explained by the absence of epilepsy in young Down's syndrome patients. On the other hand, the high proportion of prenatal and postnatal abnormalities in the epileptic group is due to high prevalence of epilepsy in patients with tuberose sclerosis and other forms of gross brain damage.

Our findings of few significant differences in problem behaviour between the groups are in keeping with some previous studies where a matched control group was used (Corbett, 1981; Deb et al, 1987; Espie et al, 1989; Gilles et al, 1989). However, it is in contrast with older studies (Eyman et al, 1969; Capes & Moore, 1970) where no adequately matched control group was used. Comparison of the subgroups of epileptics revealed that where underlying brain damage is a predominant factor (i.e. severe mental handicap and slow wave in EEG activity) epileptics showed less problem behaviour than non-epileptics. Conversely, where the influence of underlying brain damage is weak and epileptic factors are strong (i.e. mild mental handicap group, multiple type of fits, frequent fits, generalised epileptiform activity in EEG) epileptics showed more problem behaviour than non-epileptics. Monopharmacy, particularly carbamazepine, seemed to have some protective effect from problem behaviour. It is worth emphasising that a high proportion of the epileptics in our study were treated with carbamazepine which has less behavioural side-effects and in some cases may have had mood stabilising effect (Trimble & Corbett, 1980). Among the community population, the finding that epileptics with less seizure duration showed more problem behaviour than non-epileptics is puzzling; however, this could be the result of the small number. It is also important to keep in mind that some of the positive statistical results in the subgroups may have originated purely by chance.

Overwhelmingly, this study demonstrates little difference in problem behaviour between mentally handicapped individuals with and without epilepsy. Although our study primarily concentrated on interictal behaviour, it is worth remembering that some authors argued against the validity of the definition of interictal state. Hermann & Whitman (1984) emphasised that the interictal period is anything but a quiescent state and there are significant variations both between and within patients in brain electrical activities during that period. The effect of this variation of brain electrical activities on behaviour is unknown. Also the patients who suffered from very frequent seizures had a nonsignificant interictal period.

In the community population, significantly more destructiveness and irritability in the mild to moderately handicapped epileptic patients may highlight the role of psychosocial factors in causing psychopathology in epileptic patients, the influence of which is less prominent in severely handicapped epileptics who live in hospital.

Acknowledgement and references are given at the end of Part III

British Journal of Psychiatry (1991), 159, 826-830

Psychopathology of People with Mental Handicap and Epilepsy II: Psychiatric Illness

S. DEB and DAVID HUNTER

The prevalence of psychiatric illness was studied in 150 epileptic mentally handicapped people (both hospital in-patients and living in the community) and a matched group of 150 non-epileptic controls. The Profile of Abilities and Adjustment (PAA) scale was used for the initial screening of psychiatric illness. Mildly to moderately handicapped individuals who had good communication

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skills and scored positively on the PAA schedule for psychiatric illness were interviewed using the PSE interview schedule. Severely mentally handicapped individuals who scored positively on the PAA's psychiatric illness subscale were observed and information was gathered from their medical notes and carers. A psychiatric diagnosis was made using DSM-III-R criteria. The non-epileptic group showed significantly more psychiatric illness than the epileptic group. Psychiatric illness was diagnosed in 25% of the cohort.

The relationship between epilepsy and psychiatric illness remains unclear. Many studies have found it difficult to distinguish between chronic interictal symptoms and peri-ictal psychological symptoms, or have failed to differentiate between personality disorders and other psychiatric illness. The cohort in many previous studies has been selective or biased, and only a few studies have used matched control groups. Psychiatric symptoms have been examined in general terms rather than in terms of specific psychiatric syndromes. Even when the psychiatric syndromes have been studied, many different diagnostic criteria have been used. So far, some association between epilepsy and increased general psychopathology has emerged. The widely quoted study of Slater et al (1963), in which an increased rate of schizophrenia-like psychosis was reported among patients with temporal lobe epilepsy (TLE), was based on a highly selected population. Since then, studies have shown an association between TLE and psychosis (Guerrant et al, 1962; Stevens, 1966; Flor-Henry, 1969; Shukla et al, 1979; Perez & Trimble, 1980) although this was not confirmed by others (Small et al, 1962; Stevens, 1980; Hermann et al, 1981; Ramani & Gumnit, 1981). Bipolar manic-depressive psychosis, however, does not seem to be associated with epilepsy (Bruens, 1971; Toone et al, 1982). Two recent studies have found an increased prevalence of depressive illness among community-based epileptic patients. Robertson & Trimble (1983) found more non-endogenous depression in the epileptic population.

Because of the associated problems of diagnosing mental illness in the mentally handicapped population, the actual prevalence figure varies enormously from one study to another. Most estimates of the prevalence of serious psychiatric disorder, including both the personality disorders and psychoses, range from 8% to 15%. When the minor emotional problems are included, estimates soar well above 50%. Estimates of neurotic illness among mentally handicapped people fall somewhere between 4% and 50% (Parsons *et al*, 1984).

Psychiatric illness in the mentally handicapped adult epileptic population has been incompletely studied. In a Danish population study, Lund (1985) found that 52% of mentally handicapped persons with seizures in the past year suffered from psychiatric illness, compared with 26% of those without seizures – a statistically significant difference. However, Lund failed to use a matched control group. Autism and behaviour disorder were included in the diagnosis of psychiatric illness.

Against this background we compared a group of mentally handicapped epileptics in hospital and in the community with a carefully matched control group of non-epileptic mentally handicapped people for the prevalence of psychiatric illness.

Method

A group of 150 mentally handicapped epileptic patients (100 from hospital and 50 from the community) were studied along with a matched control group of non-epileptic mentally handicapped people from the same hospital and the same community. Matching was undertaken according to the age, sex, level of intelligence, communication, sensory deficit, length of institutionalisation; type of living environment and the severity of associated chronic physical illness. (A detailed description of the study population is given in paper 1.)

Section XI of the PAA (Psychiatric and physical conditions) was used as an initial screening instrument. Those who scored positively on any of the subsections of psychiatric conditions were selected for further study. The medical case records of these patients were scrutinised. Those with mild or moderate mental handicap were interviewed by one author (SD), following the interview structure of the Present State Examination (Wing *et al*, 1974) (the computerised diagnostic system CATEGO was not used). Those with severe mental handicap were observed for 20 minutes. Finally, a psychiatric diagnosis was made according to DSM-III-R diagnostic criteria (American Psychiatric Association, 1987).

Some severely handicapped people who had sustained periodic behaviour change with or without associated mood change had a diagnosis of "cyclical behaviour and/or mood change". Because of the lack of specific psychiatric symptoms, these patients could not be classified according to the DSM-III-R. A diagnosis of obsessive-compulsive disorder was made, not merely on the basis of presence of ritualistic behaviour, but on the basis of DSM-III-R criteria, although, in some patients, there was no evidence of personal distress and overt resistance to the performed act could not be detected. Mood disturbance and irritability were measured and compared between the groups. Psychiatric illnesses

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were regrouped into (a) total psychiatric illness (presence of any of the psychiatric illness categories), (b) psychotic illness (presence of either cyclical behaviour and/or mood change, or major depression, or bipolar disorder, or schizophrenia, or delusional disorder), (c) neurotic illness (hypochondriasis, anxiety, obsessive-compulsive or phobic disorder).

An attempt had been made to reach a diagnosis of pervasive developmental disorder by using sections XIII, XIV and XV of the PAA schedule (personal communication with Dr Lorna Wing). A diagnosis of pervasive developmental disorder was made in 16 epileptic and 17 nonepileptic patients. These data were not further analysed for the following reasons: (a) the small number of patients in this diagnostic category, (b) similar number of patients in both epileptic and non-epileptic groups, (c) an inability to obtain adequate developmental history on these patients, and (d) the questionable validity of this diagnosis in an adult population.

Data were analysed with the SPSSX computer package using χ^2 (after Yates' correction) and Fisher's exact probability test, where appropriate.

Results

According to the PAA scale, five epileptics and eight nonepileptics showed flat or unhappy mood, 67 epileptics and 55 non-epileptics showed changeable mood, and 78 epileptics as opposed to 87 non-epileptics had normal happy mood. Of all the in-patients (n = 200) only seven showed flat or unhappy mood whereas six out of all the communitybased patients (n = 100) had such mood abnormality. Changeable mood was shown by 103 in-patients compared with only 19 community-based patients. There were 90 inpatients and 75 community-based patients with normal happy mood. Mood changes varied between within minutes, within hours and within days. The distribution of various psychiatric illnesses in different groups is shown in Table 1. Epileptics showed more schizophrenia and delusional disorder (no such diagnosis among non-epileptics), whereas non-epileptics had more affective disorder (no bipolar disorder among epileptics).

The non-epileptic group showed more psychiatric illness than the epileptic group ($\chi^2 = 4.036$, d.f. 1, P < 0.05). The significant results of the comparison between different subgroups of epileptic mentally handicapped people and their matched controls are shown in Table 2.

The non-epileptic male population had more psychiatric illness than the male epileptic population. Among those aged over 40, non-epileptics had more overall psychiatric illness than epileptics. Among the in-patient group, although the non-epileptic population had more total psychiatric illness than the epileptic group, this failed to reach statistical significance. Among the under-40 age group, while non-epileptics had more psychiatric illness than epileptics, this also failed to reach statistical significance.

Of the younger age group (below 40 years), 20% suffered from psychiatric illness as opposed to 34% of elderly people (over 40 years) (χ^2 = 11.24, d.f. 1, P < 0.001). Of the younger group, 6% and of the older group, 14.5%, suffered from psychotic illness. Nearly 10% of the younger group and 14.9% of the older group suffered from neurotic illness, although the difference was not significant.

Nearly 25% of the total population had had a diagnosis of psychiatric illness (including a past history), 9% had a diagnosis of psychosis and 12% had a diagnosis of neurosis.

Of the total male population, 22% suffered from psychiatric illness, compared with 27% of the total females. The distribution of psychotic and neurotic illness between the two sexes was similar.

In comparing psychiatric disorders in individuals with varying degrees of handicap, 32% of those with mild to moderate handicap suffered from psychiatric illness,

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Distribution of various p	sychiatric ill	Inesses in t	the d	different	group

Psychiatric illness	Epilep (n =	ntics (%) = 150)	Non- (%)	epileptics (n = 150)	Hospital in- patients (n = 200)	Community patients (n = 100)	
Cyclical behaviour and/or mood change	6	(4)	6	(4)	8	4	
History of psychiatric illness	0		5	(3.33)	2	3	
Major depression	1	(0.66)	4	(2.66)	2	3	
Bipolar disorder	0		6	(4)*	6	0	
Schizophrenia	2	(1.33)	0		1	1	
Delusional disorder	2	(1.33)	0		2	0	
Dementia	3	(2)	4	(2.66)	4	3	
Generalised anxiety disorder	1	(0.66)	0		1	0	
Hypochondriasis	7	(4,66)	8	(5.33)	13	2	
Obsessive-compulsive disorder	2	(1.33)	4	(2.66)	5	1	
Simple phobia	5	(3.33)	10	(6.66)	11	4	
Group							
Total psychiatric illness	29 (19.33)	47	(31.33)*	55	21	
Psychotic illness	11	(7.33)	16	(10.66)	19	8	
Neurotic illness	15 (10)	22	(14.66)	30	7	

*P<0.05.

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Table 2

Statistically significant difference between the subgroups of the epileptic group and the matched control non-epileptic group (NEP=Non-epileptic, EP=Epileptic)

Subgroups	Direction of difference	χ²	d.f.	P=
 Total psychiatric illness				
Male	NEP more than EP	4.567	1	0.032
Age over 40 years	NEP more than EP	4.005	1	0.045
Active epilepsy	NEP more than EP	5.048	1	0.025
Single type fit	NEP more than EP	3.956	1	0.047
Focal change in EEG	NEP more than EP	4.128	1	0.042
Age of onset of epilepsy before 9 years	NEP more than EP	8.001	1	0.004
Duration of epilepsy for less than 19 years	EP more than NEP	6.649	1	0.009
Duration of epilepsy for more than 19 years	NEP more than EP	19.057	1	0.000
Frequent fits	NEP more than EP	5.149	1	0.023
Epileptics on polypharmacy	NEP more than EP	6.976	1	0.008
Neurotic illness	NFP more than FP	4 699	1	0.030

compared with 17% of those severely handicapped $(\chi^2 = 7.91, \text{ d.f. }1, P < 0.01)$. Nearly 15% of those with mild to moderate handicap, and 5.6% of those with severe handicap, suffered from psychotic illness $(\chi^2 = 4.07, \text{ d.f. }1, P < 0.05)$. Nearly 15% of those with mild to moderate handicap and 9.3% of those with severe handicap had suffered from a neurotic illness, although the difference was not significant.

Among the in-patient group, 27% suffered from psychiatric illness compared with 20% of the communitybased population. A similar number of each group had sustained a psychotic illness, whereas 14.5% of the inpatients and 7% of the community population had suffered from a neurotic illness. However, there was no statistical difference between the two groups.

One mentally handicapped epileptic person with autoscopic symptoms has previously been reported (Collacott & Deb, 1989), and was classified as having delusional disorder.

The epileptic patients who had a 'severe behaviour' rating also had significantly higher psychiatric illness. Among the non-epileptic patients the trend was in the same direction but failed to reach a level of statistical significance.

Discussion

Despite the theoretical prejudice held by some American authors (Himmelhoch, 1979) that there are 'dysthymic' subictal mood disorders, our study failed to show a higher rate of mood disorders in the epileptic population than in the non-epileptic control group. Changeable mood was common (41%) in the total mentally handicapped population studied. The in-patient population showed a significantly higher rate of changeable mood than the community-based population. This may reflect reporting bias by the hospital nursing staff. At times hospital staff reported mood change when there was a change from normal happy mood to irritability sometimes leading to aggression, whereas for community-based patients. families tended to report changeable mood only when the change was from happy to unhappy or abnormally happy. It is also possible that changeable mood deterred rehabilitation of the in-patients and may have precipitated hospital admission in the first place. It is worth noting that the in-patient and community groups were not matched. Epileptics as a group showed a higher rate of changeable mood although this failed to reach a level of statistical significance. It is possible that some who had shown a changeable mood may have suffered from rapid cycling affective disorder; however, owing to a lack of well-defined criteria for such diagnosis in mentally handicapped populations, they were not classified as such.

In 1935, von Meduna first put forward his hypothesis of 'biological antagonism'. In discussing the relationship between epilepsy and schizophrenia, he said, "Between the two diseases there is an antagonism so striking that it cannot only be accidental". Indeed, following this hypothesis, intramuscular camphor-induced seizures (and in recent times electroconvulsive therapies) have been successfully used in treating psychiatric illness. Since before 1935, many have written both for and against the antagonism theory. The findings of our study, showing a higher rate of psychiatric illness among the non-epileptic population, are therefore of considerable interest.

The comparison of the subgroups in our study shows that in those where the epileptic factor is stronger (i.e. active epilepsy, an earlier age of onset, a longer duration of epilepsy and frequent fits) there is less psychiatric illness. Where the epileptic factor is weaker, as in the group with a shorter duration of epilepsy, the epileptics had more psychiatric illness.

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These findings have to be interpreted with caution. Findings of the comparison in the subgroups may have simply reflected the findings in the overall group. They could also be chance findings, and in some cases the number in each group was very small. It is possible that psychosocial factors played a less influential role in causing mental illness in the mentally handicapped population although this was not supported by the findings of comparisons of epileptics and non-epileptics in different IQ groups. Anticonvulsant medication may also have a more tranquillising effect on our studied population because of the associated underlying brain damage.

Compared with the community-based population, in-patients showed a higher rate of psychiatric illness, including both psychoses and neuroses. However, this failed to reach a statistically significant level.

The difference in the rate of psychiatric illness between age groups is interesting. The older group had more psychiatric illness than the younger group (both psychoses and neuroses) although this failed to reach a significant level, which may be explained by the inclusion of dementia as a diagnostic category.

As expected, mildly to moderately mentally

Acknowledgement and references are cited at the end of paper III.

psychiatric and psychotic illness than those with severe mental handicap: this may reflect the difficulty of diagnosing psychiatric illness in the severely mentally handicapped. Although this is not a population study, the

handicapped people showed significantly more

prevalence figures of total psychiatric illness, psychotic illness and neurotic illness in the total mentally handicapped population are in keeping with previous studies (Menolascino, 1970). Lund (1985) quoted a higher prevalence figure of psychiatric illness possibly because he included autism and behaviour disturbance.

The diagnosis of psychiatric illnesses in mentally handicapped people remains problematic. Our inclusion of 'cyclical behaviour and/or mood change' as a psychiatric diagnostic category will raise particular controversy. Had some of these patients been able to communicate, they might have presented features diagnostic of depressive disorder. However, in the absence of such a definitive clinical picture, we decided to use this descriptive terminology, following Rutter & Graham's (1968) broad definition of psychiatric disorder. Further thorough and careful research is needed to test the hypothesis raised by this study.

British Journal of Psychiatry (1991), 159, 830-834

Psychopathology of People with Mental Handicap and Epilepsy III: Personality Disorder

S. DEB and DAVID HUNTER

A group of 75 mildly to moderately mentally handicapped people with epilepsy, resident in both a hospital and the community, were studied together with an individually matched control group of non-epileptic patients. Their carers were interviewed to gather information for two observer-rated personality questionnaires, the Standardised Assessment of Personality (SAP) and the T-L Personality Behaviour Inventory. The two groups were compared with respect to the prevalence rates of various personalities. An abnormal personality score according to the SAP schedule was reported in 26% (n = 39) of the cohort, of which 28 (18.6% of the cohort) were personality disorders. A diagnosis of SAP abnormal personality was made in 46% of the in-patients and 6.5% of the community-based population. Of the cohort, 15% had an abnormal personality score according to the T-L schedule. No statistically significant difference emerged between the epileptic and the non-epileptic groups in the prevalence of either the SAP or T-L personality.

PSYCHOPATHOLOGY IN MENTAL HANDICAP AND EPILEPSY: III

The belief that personality disorder is more common among epileptic individuals than non-epileptics appears to be based more on anecdotes than scientific proof. The concept of a global 'epileptic personality', held earlier this century, has generally fallen into disfavour. The pendulum has swung from the constitutional concept, via the denial of any mental abnormality (Lennox, 1960) to the contested identification of a specific temporal lobe syndrome (Gibbs, 1951; Geschwind, 1979). A critical review of studies using standardised objective tests, however, has been unable to confirm the position of temporal lobe epilepsy in psychopathology. It appears that patients with epilepsy demonstrate more emotional and psychiatric problems than normal individuals and other medical groups, but not greater than those with other chronic neurological or medical conditions (Klove & Doehring, 1962; Guerrant et al, 1962; Standage & Fenton, 1975; Kogeorgos et al, 1982; Whitman et al, 1984).

Trimble (1983) criticised the use of the Minnesota Multiphasic Personality Inventory (MMPI) as an inappropriate instrument for detecting personality disorder in patients with epilepsy. Noting the shortcomings of the MMPI, Bear & Fedio (1977) developed their own personality inventory. In a controlled study of a small number of patients, Bear & Fedio (1977) found some of the personality types of their rating scale to be associated with temporal lobe epilepsy. Using the Bear & Fedio rating scale, Hermann & Reil (1981) and Neilsen & Kristensen (1981) confirmed their findings, but Mungas (1982) did not.

Because of the inherent difficulties in diagnosing personality disorders in people with mental handicap, they have seldom been identified in psychiatric prevalence studies of the mentally handicapped population (Menolascino, 1970). Studies which attempt to identify personality disorders among mentally handicapped individuals generally report a relatively high rate of such disorders (Parsons *et al*, 1984). Craft (1959) found that schizoid personalities and emotionally unstable personalities were the most frequently observed psychiatric disorders among 324 mentally handicapped in-patients.

It is possible that some who had a diagnosis of schizoid personality disorder were in fact autistic, and others who had a diagnosis of emotionally unstable personalities in fact suffered from rapid mood swings which we found to be very common in our studied population (see paper II).

In a recent study, Reid & Ballinger (1987) used the Standardised Assessment of Personality (SAP) to measure the rate of personality disorders in 100 randomly selected mildly or moderately mentally handicapped adults in an institution. They found 56% of patients showed features of abnormal personality. In 22%, this abnormal personality was sufficiently marked to suggest the presence of a personality disorder. Owing to the difficulty of using client-rated personality questionnaires in mentally handicapped people, we have used two observer-rated personality scales.

Method

A group of 75 mildly to moderately mentally handicapped epileptic adults from both a hospital and the community, together with a matched control group of 75 non-epileptic patients from the same institution and community were studied. The controls were matched by age, sex, level of intelligence, length of institutional stay, degree of sensory impairment, level of chronic physical illness and living environment. (A detailed description of the population studied is given in paper I.)

The SAP schedule was devised by Mann et al (1981) and its inter-rater reliability was found to be good (weighted kappa ranged from 0.60, fair agreement, to 0.85, good agreement). Ballinger & Reid (1987) established the reliability of the SAP in a population of mildly and moderately mentally handicapped adult hospital residents. One author (SD) received training in the use of this scale. The SAP scale is an observer-rated semi-structured interview designed to diagnose either the absence or presence of the following personality traits: self-conscious, schizoid, paranoid, cyclothymic, obsessional, anxious, neurasthenic, aggressive, psychopathic and hysterical. For each trait, two grades are possible - Grade 1 being personality accentuation and Grade 2 being personality disorder. An individual may score on more than one type of personality trait. For practical reasons it was only possible to score the following types: cyclothymic, obsessional, anxious, aggressive and psychopathic.

The T-L Personal Behaviour Inventory was devised to identify abnormal personalities specifically associated with epilepsy (Bear & Fedio, 1977). This scale has both clientrated and informant-rated versions. In the present study, the informant-rated version was used. This version has 18 subsections, each subsection being rated on a nought-tofive point scale. In this study it was only possible to use six subsections: excessive writing tendency, feelings about sex, over-religiosity, lack of sense of humour, interest in detail, and persistence and repetitiveness. It was decided to score a personality type as being present if the individual scored three or more points on any of the six subsections (personal communication with Dr Fedio). More than one personality type could be present in any individual.

The authors are aware that some of the personalities in the above-mentioned T-L personality categories (i.e. persistence and repetitiveness) could be symptomatic of pervasive developmental disorder. An attempt had been made to reach this diagnosis, the result of which is discussed in paper II.

Since the T-L scale has not been used previously with mentally handicapped individuals, an inter-informant reliability test was undertaken. Information was gathered
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from both ward nursing staff and staff from the occupational therapy department on the T-L personality types of 50 hospital residents (both epileptics and non-epileptics). T-L personality scores gathered from two different informants on each resident were then compared using Spearman's correlation coefficient test.

The following T-L personality types demonstrated good inter-informant reliability (P < 0.001); writing tendency, feeling about sex, interest in detail, and persistence. However, insufficient data were available to compare the two groups on the T-L personality types of sense of humour and religious conviction. One author (SD) interviewed a senior nurse from the ward, or a relative or day-centre instructor in the case of community-based patients. Each informant had known the patient for at least three years. Each interview lasted approximately 20 minutes: information gained was used to score both the SAP and the T-L scale.

Data were analysed with the SPSSX computer package using χ^2 (after Yates' correction) and Fisher's exact probability test where appropriate.

Results

Overall, 26% (n = 39) of the total study population (n = 150) showed some abnormality of personality according to SAP; in 18.6% (n = 28) of patients, the abnormality of personality was severe enough to reach a diagnosis of personality disorder. A total of 46% of in-patients, and only 6.5% of the community-based population, had a diagnosis of abnormal personality. In 36% of the in-patient population, the severity of personality abnormality reached a diagnosis of personality disorder. However, only one of the community-based group had a diagnosis of personality disorder. Four persons in the in-patient group had a diagnosis which included two different personality disorders together, while two had a diagnosis of three personality disorders together.

The diagnosis of cyclothymic personality was absent in the younger group (below 40) and the community-based population, whereas about 8% of the older group (over 40) and a similar percentage of the in-patients had this diagnosis. No-one in the younger age group had a diagnosis of obsessional personality. Although almost all types of abnormal personalities were more prominent in the inpatient population, aggressive personality disorder reached a highly significant proportion compared with the communitybased population. Two epileptics and two non-epileptics had a diagnosis of two personality disorders together. One epileptic and one non-epileptic patient had a diagnosis of three personality disorders together. There was no overall difference in the prevalence of personality disorders either between the sexes or between age groups.

The distribution of the SAP personalities is shown in Table 1. Among the epileptics (n = 75) and also the in-patient group (n = 76), 15 had a diagnosis of T-L personality disorder. Of these, eight had one personality type, four had two and three had three personality types together, and six had a diagnosis of 'persistence and repetitiveness' type. Similarly, among the non-epileptic group (n = 75), and in the community group (n = 74), eight had a T-L personality disorder. Of these, five had only one type, two had two

Table 1
Distribution of different types of personalities according to
SAP scale

SAP personalities	Epileptics (n = 75)	Non- epileptics (n = 75)	In- patients (n = 76)	Community- based patients (n = 74)
Disorder only				
cyclothymic	1	1	2	0
obsessional	1	0	1	0
anxious	0	2	2	0
aggressive	8	6	13	1
psychopathic	0	1	1	0
Accentuation only	,			
cyclothymic	0	0	0	0
obsessional	1	0	1	0
anxious	0	1	0	1
aggressive	5	1	5	1
psychopathic	0	1	1	0
All aggressive				
disorders	17	12	26	3*
Total personality				
disorders only	13	12	24	1*
Total abnormal				
personality	20	19	34	5*

*P<0.001.

types, one had three types together and three had a diagnosis of 'persistence and repetitiveness' type. There was no statistically significant difference between the groups.

The prevalence of total SAP and T-L personality among different subgroups of the epileptic mentally handicapped population was compared with that of the control group. No statistically significant difference between the groups in either the total score on the SAP scale or aggressive personality type was found. However, when the scores on the T-L personality types were compared, epileptics had a statistically higher score compared with non-epileptics in the polypharmacy group ($\chi^2 = 6.825$, d.f. 1, P < 0.01), in the polypharmacy group ($\chi^2 = 5.877$, d.f. 1, P < 0.02), and in the 'active' epileptic subgroup ($\chi^2 = 4.444$, d.f. 1, P < 0.05).

Discussion

The classification and diagnosis of personality disorders is controversial, particularly in mentally handicapped people when informant-rated personality inventories must be employed. Within these limitations we have been able to assess personality disorders among mentally handicapped epileptics and compare them with a matched control group. The prevalence of abnormal personality and personality disorder in this study is considerably less than that obtained by Reid & Ballinger (1987). One possible explanation of this is the inclusion of community-based patients in our study (our finding of 46% of abnormal personality among hospital in-patients is comparable PSYCHOPATHOLOGY IN MENTAL HANDICAP AND EPILEPSY: III

with Reid & Ballinger's finding), another explanation being the exclusion of some SAP subcategories in our study, like self-conscious, schizoid, paranoid, neurasthenic, and hysterical, which were included in Reid et al's study. Compared with the hospital population, only 6.5% of abnormal personality among the community-based population supports Reid et al's assumption that personality disorder is a major exclusion criteria for the rehabilitation and integration of mentally handicapped people from hospital to community. The overwhelming majority of abnormality in the overall population was of aggressive type. This formed 19% out of the total of 26% of all personality abnormalities. Our inability to find a significant difference in the prevalence of personality disorders between epileptic and nonepileptic patients is in keeping with Reid et al's finding.

Overall, 15% of the total population had shown T-L personality disorders: of these, 13% were the 'persistence and repetitiveness' type. Both overall T-L personality disorder and persistence type showed higher frequency among epileptics and hospital inpatients compared with non-epileptics and communitybased patients respectively, although it failed to reach statistical significance. The high inter-informant reliability of the T-L personality inventory shows part of this to be a reliable instrument in diagnosing specific personality disorders, but its validity for detecting specific personality syndromes among epileptic individuals remains to be demonstrated.

As mentioned earlier, it is possible that the SAP personality abnormality (such as obsessionality) and the T-L personality abnormality (such as repetitiveness) could be part of the syndrome of pervasive developmental disorder. There was, however, no statistically significant difference in the prevalence of pervasive developmental disorder between the epileptic and the non-epileptic groups.

Although Craft (1959) found a high proportion of schizoid personality in the mental handicap population, we deliberately avoided this diagnostic category because of the considerable controversy which exists regarding this diagnosis among the mentally handicapped. It is believed that many individuals who previously had a diagnosis of either simple schizophrenia or schizoid personality disorder, in fact suffered from pervasive developmental disorder. Additionally, Craft's finding of a very high rate of emotionally unstable personality perhaps reflects a combination of high rate of changeable mood and aggressive personality as found in our study. Our findings failed to support the hypothesis that personality disorder is related to epilepsy in general, or temporal lobe epilepsy in particular

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among the mentally handicapped population studied. The presence of significantly more T-L personality

traits in some of the subgroups of epileptic patients is of interest and would need further careful research.

Acknowledgements

We are grateful to all the mentally handicapped people, their carers We are grateful to all the mentally handcapped people, their carers and staff who kindly took part in the study, to Professors G. W. Fenton and J. Corbett, and Drs L. Wing and M. R. Trimble for their valuable advice, and to Mrs Jeanette Forbes for patiently typing the manuscript. Our special thanks to the nursing staff of Leicester Frith Hospital and Dr R. A. Collacott for their continuing help and support.

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HUMAN PSYCHOPHARMACOLOGY, VOL. 7, 129–134 (1992)

The Effect of Anticonvulsant Medication on the Psychopathology of Adults with a Mental Handicap and Epilepsy

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vifferent aspects of anticonvulsant treatment and psychopathology were studied in a group of 150 adult epileptic ientally handicapped patients and compared with a matched control group of 150 adult non-epileptic mentally andicapped people. Patients were collected from both hospital and community. Most epileptic patients received ionopharmacy of the modern generation of anticonvulsants within the British National Formulary recommended osage schedule. Most had their serum anticonvulsant level within the local laboratory reference range. Anticonvulints other than sodium valproate lowered serum folate level. In general there was no direct relationship with ticonvulsant medication and psychopathology, although carbamazepine monopharmacy showed some protective fect on aggressive behaviour.

3Y WORDS-Mental handicap, anticonvulsant medication, psychopathology.

NTRODUCTION

nticonvulsants are commonly prescribed drugs r mentally handicapped people because of the gh prevalence of epilepsy in this population. Thile the effect of anticonvulsant medication on e cognition and behaviour of a non-handicapped opulation has been studied to some extent, little known about the effect of anticonvulsants on e behaviour of mentally handicapped people rimble and Reynolds, 1976; Trimble and Corstt, 1980; Thompson and Trimble, 1982).

Fishbachar (1982) in a prospective study of 36 entally handicapped patients demonstrated not ily a positive relationship between a reduction

polypharmacy and a reduction of seizureequency but also an improvement of behaviour. the advantages of monopharmacy of anticonvulint treatment over polypharmacy are now well cognised; indeed Richens and Houghton (1974) mmented on the 'therapeutic dilemma' of tempting to control frequent seizures by drug erapy which may have a considerable effect upon e social functioning and behaviour of individuals t fail to control adequately the epilepsy for which ey are prescribed.

Anticonvulsant toxicity can be classified as

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hypersensitive in nature, acute (dose related) toxic effect of encephalopathic type or chronic toxic effects. Both acute and chronic toxic effects may manifest in subtle and unusual forms in mentally handicapped patients; compounded by the fact that many mentally handicapped individuals find expressing symptoms difficult, close and constant monitoring of mentally handicapped individuals receiving anticonvulsant medication is mandatory.

Although most toxic effects of anticonvulsant treatment were attributed to high serum levels, cases have been demonstrated where these sideeffects were found in patients whose serum anticonvulsant level were within the so-called therapeutic range (Reynolds and Travers, 1974).

Many factors can affect psychopathology of individuals with a mental handicap and epilepsy. These factors include, age, sex, level of handicap, environment (hospital vs. community), type of seizure, frequency of seizure, age of onset and duration of seizure, type of EEG abnormality, types, dosage and serum level of anticonvulsant medications etc. The relative effect of each of these factors on psychopathology is difficult to determine. However, the influence of each factor can be studied separately. In this paper, the particular effect of anticonvulsant factors (eg, type, dose, serum level, etc), on the psychopathology has been studied. The relative influence of the other factors on the psycho-

Accepted 17 February 1992

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pathology of the same population had been described elsewhere (Deb and Hunter, 1991).

METHOD

A cohort of three hundred mentally handicapped adults from hospital and community were studied. Half of the cohort (n = 150) suffered from epilepsy and the other half (n = 150) who did not have a history of epilepsy, acted as an individually matched control group. Epilepsy was defined according to Gunn and Fenton's (1969) operational criteria of at least three epileptic seizures in the last two years, or if before that time, patients were still receiving anticonvulsant medication. All, except the profoundly handicapped individuals from the two hospitals in Leicester for the mentally handicapped people and from two adult training centres who fulfilled this operational criteria of epilepsy were included.

Ten patients were randomly excluded to get a round figure of 150. The control group was recruited from the same hospitals and the adult training centres. Two groups were matched according to age, sex, level of intelligence, level of communication, sensory impairment, living environment and associated chronic physical illness.

Aspects of psychopathology of the cohort were studied under the headings of (1) maladaptive behaviour (2) psychiatric illness and (3) personality disorder. Maladaptive behaviour was measured by the Profile of Abilities and Adjustment (P.A.A.) Schedule. The P.A.A. is a combination of the Disability Assessment Schedule (D.A.S.) (Holmes et al., 1982) and the Star Profile (Williams, 1982). Holmes et al., (1982) found a good reliability (between 78 per cent and 93 per cent) in the scores on the maladaptive sections of the D.A.S. Maladaptive section had 13 subsections, namely; physical aggression, destructiveness, overactivity, attention seeking behaviour, self-injury, wandering, screaming and other noises, temper tantrum, disturbing others at night, objectionable personal habits, throwing objects aimlessly, anti-social behaviour and sexual delinquency. All the subsections of the maladaptive section of the P.A.A. scale are taken from the D.A.S. Sections of the P.A.A. used in our study were scored on a ranked scale. The P.A.A. is an observer-rated scale, the information for which is either gathered from a senior nurse in the hospital or a carer in case of the community residents who had known the mentally handicapped person for the previous 3 years or more.

Each of the 13 maladaptive behaviour subscales of the P.A.A. was rated on a sliding scale of 1 to 6. A score between 1 and 3 signified severe problem and between 4 and 6 signified mild to no problem in each behaviour category. Each person was then rated according to the number of maladaptive behaviour subscales on which they scored severe rating (ie, 1 to 3). Each person could, therefore, score between 0 and 13 on 'severe maladaptive behaviour' rating.

Section XI of the P.A.A. (psychiatric and physical conditions) was used as an initial screening instrument for the diagnosis of a psychiatric illness. Those individuals with mild to moderate handicap who scored positively on any of the subsections of psychiatric conditions received a standard psychiatric interview by one author (SD). Those individuals with severe handicap who scored positively on the psychiatric condition subsection of the P.A.A. were observed over a period of 30 minutes or more. The medical case records of these individuals were scrutinised and finally a diagnosis was made according to the axis 1 of the DSM III-R criteria (American Psychiatric Association, 1987). A diagnostic category of 'Cyclical behaviour and/ or mood change' was used for those individuals with severe handicap who manifested periodic changes in their behaviour with or without mood change, yet did not fulfil the criteria for any other psychiatric diagnosis according to DSM III-R.

Psychiatric illness was said to be present if an individual had one or more of the following diagnoses: schizophrenia, delusional disorder, major depression, bipolar disorder, obsessive compulsive disorder, hypochondriasis, simple phobia, generalized anxiety disorder, dementia, cyclical behaviour and/or mood change and a history of psychiatric illness (depression or psychosis).

An observer-rated personality questionnaire, Standardized Assessment of Personality (S.A.P.) Scale was used to detect the presence or absence of the following personality disorders in the mild to moderately mentally handicapped adults of the study population: cyclothymic, obsessional, anxious, aggressive and psychopathic (Mann *et al.*, 1981). Inter-rated reliability of S.A.P. was found to be good (weighted kappa ranged between 0.60 to 0.85). Ballinger and Reid (1987) established the reliability of the S.A.P. in a resident hospital population of adults with mild and moderate mental handicap.

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S.A.P. is an observer-rated questionnaire and formation for this scale was gathered from either senior member of the ward nursing staff or in se of the community based population, a relative a carer who had known the patient for at least e previous three years.

Information concerning the type and dosage of ticonvulsants was obtained from the medical cords. Serum anticonvulsant levels along with emoglobin, M.C.V. and serum vitamin B12 were easured of most of the epileptic patients who ceived anticonvulsant medication. The serum /els of anticonvulsant drug were estimated proximately twelve hours following the administion of the last dose.

ATISTICS

ata was analysed by computer using the SPSSX ckage. Wilcoxon matched pairs signed rank test tailed), Mann Whitney (2 tailed) or Chi-Square fter Yate's correction) and Fisher's exact probility tests were used wherever appropriate.

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te epileptic group contained 77 males and 73 nales. 75 were severely handicapped (IQ below), 26 moderately handicapped (IQ 49–35), and were mildly handicapped (IQ 70–50). The mean e was 40 years (SD 13 years) with a range of -77 years. Eighty-three were aged below 40 years tereas 67 were aged forty or over.

Of the 150 individuals with epilepsy, the majority = 139) currently received anticonvulsant medica-

tion. Table 1 shows the number of patients receiving different anticonvulsant medication. For the 139 individuals who received anticonvulsant medication, there were altogether 195 anticonvulsant prescriptions. Table 2 shows the number of anticonvulsants in various dose range and local laboratory reference range of serum level.

Table 1. Epileptic patients on different anticonvulsant medication (n = 150)

Drugs	n	%
Phenobarbitone or Phenytoin		
(in combination)	37	24.66
Phenobarbitone (alone)	10	6.66
Phenytoin (alone)	4	2.66
Sodium Valproate (in		
combination)	26	17.33
(alone)	16	10.66
Carbamazepine (in		
combination)	37	24.66
(alone)	56	37.33
Ethosuximide (alone)	1	0.66
Monopharmacy	87	58.00
Polypharmacy	52	34.66
No anticonvulsant	11	7.33

The distribution of haemoglobin concentration, Mean Corpuscular volume (M.C.V.), serum folate and vitamin B12 levels is shown in table 3.

The effect of different anticonvulsants on haemoglobin concentration, M.C.V., and serum folate and vitamin B12 levels was examined. No single anticonvulsant had a statistically significant effect on any of these indices apart from individuals

ble 2. Number of anticonvulsant medications in various range of dose and serum therapeutic level

commended dose age in BNF	Below the reference range	Within the reference range	Above the reference range
enobarbitone	2	23	6
enytoin	3	17	
dium Valproate	1	40	1
rbamazepine	8	- 78	7
midone	1	3	
nosuximide	1	4	
tal	16 (8%)	165 (85%)	14(7%)
erapeutic serum anti-convulsant level		1	
enobarbitone	8	19	4
enytoin	6	11	3
lium Valproate	12	24	6
rbamazepine	9	71	13
midone	2	2	
iosuximide	3	2	
tal		129 (66%)	26 (13%)

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Table 3. Distribution of haemoglobin, M.C.V., serum folate and vitamine B12 levels according to the local laboratory reference range

Investigation	Laboratory Normal range	Below normal range n(%)	Within normal range n(%)	Above normal range n(%)
Haemoglobin	11·5–18·0 g/dl	5 (5)	91 (95)	0
M.C.V.	80–99fl	4 (4)	89 (93)	3 (3)
Serum folate	1·7–10 mg/l	5 (4)	110 (96)	0
Serum vitamin B12	170-800 ng/l	2 (2)	92 (80)	21 (18)

Table 4. Comparison of individuals on monopharmacy (n = 87) and those receiving polypharmacy (n = 52) of anticonvulsant medication

	Mo	ono-	Pc	oly-
	phar	macy	phar	macy
Group	n	(%)	n	(%)
Male	42	(48)	30	(58)
Female	45	(52)	22	(42)
Below 40 years	42	(48)	36	(69)
Over 39 years	45	(52)	16	(31)*
Mild/moderate handicap	43	(49)	27	(52)
Severe handicap	44	(51)	25	(48)
Active epilepsy	48	(55)	44	(85)
Non-active epilepsy	39	(45)	4	(15)†
Frequent seizures	21	(24)	27	(70)
Less frequent seizures	35	(31)	8	(16)†
Single seizure type	52	(78)	26	(54)
Multiple seizure type	15	(22)	22	(46)*
Generalised epilepsy	60	(90)	33	(67)
Partial epilepsy	7	(10)	15	(33)*
EEG: Generalised epileptiform		(1.6)		
activity Focal epileptiform activity	10 15	(16) (29)	16	(22)

* $p < 0.05; \ \dagger p < 0.001$

receiving sodium valproate monopharmacy, who had a significantly higher (p < 0.05) level of serum folate than those receiving monopharmacy of other anticonvulsants collectively.

The total (this included all the anticonvulsants collectively) monopharmacy subgroup of patients whose serum levels was in excess of the local laboratory reference range, had a significantly lower level of serum folate (p < 0.005) compared with those in whom the serum level was within the local laboratory reference range.

When the carbamazepine monopharmacy group was analysed, no direct relationship was observed between the serum level of the drug and the prevalence of various aspects of psychopathology, apart from S.A.P. personality disorder. Personality disorder, according to the S.A.P. scale was found to be more prevalent (p < 0.05) in the group in whom the serum level of carbamazepine was in excess of the local laboratory reference range.

The detailed comparison of those who received monopharmacy (n = 87) and those who received polypharmacy (n = 52) of anticonvulsant medication is made in table 4.

A comparison of the prevalence of various aspects of psychopathology (ie, severe maladaptive behaviour, psychiatric illness, personality disorder) was made between the individuals who received monopharmacy and those who received polypharmacy of anticonvulsants. Twenty-two individuals (26 per cent) of those who received monopharmacy and 5 (10 per cent) of those who received polypharmacy had a diagnosis of a psychiatric illness (p < 0.05). Fifty-nine (68 per cent) of the monopharmacy group and 23 (44 per cent) of the polypharmacy group showed severe maladaptive behaviour. Twenty-four individuals in both groups were shown to have an abnormal personality according to the S.A.P. scale. None of the latten differences were statistically significant.

The subgroups of the epileptic individuals who received polypharmacy, monopharmacy, and the individual monopharmacy groups were compared directly with their counterpart of the control group of non-epileptic individuals for the prevalence o the various mental disorders. The epileptic indivi duals who received polypharmacy showed signifi cantly less psychiatric illness ($\chi^2 = 6.98$; df = 1 p < 0.005) compared to those without epilepsy There was no other statistically significant differ ence in any other comparisons. However, when the scores on the 13 maladaptive behaviour sub sections of the P.A.A. were compared between the various subgroups of the individuals with epileps; and their counterpart of the non-epileptic contrc group, following differences were observed. Th epileptic group who received monopharmac

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Z = -2.49, p = 0.013) and particularly carbamazeine monopharmacy (Z = -2.10, p = 0.035) howed significantly less aggressive behaviour comared to those who did not sustain epilepsy. The pileptic group was further subdivided into hospiilized and the community groups and each was ibsequently subdivided according to the type of nticonvulsants they received. Each epileptic group as then compared with the corresponding control coup. The epileptic individuals, resident in hospi-I showed similar results as to the whole group, that, the monopharmacy group (Z = -2.50,=0.012) and particularly carbamazepine monoharmacy group (Z = -2.52, p = 0.011) showed gnificantly less aggressive behaviour compared to e individuals who did not sustain epilepsy. There as no statistically significant difference in any her inter-group comparisons.

ISCUSSION

is now accepted that the majority of epileptic tients have a normal mental state. In some tients where possible deterioration in mental ite is observed, neuro-epileptic factors, psychosoil factors and drug factors may come into play. If these various factors tend to interact with each her the relative effect of each factor on mental ite of epileptic individuals is difficult to determine eynolds, 1976). It is more difficult to assess the ssible role played by drug factors on the deteriotion of mental state because it is not possible study untreated epileptic patients.

Our study found the prescribing habit in the area s in keeping with modern trend, ie, a majority eived monopharmacy of anticonvulsant medican. There was also a tendency towards the use more modern broad acting anticonvulsants such carbamazepine and sodium valproate. The jority of anticonvulsant drugs were prescribed hin the B.N.F. recommended daily dose and the jority had serum anticonvulsant level within the al laboratory reference range.

Collacott *et al.* (1989) reported on a 4 year proctive study on anticonvulsant medication of 172 ntally handicapped epileptic in-patients of a up of hospitals in Leicester. Overall, a signifit reduction in the use of polypharmacy of antivulsant was achieved. Associated with the uction of polypharmacy was the significant uction of seizure-frequency in some groups, lough in a minority of patients seizure-control uained difficult. There was a significant increase in the use of carbamazepine and a significant decrease in the use of phenobarbitone, sodium valproate, ethosuximide, phenytoin, sulthiame and primidone by the end of the 4 year period. In the current study (many epileptic individuals from this study were included in Collacott *et al.*'s study), the high rate of use of carbamazepine may reflect the personal choice of the doctor or local trends. However, it may also be an attempt to treat epilepsy as well as maladaptive behaviour in the same individuals as described by Trimble and Corbett (1980).

Of 102 epileptic patients studied by Hermann et al. (1990) in a population-based survey, 46 received polypharmacy, 55 monopharmacy, and 1 received no anticonvulsant. Fourteen patients received barbiturates whilst 87 received other anticonvulsants. Of 72 mentally handicapped adults with epilepsy in an institution for people with mental handicap studied by Jamil et al. (1990), 35 received monopharmacy, 28 polypharmacy and 9 no anticonvulsant medication. These are very similar to the findings of the current study. It seems that the proportion of epileptic patients who receive monopharmacy and polypharmacy is very similar in both the mentally handicapped and the normal population, although the portion receiving monopharmacy was higher in the current study.

Sodium valproate monopharmacy was shown not to lower the serum folate level, possibly because of its lack of liver enzyme induction property. This is consistent with the findings of a previous study (Deb et al., 1987). A very small percentage of individuals in this study had a serum folate level below the local laboratory reference range, whilst in the majority, the serum folate level was within the normal range. A low serum folate level has been found between 27 per cent and 91 per cent of individuals receiving anticonvulsant medication in previous studies (Reynolds, 1976). Low levels of serum folate are considered to be associated with polypharmacy, particularly in the presence of phenytoin, and to a lesser extent, phenobarbitone and primidone (Reynolds, 1976). In contrast, the lower serum folate level in a small proportion of the studied population may be explained by the fact that the majority of the studied population received monopharmacy of carbamazepine or sodium valproate.

Results of the current study showed that the anticonvulsant monopharmacy in general, and of carbamazepine in particular, seems to have some protective effect against aggressive behaviour in individuals with a mental handicap and epilepsy. However, this could be a chance finding, although

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this is in keeping with the findings of many previous studies (Trimble and Corbett, 1980). It is also worth bearing in mind that the choice of anticonvulsants may not have been made randomly and carbamazepine may have been the choice of drugs for epileptic patients with associated behavioural disorder. This effect does not appear to be directly related to the serum level. When the polypharmacy group was directly compared with the monopharmacy group they were found to have significantly more active epilepsy, multiple seizure type, frequent seizure, and partial epilepsy amongst them. The polypharmacy group was significantly younger than the monopharmacy group. These findings are similar to those of Sheppard et al. (1987), although it is recognised that these two groups (polypharmacy and monopharmacy) were not matched.

The finding of no direct relationship amongst different anticonvulsants, their dosage, their serum level and psychopathology, suggests that the new generation of anticonvulsants including carbamazepine has less effect on the mental state of individuals with epilepsy. Previous studies have shown higher rates of psychopathology which may be attributed to the behavioural side-effects of the older generation of anticonvulsants, such as phenobarbitone and phenytoin on the mental state (Trimble and Corbett, 1980). Indeed, it is possible that in the current study, some of the epileptic individuals who received carbamazepine were already treated for their mental state.

ACKNOWLEDGEMENT

The authors wish to thank all the patients, their families and staff who took part in the study, Dr. M. R. Trimble and referees for their valuable comment on the earlier manuscript and Miss L. Matheson for secretarial support.

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THE EFFECT OF FOLATE METABOLISM ON THE PSYCHOPATHOLOGY OF ADULTS WITH A LEARNING DISABILITY AND EPILEPSY.

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Summary

Different aspects of psychopathology and folate metabolism were studied in a group of 150 adults with a learning disability and epilepsy and compared with an individually matched control group of 150 adults with a learning disability who did not sustain epileptic seizure. The cohort was collected from both hospital and community. Only 4.45% of those who received anticonvulsant medication had a serum folate level below the normal laboratory reference range. Anticonvulsants other than Sodium Valporate tended to lower serum folate level. There existed an inverse relationship between the serum anticonvulsant levels and serum folate level. When the serum folate level of the adults with epilepsy who had either severe behaviour problems and\or psychiatric illness and\or personality disorder was compared with the adults with epilepsy who had no such disorder, no major significant inter-group difference emerged.

Key words: Learning disability; epilepsy; folate metabolism; psychopathology.

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Introduction

Most anticonvulsant medication, apart from Sodium Valporate, tend to lower folate level (Maxwell et al, 1972; Deb et al, 1987). In patients treated with anticonvulsant medication serum vitamin B12 levels are usually normal except in a few exceptional cases where these may be significantly depressed (Reynolds, 1976).

Low serum folate levels had been shown in psychiatric patients (Carney, 1967, Hallstrom, 1969). Some had also suggested that prolonged drug induced folate deficiency may lead to psychiatric conditions in epileptic patients (Reynolds et al, 1971). This view had been challenged by other authors (Jenson & Olesen, 1970). Ralston et al failed to show any significant effect on aggressive behaviour after a 3 month trial of dietary folate supplement in epileptic patients (Ralston et al, 1970). Weckman & Lehtovaara failed to show any significant difference in CSF folate levels (weckman & Lehtovaara, 1969).

We studied the effect of serum folate level on the psychopathology of mentally handicapped epileptic adults and compared them with a matched control group of nonepileptic mentally handicapped adults to test the

hypothesis that whether or not there is a relationship between serum folate level and psychopathology. <u>Method</u>

One hundred and fifty adult epileptic patients from two hospitals for mentally handicapped people and two day centres were studied along with an individually matched control group of 150 non-epileptic mentally handicapped adults from the same hospitals and day centres. One hundred epileptics came from the hospitals and fifty lived in the community. A similar proportion of the nonepileptics came from the hospital and the community.

Matching was done according to age, sex, level of intelligence as measured by various psychometric tests, speech level, level of sensory impairment, living environment and associated chronic physical illness.

Classification of mental handicap was undertaken according to The Ninth Revision of the International Classification of Diseases (WHO, 1978). Epilepsy was defined according to Gunn and Fenton's (1969) operational criteria of a history of three or more epileptic seizures in the previous two year period or, if before that time, the patients are still on anticonvulsant treatment. Drug related epilepsy and febrile convulsions were excluded.

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Instruments used:

Maladaptive behaviour

The profile of Abilities and Adjustment (PAA) Schedule was used to measure the extent of maladaptive behaviour. PAA is the combination of the Disability Assessment Schedule (DAS) (Holmes et al, 1982) and the Star Profile (Williams C, 1982). The DAS scale had inter-rater, inter-informant and test-retest reliability of between 78% and 93%. Sections of the PAA used in our study were scored on a ranked scale. Each of the thirteen maladaptive behaviour subscales was rated on a sliding scale of 1 to 6. A score of 1 to 3 signified a severe problem in each maladaptive behaviour category and from 4 to 6 signified a mild to no problem in that behaviour category. Each person was then rated according to the number of maladaptive behaviour subscales on which they have scored a severe rating (1 to 3). Each person could therefore score between 0 to 13 on the "severe behaviour" rating. PAA is an observer rated schedule, information for which was obtained either from a senior ward nurse or, for the community based population, from a relative or carer. Thirteen maladaptive behaviour sub-sections of PAA included: physical aggression, destructiveness, over activity, attention seeking behaviour, self-injury, wandering, screaming and other noises, temper tantrum,

disturbing others at night, objectionable personal habits, throwing objects aimlessly, anti-social behaviour, and sexual delinquency.

Psychiatric illness:

An initial screening for psychiatric illness was done through section XI of the PAA schedule (Psychiatric and Physical condition). Those patients who scored positively on the psychiatric illness category of PAA were further assessed with the help of a psychiatric interview, a period of observation, and thorough scrutiny of medical records. Finally a psychiatric diagnosis was made according to the Axis I of the DSM-III-R criteria (A.P.A., 1987). Different mood states were diagnosed using the "mood" subcatergory of the section XI of the PAA. Mood was categorised as "low", "changeable" and "happy".

The "psychiatric illness" category included schizophrenia, delusional disorder, major depression, bipolar disorder, obsessive compulsive disorder, hypochondriasis, simple phobia and generalised anxiety disorder, along with the diagnoses of dementia, cyclical behaviour and/or mood change and a history of major psychiatric illness (i.e., schizophrenia, delusional disorder, affective illness).

Personality Disorder:

An observer-rated personality questionnaire was used to detect personality disorder amongst mildly to moderately handicapped patients. The Standardised Assessment of Personality (S.A.P.) was designed by Mann et al and its inter-rater reliability was found to be good (weighted kappa ranged between 0.60 to 0.85) (Mann et al, 1981). Ballinger and Reid established the reliability of the SAP in a resident hospital population of mildly and moderately mentally handicapped adults (Ballinger & Reid, 1987). The SAP scale is an observer-rated semistructured interview designed to diagnose either the absence or presence of some personality disorders. In our population it was possible to score on only the cyclothymic, obsessional, anxious, aggressive and psychopathic categories. An individual may score on more than one type of personality category. Personality disorder was only said to be present if an individual had scored positively on either one or more of these categories. Information for the above mentioned scale was obtained either from a senior ward nurse or, in the community based population, from a relative or a carer who had known the patient for at least three years. DSM III-R criteria has not been used for the diagnosis of personality disorder in the study population because it has no observer-rated diagnosis whose reliability is tested in a population with a mental handicap.

An overall diagnosis of "Mental disorder" was made if a patient suffered from either one or more of the following categories: (a) maladaptive behaviour (b) psychiatric illness (c) personality disorder. Information concerning the type and dosage of anticonvulsants was obtained from the medical records. Serum anticonvulsant levels along with haemoglobin, Mean Corpuscular Volume (M.C.V), serum folate and serum vitamin B12 level were measured for all epileptic patients who received anticonvulsant medication. Serum anticonvulsant levels were estimated approximately twelve hours following the administration of the last dose of medication.

<u>Statistics:</u>

Data was analysed by computer using the SPSS^x package. Different behaviour variables amongst the epileptic population were compared with the matched control group using the Wilcoxon matched pairs signed rank test (2tailed). The variables such as psychiatric illness, severe behaviour, personality disorder and mental disorder were compared between the epileptic and nonepileptic groups and also between different epileptic groups using Mann Whitney (2-tailed) or Chi-square (after Yate's correction) and Fisher's exact probability test, wherever appropriate.

Description of the epileptic group: there were 77 males and 73 females. The mean age was 40 years (SD 13 years)

with a range of 20-77 years. Compared with the community population, hospital based patients were of a significantly older age group. 75 were severely handicapped (IQ below 35), 26 moderately handicapped (IQ 35-49(, and 49 were mildly handicapped (IQ 50-70). Compared with the community population, hospital based patients remained predominantly severely handicapped. A detailed description of anticonvulsant medication is given in Table 1. Further detailed description of this population is given in a separate paper (Deb & Hunter, 1991).

(Table 1 here)

No statistically significant difference emerged between the epileptic and non-epileptic group when the variables which were used for matching two groups were compared.

<u>Results:</u>

Despite an attempt to measure the serum folate levels of all patients receiving anticonvulsant therapy, the levels of only 115 out of 139 patients who received anticonvulsants were obtained, because the others refused consent for this blood test. These ranged between 1.2 mmol\L and 9.9 mmol\L while the local laboratory reference range was 1.7 mmol\L to 10 mmol\L. Only 5 patients (4.35%) had serum folate level below the local laboratory reference range leaving the serum folate level

of 110 patients within the normal range (see table 2 for the distribution of haemoglobin, M.C.V., serum folate and vitamin B12 levels).

(Table 2 here)

Of 24 patients who refused consent for blood test for serum folate level, 11 were male and 13 were female. Their age ranged between 20 and 64 (mean 36, SD 14), there were 13 severely mentally handicapped adults as opposed to 6 mildly and 5 moderately handicapped adults. Twelve came from the hospitals and 12 lived in the community. This population was not significantly different from those for whom a serum folate level was available.

(Figure 1)

The distribution of the serum folate levels as seen in Figure 1, shows that in the majority of patients serum folate levels fell below the mean and there was no normal distribution of the values (skewness=1.58).

The monopharmacy group which received an anticonvulsant other than Sodium Valporate (n=71) had a significantly low serum folate level (P<0.05) when compared with the sodium valporate monopharmacy group (n=16). No such difference in serum folate level, haemoglobin, M.C.V. and vitamin B12 level emerged in comparing the Carbamazepine

monopharmacy group with the rest of the monopharmacy group or in comparing the Phenytoin/Phenobarbitone monopharmacy group with the rest of the monopharmacy group. Apart from the difference on the serum folate level, Sodium Valporate monpharmacy group did not show any significant difference in haemoglobin, M.C.V., or serum vitamin B12 levels when compared with the rest of the monopharmacy group.

Significantly lower serum folate level (P<0.005) was found in those of the monopharmacy group whose serum level was over the local laboratory therapeutic range when compared with the monopharmacy group whose serum level was within the therapeutic range. No significant difference in the serum folate level was found when the two monpharmacy groups with serum levels either below the therapeutic range or within the range were compared. No statistically significant difference emerged in haemoglobin, M.C.V., serum folate level and vitamin B12 level when the subgroup receiving anticonvulsants within the British National Formulary (BNF) recommended dose range was compared with the subgroup receiving anticonvulsants in a dose which fell outside the recommended BNF range. Detailed description of the dose range and the serum levels of anticonvulsants of the study population is given in separate papers (Deb & Hunter, 1992))

The epileptic patients whose serum folate level fell below the reference range (n=5) were compared with the corresponding matched control group of non-epileptic patients (n=5) for 13 maladaptive behaviours along with co-operativeness, irritability and mood subscales of PAA. Similarly those epileptic patients whose serum folate level fell within the normal reference range (n=110) were compared with the corresponding control group of nonepileptic patients (n=110) for the above mentioned variables. The Wilcoxon test did not reveal a statistically significant difference in any of these comparisons.

When 110 epileptic patients with normal serum folate level were compared with 110 non-epileptic control patients for other variables, the following were observed: (1) 20% of epileptics compared with 31% of nonepileptics had a diagnosis of psychiatric illness (2) 64% epileptics as opposed to 58% of non-epileptics had a diagnosis of severe behaviour problem (3) 34% of epileptics as opposed to 27% of non-epileptics had a diagnosis of personality disorder (4) 71% of epileptics compared with 68% of non-epileptics had a diagnosis of mental disorder. Chi-square test did not reveal any statistically significant difference between the individual groups.

The serum folate level between the following epileptic groups were compared: (1) epileptic patients with and

without severe behaviour problems, (2) epileptic patients with and without a psychiatric illness, (3) epileptic patients with and without a personality disorder, and (4) epileptic patients with and without a mental disorder. The Mann Whitney test revealed those epileptics who had a personality disorder to have significantly higher serum folate levels (P<0.02) compared with those who had no personality disorder. No other inter group comparison revealed = any significant difference.

<u>Discussion:</u>

The use of anticonvulsant medication in the current study population was in keeping with the modern trend in that there was a tendency to prescribe monopharmacy of the new generation of anticonvulsants. The preference for Carbamazepine monopharmacy could be explained by the local trend of prescribing habit or the expected mood stabilising effect of this anticonvulsant drug, or an attempt to treat both epilepsy and behaviour problems together in certain patients. However, Carbamazepine is relatively inexpensive and a broad spectrum anticonvulsant with relatively low side-effects.

The finding that all anticonvulsants apart from Sodium Valporate lowered serum folate level is in keeping with our previous study (Deb et al, 1987). This finding could be explained by the fact that Sodium Valporate does not induce liver enzymes. Our finding that low serum folate level is associated with the serum folate level of

anticonvulsants over the therapeutic range is interesting. Although in the current study there was no evidence to suggest that Sodium Valporate monopharmacy has anyway affected haemoglobin and\or M.C.V. in the study population, some authors suggested (Ganick et al, 1990) that Sodium Valporate therapy, with trough blood levels in the higher portion of the therapeutic range, may be associated with marked increase in M.C.V. and lowered haemoglobin in the absence of low folate levels.

Although a very small percentage had a serum folate level bellow the normal therapeutic range, the majority had their level in the lower normal range. It is worth remembering both that the normal reference level tends to vary from one laboratory to another and that it is estimated on the basis of a mean ± 2SD, therefore the levels in 2.5% of normal population will automatically fall below this range. A low serum folate level is found in 27 to 91 per cent of patients receiving anticonvulsant medication (usually in over 50%) according to many previous studies. Low levels were also said to be associated with polypharmacy particularly if it includes Phenytoin and to a lesser extent Phenobarbitone and Primidone (Reynolds, 1976). In contrast the low serum folate level in very low percentage of the study population may be explained by the fact that the majority of the study population received monopharmacy particularly of Carbamazepine or Sodium Valporate

(compared with Phenytoin and Phenobarbitone or Primidone in previous studies).

We tried by various statistical methods to identify if there was a genuine relationship between the serum folate level and psychopathology in the study population. Overall our findings failed to support the hypothesis of a positive relationship. This is in contrast with some previous findings (Carney, 1967; Reynolds et al, 1971) but similar to others (Deb et al, 1987; Jenson & Olesen, 1970). Reynolds hypothesised that long duration folate deficiency may cause neuropsychiatric complication (Reynolds et al, 1971). Compared with older studies, the patients in our study were regularly monitored for folate deficiency and subsequently supplemented if necessary, thus minimising the prolonged effect of folate deficiency in causing neuropsychiatric problems as postulated by Reynolds. However, when we investigated to see what proportion of the study population received folate supplement, we were suprised to find only one of all the patients who received anticonvulsant to receive folic acid supplement.

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ACKNOWLEDGEMENT: The authors wish to thank all the patients, their families and staff who took part in the study, Dr R A Collacott for his valuable comments on the manuscript and Miss C Buckler for patiently typing the manuscript.

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	patients
	Epileptic

Drugs	n=150	00
Phenobarbitone or Phenytoin (in combination)	37	24.66
Phenobarbitone (alone)	10	6.66
Phenytoin (alone)	ቅ	2.66
Sodium Valporate (in combination) (alone)	26 16	17.33 10.66
Carbamazepine (in combination) (alone)	37 56	24.66 37.33
3thosuximide (alone)	1	0.66
4onopharmacy	87	58.00
Polypharmacy	52	34.66
No anticonvulsant	11	7.33

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Table 2

Distribution of haemoglobin, MCV, serum folate and vitamin B12 levels according to the local laboratory reference range

Investigation	Laboratory Normal Range	Below normal Range n (%)	Within normal Range n (%)	Above normal Range n (%)
Haemoglobin	11.5 - 18.0 g/dl	5 (5)	91 (95)	0
MCV	80 - 99 fl	4 (4)	89 (93)	3 (3)
Serum folate	1.7 - 10 uG/L	5 (4)	110 (96)	0
Serum vitamin B12	170 - 800 nG/L	2 (2)	92 (80)	21 (18)

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Distribution of serum folate levels Figure 1



ELECTROPHYSIOLOGICAL CORRELATES OF PSYCHOPATHOLOGY IN INDIVIDUALS WITH A MENTAL HANDICAP AND EPILEPTIC SEIZURE

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<u>Abstract:</u>

Psychopathology (maladaptive behaviour, psychiatric illness and personality disorder) of one hundred epileptic adults with a mental handicap from hospital and community was studied and compared with a matched control group of non-epileptic adults with a mental handicap from the same hospital and the community. All epileptic patients had an EEG recording done. 91 of these EEGs were abnormal, 48 had only excessive slow background activity abnormality, whereas 12 had only generalized epileptiform changes in the temporal region (5 left sided, 4 right sided and 9 bilateral). Further 13 had shown both focal temporal as well as generalized epileptiform activities. No major statistically significant difference emerged in psychopathology either between epileptic and non-epileptic patients or between the various EEG subgroups. Patients with focal EEG changes did not show significantly higher psychopathology when compared with those with generalized EEG changes.

Key words: Mental handicap; EEG; psychopathology.

Introduction:

An EEG tells little regarding intelligence or learning capacities (Schain, 1972). However, the non specific abnormalities, consisting mainly of excessive slowing and poor organisation of the background rhythm for age, which gives the recording an immature apperance, are consistent with mental handicap with associated brain damage (Andriola, 1983). It seems that the degree of EEG abnormality depends mostly on the degree of brain damage and localisation of the leisons rather than aetiological factors (Majkawoski, 1982). In a study Gibbs et al found about 35% of individuals with mild mental handicap to show abnormal EEG compared to 60% of individuals with severe handicap. 80% of individuals with a mental handicap and cerebral palsy, 96% of those with a mental handicap and epilepsy and 100% of individuals with a mental handicap and both epilepsy and cerebral palsy showed abnormal EEG changes (Gibbs et al, 1960).

Stevens stated that it is well known that EEG spikes are recorded with a greater frequency in individuals with behaviour disorders and psychosis than in the general population (Stevens, 1977). The relationship between the EEG and mental state in adults with epilepsy is complex and is not entirely related either to the localisation or

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distribution of the epileptiform activities in the EEG (Fenton, 1986). In a recent community study, Edeh and Toone found a non-significant trend for psychiatric morbidity to be greater in patients with temporal lobe seizures (Edeh & Toone, 1987). The concept of a specific behaviour syndrome and personality being associated with temporal lobe epilepsy was initially put forward by Gibbs in 1951 and later redeifined and reformulated by Geschwind (Gibbs, 1951; Geschwind, 1979). An attempt to demonstrate this specific behaviour syndrome in temporal lobe epilepsy by a specially designed inventory by Bear and Fedio has failed to draw any unquivocal conclusion (Bear & Fedio, 1977; Hermann & Whitman, 1984). To our knowledge, psychopathological correlates of EEG in adults with a mental handicap and epileptic seizure has not been properly studied. As a part of a bigger study we looked into the EEG changes in adults with mental handicap and their relationship with psychopathology.

<u>Method:</u>

Three hundred adults with mental handicap from Leicester, U.K., were selected for the study. 150 of them sustained epileptic seizure, the other 150 being the individually matched contol group who had no history of epileptic seizure. All but the profoundly mentally handicapped adults with epileptic seizure from the two main hospitals for adults with a mental handicap in Leicester, UK (n=100), and all epileptic adults (excepting those with a profound mental handicap) with a mental handicap who attended two Adult Day Centres (n=50) were included. The control group came from the same hospitals and Day Centres.

An interictal EEG recording was available for 100 epileptic patients. Less than half of these patients had an EEG recording within the previous twelve months and the remaining had their EEG recording done during the study period. In the latter group the consultant reporting on the EEG was unaware of the individual's seizure type. Of 150 epileptic patients, 47 either refused consent or did not co-operate for the EEG. We were unable to get permission from the Health Authority's
local ethical committee to perform EEG on these patients. 16 channel SLE machine was used, 19 pad electrodes placed according to the 10-20 system. EEG sensitivity was 100uV per cm, and paper velocity 30mm per second. Besides a rest period recorded in each of the 8 montages, with eyes open/closed manoeurve, an overbreathing period of 3 minutes and photic stimulation were carried out in most individuals. Spike, polyspikes, spike wave, sharp wave and sharp and slow waves were accepted as epileptiform activity in the interictal EEG. The findings of only these 100 epileptic patients and their matched control group will be discussed in this paper.

Matching of the two groups was done according to (1) age (2) sex (3) level of intelligence as measured by various psychometric tests (4) level of communication (5) sensory impairment (vision and hearing) (6) living enviroment (7) asociated chronic physical illnesses. Two groups were individually matched for age, sex, IQ level and living enviroment. Further analysis of the data from the Profile of Abilities and Ajustment schedule (this schedule is described later in the text) did not reveal any significant intergroup difference in the scores on the subsections, such as communication (expressive speech, comprehension, clarity of speech), sensory impairment (vision and hearing), and chronic physical illness (see Table 1).

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Classification of mental handicap was undertaken according to The Ninth Revision of the International Classification of Diseases (Mild handicap, IQ 70-50; Moderate handicap, IQ 49-35; severe handicap IQ below 35) (World Health Organization, 1978).

Epilepsy Variables:

Epilepsy was defined as the presence of a history of three or more epileptic attacks in the previous two year period or, if before that time, the individuals were still on anticonvulsant treatment, this is in accordance with the operational criteria proposed by Gunn & Fenton (Gunn & Fenton, 1969). Drug related seizures and febrile convulsions were excluded. Classification of the epileptic seizures was undertaken on the basis of clinical features only and according to the International classification of epileptic-seizures (Classification and Terminology for The International Leauge against Epilepsy, 1981). A detailed description of epileptic attacks was obtained from an eye-witness.

Information regarding the anticonvulsant medication was obtained from medical notes and carers. The detailed description of anticonvulsant medications and their effect on the psychopathology on the study population is given in a seperate paper (Deb & Hunter, 1992). No patient in the control group received anticonvulsant drugs, however patients in both groups received other commonly used drugs in this population, particularly neuroleptics.

Instruments Used:

Maladaptive Behaviour:

The Profile of Abilities and Adjustments (P.A.A.) schedule was used to measure various aspects of adaptive and maladaptive behaviours. This schedule was designed by Dr Lorna Wing and her colleagues from the MRC Social Psychiatry Unit, London, by the combination of two scales; the Disability Assessment Schedule (D.A.S) and the Star Profile (Holmes et al, 1982; Williams, 1982)

Holmes et al found a very high reliability scores (78% -93%), when they undertook very extensive inter-rater, inter-informant and test-retest reliability studies of the DAS (Holmes et al,1982). The PAA is esentially an observer-rated schedule, information for which was obtained either from a senior ward nurse or, in the case of community based population, from a relative or a carer. The sections of the PAA used in our study (almost all of them were present in the DAS) (see Table 1) were scored on a ranked scale. Each of the thirteen maladdaptive behaviour subscales was rated on a sliding scale of 1 to 6. A score between 1 to 3 signified severe problem in that behaviour catergory and 4 to 6 signified mild to no problem in each behaviour catergory. Each person was then rated according to the number of maladaptive behaviour subscales on which they have scored severe rating (1 to 3), therfore each prson could score between 0 to 13 on "severe behaviour" rating.

Psychiatric Illness

Section XI of the PAA (Psychiatric and Physical conditions) (see table 1) was used as an initial screening instrument for the diagnosis of psychiatric illness. Those adults with mild to moderate handicap who scored positively on any of the subsections of psychiatric conditions received a standard psychiatric interview by one author (S.D.). Those adults with severe handicap who scored positively on the psychiatric condition subsection of the PAA were further observed over a period of 30 minutes. The medical case records of these patients were scrutinised and finally a psychiatric diagnosis was made based on the axis 1 of the DSM-III-R criteria (American Psychiatric Association, 1987). A diagnostic category of "Cyclical behaviour and/or mood change" was used for those patients with severe handicap who manifested periodic changes in their behaviour with or without associated mood change, yet did not fulfill the criteria for any other psychiatric diagnosis according to DSM-III-R.

Psychiatric illness was said to be present if an individual had one or more of the following diagnoses: schizophrenia, delusional disorder, major depression, bipolar disorder, obsessive compulsive disorder, hypochondriasis, simple phobia, generalized anxiety disorder, dementia, cyclical behaviour and/or mood change and a history of psychiatric illness.

Personality Disorder:

One observer-rated personality questionnaire was used to detect personality disorder in patients with only mild to moderate mental handicap. The Standardized Assessment of Personality (S.A.P.) was designed by Mann et al and its inter-rater reliability was found to be good (weighted kappa ranged between 0.60 to 0.85) (Mann et al, 1981). Ballinger and Reid established the reliability of the SAP in a resident hospital population of adults with mild and moderate mental handicap (Ballinger & Reid, 1987). The SAP scale is an observer-rated semi-structured interview designed to diagnose either the absence or presence of some personality disorders. In our studied population it was only possible to score on the cyclothymic, obsessional, anxious, aggressive and psychopathic type. An individual may score on more than one type of personality catergory and, "personality disorder" was said to be present if an individual had scored positively on either one or mome of these types.

Information for this scale was obtained by one author (S.D.) either from a senior ward nurse or, for the community based population, from a relative or a carer who had known the patients for the last three years or more.

An overall diagnosis of "mental disorder" was made if the individual had either one or more of the following catergories; (a) Maladaptive behaviour (b) Psychiatric illness (c) Personality disorder.

<u>Statistics:</u>

Data was analysed by computer using the SPSSX package. Wilcoxon matched pairs signed rank test (2 tailed), Mann Whitney (2 tailed) or Chi-Square (after Yate's correction) and Fisher's exact probability tests were used wherever appropriate.

<u>Results:</u>

Description of the epileptic group (n=100): The age range of the epileptic patients was 20-77 years (mean 41 years, SD 14). Fifty-two were males and 48 females. Sixty-five of them lived in the hospital wheras 35 lived in the community. Thirty-seven were mildly, 23 moderately and 40 severely handicapped. Further description of the study population is given in seperate papers (Deb & Hunter, 1991). There was no statistically significant difference between the individuals with and without epilepsy in the variables for which they were matched.

EEG findings: Of 100 EEG recordings, 9 were completely normal, 48 showed only excessive slow background wave abnormality and the rest 43 showed some form of epileptiform activities, 12 had shown bilateral, diffuse, generalized epileptiform activities (including 3 Hz abnormality), 18 had shown focal epiletiform activities in the temporal region (5 left sided, 4 right sided and 9 bilateral) and the rest 13 had shown both focal temporal as well as generalized epileptiform activities.

Of those who sustained generalized seizures, 21% showed generalized epileptiform changes in the EEG, whereas 31% showed generalized epileptiform changes in the EEG. Of those who susutained partial seizures, 31% showed generalized epileptiform changes in the EEG, whereas 25% showed focal changes in the EEG. A Chi-square test did not reveal any statistically significant difference between these groups.

Comparisons of the different subgroups of the epileptic patients according to their EEG abnormalities (eg., epileptiform, slow wave, general and focal) with their corresponding matched control group of non-epileptic patients are shown in table 2 and 3. When 13 maladaptive behaviour subsections along with mood, irritability and co-operativeness according to the PAA were compared between the groups, the following were observed; (a) Patients in the control group had shown worse attention seeking behaviour (P<0.05) compared to the epileptic patients in the epileptiform EEG group (n=43) (b) Patients in the control group had shown worse attention seeking behaviour and destructivness (P<0.05) compared to the epileptic patients in the focal EEG group (n=18) (c) Epileptic patients in the generalized epileptiform group (n=12) had shown less co-operativness (P<0.05) when compared to the control group (d) however no statistically significant difference emerged when the epileptic patients in the slow background activity group (n=48) were compared to the control group.

(Table 2 and 3 here)

When the epileptic patients in the generalized epileptiform EEG group (n=12) were directly compared with

the epileptic patients in the focal epileptiform EEG group (n=18) the following results were obtained; (a) 58% of epileptic patients in the generalized group compared to 50% in the focal group had shown severe behaviour problem (b) 33% of epileptic patients in the generalized group as opposed to 17% in the focal group had a diagnosis of a psychiatric illness, (c) 28% of epileptic patients in the generalized group as opposed to 45% in the focal group had a diagnosis of personality disorder, and (d) 58% of epileptic patients in the generalized group compared to 66% in the focal group had an overall diagnosis of mental disorder. None of these intergroup comparisons showed statistically significant difference.

Discussion:

Although one should not overemphasise the meaning of a single inter-ictal EEG finding, the presence of abnormalities such as epileptiform changes are more reliable factors for interpretation than the absence of abnormality in the EEG. Of an original cohort of 150 epileptic mentally handicapped adults we were able to obtain EEG recordings on 100. It was not possible to perform EEG on 47 patients because they did not consent or co-operate. It was not practically possible to perform EEG on these patients because the only way of performing EEG on these patients would have been by sedating them, which would have changed the EEG findings. In any case, it was not felt ethical to perform EEG against peoples' will. Because of this practical problem we may have been unable to perform EEG on some patients with some maladaptive behaviours. However, these maladaptive behaviours would mainly be "hyperavtivity" type, rather than inter-ictal aggression. Also when the whole group of epileptic patients (n=150) were compared with the non-epileptic control group, no significant difference emerged in psychopathology (Deb & Hunter, 1991).

In spite of a high proportion of focal EEG abnormality, only a minority sustained partial seizures. This is considered to be due to the fact that most of the clinically determined generalized seizures were infact secondarily generalized from partial seizures. It is also worth remembering that some partial seizures remain difficult to diagnose in people with a mental handicap.

A very high proportion of background slow wave activities could be explained by the underlying brain damage in the study population or by the use of drugs.

Our finding of 91% of EEG abnormality in the epileptic adults with a mental handicap is very similar to Gibbs et al's previous finding of 96% EEG abnormality in individuals with mental handicap and epilepsy (Gibbs et al,1960). Although many previous studies compared psychopathology of epileptic patients with various seizure types, we are not aware of any study, particularly involving mentally handicapped people where psychopathology was compared in individuals with different EEG types. There are a few possible explanations of not finding a significant difference in the psychopathology between the epileptic and the non-epileptic groups.

In a review article Dodrill and Batzel stated that epileptic patients show more emotional and behaviour problems compared to non-epiletic patients with nonneurological chronic physical illness but not patients with neurological disorders (Dodrill & Batzel, 1986). Patients with temporal lobe seizures in general do not show any increased incidence of behaviour problem compared to patients with other types of seizures (Dodrill & Batzel, 1986). There is a mild tendency for an association between emotional problems and impairment on neuropsychological tests (Dodrill & Batzel, 1986). This last hypothesis suggests that the interictal behaviour problem associated with epileptic seizures as suggested by many authors is determined primarily by underlying brain damage rather than the epileptic seizure per se. Our inability to find a significant difference in emotional and behaviour problems between the groups of epiletic and non-epileptic mentally handicapped adults

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may be explained by the fact that underlying brain damage remained a common factor in both groups.

The role of psychosocial factors in causing psychopathology in mentally handicapped people is controversial. In a recent study Hermann et al found the psychosocial factors, such as attached stigma, financial stress, life-events etc, were significantly associated with the psychopathology of individuals with epilepsy (Hermann et al, 1990). It is conceivable that the mentally handicapped individuals are more vulnerable to psychosocial stresses, however, the type of these stresses could be very different for mentally handicapped people than those for non-mentally handicapped population. The particular types of psychosocial factors, which were shown to be associated with psychopathology in Hermann et al's study may not be relevent to mentally handicapped population (Hermann et al,1990).

Espie et al argued that some mentally handicapped individuals with epilepsy show deterioration in their adaptive behaviour, which then may either be manifested or misenterpreted as a deterioration in the mental state (Espie et al,1989). A very high proportion of epileptic patients in our study received carbamazepine. Carbamazepine is known to have mood stabilizing effect (Post et al,1983). Unlike the older generation of anticonvulsants, such as phenobarbitone and phenytoin, the new generation of anticonvulsants, such as sodium valporate and carbamazepine have less behavioral sideeffects (Trimble & Corbett,1980). It is also possible that some of the epileptic patients in our study, who received carbamazepine had already been treated for their mental state.

It is also worth remembering that in this study, no significant difference was found between the epileptic and non-epileptic groups in the occurence of chronic physical illness. Previous controlled studies in the non-mentally handicapped population failed to detect any significant increase in psychopathology in epileptic individuals, when compared with groups with other chronic illness (Hermann & Whitman, 1984).

The finding of no significant difference in psychopathology between the group with focal EEG changes and the group showing generalized EEG changes counters the notion proposed by some that epileptic patients who have temporal lobe EEG focus show significantly higher psychopathology than epileptic patients without such changes, however, this is in keeping with other studies which failed to detect any difference between temporal lobe epilepsy (TLE) and non-TLE patients (Edeh & Toone,1987; Dodrill & Batzel,1986).

Hermann & Whitman however, pointed out the difficulty of comparing the groups with temporal lobe seizure and

generalized seizure (Hermann & Whitman,1984). Generalized seizures by definition include temporal areas, thus contaminate the study population. Patients with temporal lobe seizure should be compared with the patients who sustain non-temporal focal seizure. However, Tonne & Edeh in a recent study found nonsignificantly increased psychopathology in patients with not only temporal lobe seizure but also with focal seizure of non-temporal lobe origin (Edeh & Toone,1987).

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Acknowledgement: Authors wish to thank the technical staff of the EEG Department of Leicester Royal Infirmary and Dr V Brezinova for the interpretation of EEGs, Dr RA Collacott, nursing staff and other carers and mentally handicapped individuals for taking part in the study and Miss C Buckler for patiently typing the manuscript.

Table 1

Section	is of PAA used in our study		
ΛI	Vision, Hearing	(į	Objectionable personal habits
VIII	Vocal communication	k)	Throwing objects aimlessly
IX	Maladaptive behaviour:	Т)	Anti-social behaviour
J	() Physical aggression	(m	Sexual delinquency
q) Destructiveness	x	Co-operation
U	:) Overactivity	IX	Psychiatric and Physical condition
q	() Attention seeking behaviour		(uncludes mood, irritability, chronic physical illness and other psychiatric illness
Φ	:) Self-injury	XII	Social relationship
G.,) Wandering	XIII	Social interaction
£0	c) Screaming & other noises	VIX	Sterotyped behaviour
Ч	() Temper tantrum	XV	Echolalia
ŗ) Disturbing others at night		

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Table 2

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Comparison between individuals with and without epilepsy

	Epileptif (n=	orm change 43)	Slow wave (n=	changes 48)
	Indiv with epilepsy (%)	iduals without epilepsy (%)	Individ with epilesy w (%)	uals ithout epilepsy (%)
Psychiatric illness	19	37	33	31
Personality disorder	35	31	28	28
Severe behaviour problem	51	51	61	56
Mental disorder	58	65	74	68

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No statistically significant difference between the groups

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Table 3

5. 5.

Comparison between individuals with and without epilepsy

	Focal epilep (n=	tiform change 18)	Generalized epil (n=1	eptiform change 2)
	Indiv With epilepsy (%)	iduals without epilepsy (%)	Individ with epilepsy (%)	uals without epilepsy (%)
Psychiatric illness	17	55*	33	33
Personality disorder	45	36	28	14
Severe behaviour problem	50	55	58	50
Mental disorder	67	78	58	66

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