The role of electro-encephalography in Third-World psychiatry

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Summary

Patients with organic brain disease often present with psychiatric symptoms that closely mimic functional mental illness. This has major implications in Third-World countries where the psychiatric effects of physical disease are particularly widespread. Developing countries lack the advanced radiological investigations and other diagnostic facilities that may help to differentiate between functional and physical complaints. The association between electro-encephalographic (EEG) abnormalities and organic brain disease is well established; the benefit and importance of the EEG in Third-World psychiatry is described.

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Since antiquity, physicians have recognised the relationship between organic brain disease and psychiatric symptomatology.[1,2] Patients with cerebral disease often present to a psychiatrist rather than a neurologist[3] because of an array of clinical phenomena (Table I).[1,2,4-11] These organic states closely mimic functional psychiatric illness and often prove indistinguishable despite Schneiderian classification, clinical or Present State examination.[2,5,9,11-16] In many cases the degree of mood and thought disorder is sufficient to overshadow the organic manifestations and lead to a symptomatic diagnosis of psychotic or depressive illness.[3,5] Slater[7] summarised this close correlation between organic and functional presentation by stating that: 'The clinical similarity was such that one would have no excuse for not diagnosing these patients as schizophrenic.'

TABLE I. PSYCHIATRIC PRESENTATIONS OF ORGANIC BRAIN DISEASE

- Anxiety
- Catatonic schizophrenia
- Depression
- Hebephrenic schizophrenia
- Hysteria
- Mania
- Manic-depressive psychosis
- Obsessive/compulsive disorder
- Paranoid schizophrenia
- Personality disorder

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This overlap of symptomatology and clinical presentation has major implications in Third-World countries where the mental effects of physical disease are particularly widespread.[17,18] These organic brain syndromes often arise from treatable causes[18] and may occur in clear consciousness without overt physical signs.[3,10,19,20] This was demonstrated by Dommisse[19] when he showed that 13,5% of patients who died in South African mental institutions had intercranial masses and estimated that 50% of hospital admissions for mental confusion were due to organic disease. The cerebral lesions that present as functional psychiatric illness are set out in Table II.[7,10,17,18,21-24] It is essential for psychiatrists practising in developing countries to include medical illness in their differential diagnosis and exclude the possibility of cerebral disease in patients presenting with psychiatric symptoms.[3,10,19,20]

TABLE II. ORGANIC BRAIN DISEASES PRESENTING WITH PSYCHIATRIC SYMPTOMS

- Brain abscess
- Carcinoma
- Cerebral cysticercosis
- Cerebral haemorrhage
- Cerebral infarction
- Cerebral malaria
- Malnutrition
- Neurosyphilis
- Pellagra
- Trauma
- Tuberculosis
- Trypanosomiasis
- Typhus

Third-World clinicians face a major diagnostic dilemma when patients have overt psychiatric symptomatology but no evidence of underlying physical illness. They are called upon to differentiate between organic brain syndromes and psychiatric disorders without the aid of advanced radiological equipment.[17,18] However, the association between electro-encephalographic (EEG) abnormalities and organic brain disease has been well established.[21,25,26] EEG recordings can detect a wide variety of pathological conditions (Table III).[21,26,27]

TABLE III. ORGANIC BRAIN DISEASE DETECTABLE BY EEG

- Cerebral abscess
- Cerebral atrophy
- Cerebral haemorrhage
- Metabolic encephalopathy
- Seizure disorder
- Space-occupying lesion
- Substance abuse

Although the validity of EEG in modern psychiatric practice has been strongly criticised as being of limited clinical, diagnostic or prognostic value,[6,16,28-30] this study demonstrates the benefit and importance of the EEG in developing countries and its role in Third-World psychiatry.

Patients and methods

A retrospective, analytic study was undertaken by the Department of Psychiatry, Hillbrow Hospital, Johannesburg. All departmental referrals for EEG during a 1-year period (1986/1987) were analysed in an attempt to establish their value and benefit to patient care. The inclusion criteria were direct referral by the Department of Psychiatry, overt psychiatric symptomatology and an absence of clinical neurological findings.

The EEG recordings were all undertaken in the same environment using a Beckman Accutrace 100A with 22 leads placed in a 20/20 pattern. Each recording lasted 45 minutes and included exposure to photic stimuli and hyperventilation. The EEG results were then assessed by consultant staff from the Department of Neurology, University of the Witwatersrand.

Demographic data on age, sex, racial group, educational level, psychiatric history, duration of inpatient treatment, outpatient status and anti-epileptic therapy were also carefully collected and collated.

Results

The study group consisted of 145 patients, who met the inclusion criteria, and the ratio of inpatients to outpatients was 3,54:1 (Table IV). A comparison of demographic data is illustrated by Fig. 1.

TABLE IV. RESULTS

No. of subjects	**145**
EEG recordings	
Normal (%)	**51**
Abnormal (%)	**49**
Mean age (yrs)	**31**
Male:female	**1,12:1**
Patient status (%)	
Inpatient	**78**
Outpatient	**22**
Mean inpatient stay (d)	**23**
Previous psychiatric history (%)	**42**

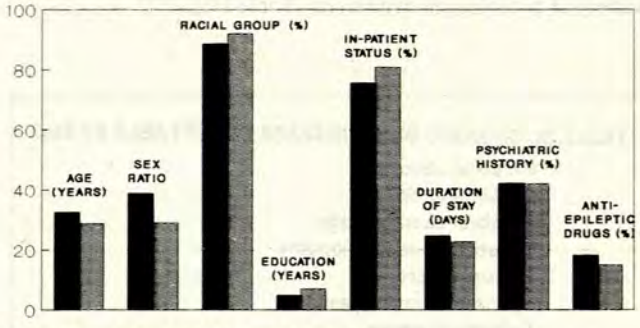

Fig. 1. Comparison of demographic data (■ = abnormal EEG; ■ = normal EEG).

Nearly half the study population (49%) were shown to have clearly demonstrable abnormalities on EEG, which could not be linked to either demographic or methodological discrepancies (Fig. 1). This subgroup contained 71 patients, 35 (50%) of whom exhibited definite epileptiform activity on investigation. In 48 patients (67,6%) localised EEG dysfunction was demonstrated, with 48% of abnormalities (23) being found in the temporal lobe areas.

All patients included in the study had been provisionally diagnosed as suffering from a functional psychiatric illness and referred to the Department of Psychiatry for ongoing treatment after discharge from acute medical care. In addition to a clinical examination, the patients with abnormal recordings had also undergone formal psychiatric assessment before EEG investigation but in only 29% of cases had a query about possible organic aetiology arisen (Fig. 2). A further 20,4% of the abnormal EEG subgroup had some doubt expressed about the validity of their psychiatric diagnosis in that they were described as having atypical psychoses or that their condition was secondary to substance abuse.

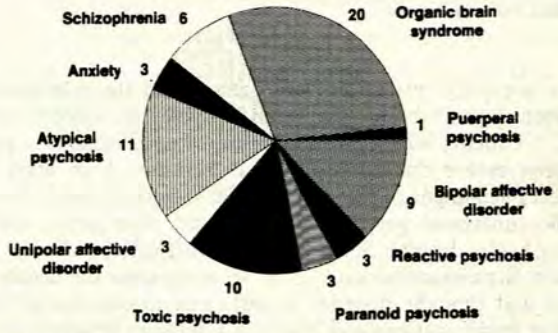

Fig. 2. Provisional psychiatric diagnosis before EEG investigation.

Discussion

It is important for physicians, especially in areas where there is a high incidence of organic brain disease, to appreciate that psychiatric symptoms may be the earliest signs of intracranial lesions.[3,29] Awareness of organic brain disease is essential in the diagnosis and treatment of psychiatric illness, since abnormalities of brain structure are not infrequent in psychiatric patients and should be excluded before prolonged psychiatric scrutiny begins.[26,31] This study confirmed the need for increased vigilance before diagnosing functional psychiatric illness, especially in developing countries. Nearly half the patients subjected to EEG after referral to psychiatric services showed overt abnormalities. Although the study contains a bias in that only those patients submitted for EEG were investigated, it still demonstrates the high incidence of underlying organic brain disease not detected by either clinical and psychiatric examination. All patients with abnormal EEG recordings had received a provisional psychiatric diagnosis at a primary referral level, with over 70% of these findings later confirmed by trained psychiatric staff. In only 29% of these patients was an organic aetiology queried after formal psychiatric assessment. Even with the addition of the 20,4% of cases with uncertain diagnoses (Fig. 2), these figures demonstrate a lack of awareness and poor detection of patients with possible underlying organic brain disease by all the physicians involved.

This trend is of particular concern, since even this poor level of detection exceeds results achieved in similar studies by nearly 10%.[12] It is therefore essential for psychiatrists in

developing countries to raise their threshold of suspicion before excluding underlying organic disease and to develop economically viable and practical methods for detecting covert physical disease. Computed tomography (CT) is widely accepted as being more reliable in detecting intracranial pathology than either EEG or neurological examination.[29] Unfortunately, the availability of CT in Third-World countries is limited by the prohibitive costs of equipment and maintenance, as well as the lack of expertise and training.[32] Due to the lack of radiological equipment, alternative investigations are needed to aid the physician in excluding the possibility of organic disease masquerading as a functional psychiatric illness.

While less reliable than CT, the value of the EEG in detecting cerebral pathology is well established,[21,25-27] and studies have shown that lesions detected on CT also had other clinical evidence, including abnormalities on EEG.[29] EEG has the advantage of being more convenient and easily available, cheaper and less difficult to operate or maintain.[3,20,26] The recordings can detect a wide variety of pathological conditions (Table III).[21,26,27] EEG may even detect disturbance of brain function before gross structural change is evident on CT and provide the first suggestion that a puzzling clinical picture may be the result of an organic lesion.[12,21,26]

The greater availability and easier access to EEG in developing countries remains unhelpful unless it can be demonstrated that the detection of cerebral disturbance replicates similar EEG findings in other countries and approximates that of CT. The reliability of EEG as a suitable method for excluding underlying cerebral pathology in Third-World countries was confirmed by this study, which obtained results comparable with applicable international studies. The presence of EEG abnormalities in 49% of the study group compares favourably with Van Sweden and De Breuker's[20] findings of a 42,5% incidence of EEG dysfunction in general hospital psychiatry referrals. These figures approximate CT, which has detected abnormalities in 46 - 57% of psychiatric referrals (Table V).[12,24,31] The differentiation between organic and functional conditions by radiography, EEG and clinical assessment is especially important in developing countries where the availability of psychiatric services is limited and often characterised by severely overcrowded facilities. There are inadequate numbers of professional staff and the patient : psychiatrist ratio often exceeds 126 000 : 1.[18,33-36]

TABLE V. ORGANIC LESIONS DETECTED IN PSYCHIATRIC REFERRALS

Author	Results (%)	Investigation
This study	**49**	**EEG**
Van Sweden and De Breuker[20]	**42,5**	**EEG**
Ellington[25]	**47 - 58**	**EEG**
Emsley *et al.*[24]	**53,7**	**CT**
Larson in Roberts and Lishman[31]	**47**	**CT**
Roberts and Lishman[31]	**50 - 57**	**CT**
Woods in Roberts and Lishman[31]	**46**	**CT**

This dearth of mental health services further highlights the need to exclude organic brain disease and channel physically ill patients through the appropriate services. This would reduce the already excessive patient load and free available psychiatric services for improved care of functionally ill patients. Recent advances in EEG technology may ultimately change the whole perspective of its use in psychiatry, especially in conjunction with increasing evidence regarding the efficacy of anticonvulsant drugs in atypical functional illness.[3,15,37]

Conclusion

The prevalence of organic brain disease masquerading as functional psychiatric illness in developing countries poses a major diagnostic dilemma for Third-World psychiatrists. They are frequently called upon to differentiate functional from physical complaints largely without the aid of advanced radiological investigations or adequate facilities. The limited availability of CT has therefore led to the use of alternative methods for detecting underlying organic cerebral disease before patients are subjected to prolonged psychiatric scrutiny. Although less reliable than CT, EEG is more readily available, cheaper, easier to use and more convenient, and it has a definite role to play in differentiating between medical and functional illness. This study has served to highlight the efficacy of EEG and its potential benefits to psychiatric practice in developing countries. It is to be hoped that the acceptability of EEG will increase with recent advances in its technology and in anti-epileptic pharmacotherapy, as well as in further research into the advantages, efficacy, intervention and outcome of EEG in psychiatry.

The role of EEG in Third-World psychiatry can be summarised in a quote from Emsley *et al.*,[24] who stated: 'Patients with cerebral lesions presenting initially with psychiatric manifestations may have profound alterations to their management and outcome if these lesions are demonstrated.'

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