EPILEPSY AND MENTAL RETARDATION
THUPPAL MADHAVAN¹, JAYANTHI NARAYAN²

Epilepsy is one of the most frequently associated conditions with mental retardation which interferes with the learning process. The present study investigates the 1207 cases (Male-814, Female-393) registered at NIMH, Secunderabad, over a period of two years. The factors studied were the prevalence of epilepsy, degree of mental retardation, etiology and associated factors. Ten mentally retarded persons with epilepsy were followed up longitudinally to study the effect of epilepsy on learning. It was observed that an attack of seizure resulted in a setback in the learning of skills. The results are discussed.

The relationship between epilepsy and mental retardation was investigated as early as 1881 by Gowers. He found that some persons with epilepsy showed mental deterioration. He further inferred that epilepsy and mental retardation have the same root cause, namely cerebral imperfection (Corbett, 1981).

As noted by O’Donohoe (1981), though it is difficult to get a true estimate of the prevalence of epilepsy in the mentally handicapped individuals, it is certain that the proportion rises steadily as the severity of retardation increases. While there is ample literature available on epilepsy in general population, the studies on epilepsy in mentally handicapped individuals and the impact of epilepsy on learning in the mentally retarded persons are minimal. Similarly studies involving cognitive abilities and learning are predominantly in epileptic individuals with normal intelligence. Most of these studies correlate scores on intelligence tests and seizures (Lechtenberg, 1985; Hirtz and Nelson, 1985; McIntyre, 1982; Masland, 1985). In the area of epilepsy and mental retardation, the available studies give assessment details, associated behaviour problems and use of drugs and not information on training them on various skills.

While these studies provide information on the overall performance of the retarded person, they throw little light on learning of each of the skills and the relationship of seizures to learning if any. This necessitates longitudinal follow up of cases with epilepsy with systematic monitoring of their progress in learning specific skills and treatment of epilepsy. The present study attempts to find out the relationship between mental retardation and epilepsy.

AIMS OF THE PRESENT STUDY

1. To study the relationship between epilepsy and mental retardation in terms of age, sex, severity levels, aetiological factors and associated conditions.

2. To study the effect of epilepsy in skill acquisition among mentally retarded persons.

MATERIAL AND METHOD

The study was carried out at the National Institute for the Mentally Handicapped (NIMH), Secunderabad, which is an apex body set up by the Government of India to develop manpower, research and models of service in the area of mental retardation in India. As a part of the service activities, persons with mental retardation are assessed by a multidisciplinary team and programme for members of individual discipline in specialised services. On an average 700 new cases of mental retardation are seen every year.

Cases of mental retardation attending NIMH in the years 1987 and 1988 were analysed for their age, sex, severity of retardation, aetiology and associated problems. Those with epilepsy were separated from those without and were compared on the above parameters based on the percentage distribution within each group. Ten persons with epilepsy and mental retardation who were being followed up in the special services of special education and medical sciences were chosen for longitudinal study of epilepsy and skill training. While selecting the cases, special care was taken to see that parents of the selected cases for the study were cooperative and were regular for the services which would minimize the trainer variable. Their improvement in home based training in skills and the response to medication for fits were assessed. The improvement in skill training was observed and scored objectively on a five point scale for each skill (5 = attempts to do, 10 = able to do with physical prompting, 15 = able to do with verbal prompting, 20 = needs cueing and 25 = independent). A maximum of four skills were taken for training. The follow up periods ranged from 6 months to 3 years (< 1 year in 4 cases, < 2 years in 2 cases, < 3 years in 4 cases) and the number of followup visits ranged 6 to 22. The followup was done on once a month basis. Information about the number of epileptic fits and their nature (full blown or abortive) was collected from the parents during follow up and the drug dosage was adjusted accordingly. The anticonvulsants given were Dilantin Sodium, Sodium Valproate, Phenobarbitone, Diazepam, Carbamazepine and Clonazepam. The drugs were used based on the

¹ Assistant Professor of Psychiatry, ² Assistant Professor of Special Education, NATIONAL INSTITUTE FOR THE MENTALLY HANDICAPPED, Manowaraks Nagar, Bowenpally, Secunderabad 500 011. Correspondence should be directed to first author.
clinical symptoms and the dosage altered or drugs changed as per the needs. To study the effect of occurrence of epilepsy on the training imparted if any during the past month, graphs were plotted showing the progress in training and the occurrence of seizures. Change in type of fits and occurrence of events like psychosis were also recorded. In order to provide double blind quality to the study, observations and recordings at followups were done for fits and training separately by the authors.

RESULTS AND DISCUSSION

In all 1207 cases of mental retardation were seen at NIMH in the years 1987 and 1988. Their age and sex distribution are given in Table-1. Out of 1207 cases, 184 had epilepsy (15.2%) at the time of consultation. This does not include those who had epilepsy at sometime in the past. 77% of children who had seizures were under 15 years of age. Firm conclusions cannot be derived from this data as 76% of the total sample is under 15 years. Corbett (1974) found that seizures in mentally handicapped is a particular problem of early childhood, because of the occurrence of seizures in 25% of children under 5 years with IQ less than 50.

Table 1. Age and sex distribution

| Age Group (in years) | Non EPI (1023) | EPI (184) |
|----------------------|---------------|-----------|
|                      | M  | F  | M  | F  |
| upto 5               | 133| 91 | 25 | 17 |
| 6 - 10               | 190| 90 | 34 | 18 |
| 11 - 15              | 186| 87 | 32 | 15 |
| 16 - 20              | 99 | 35 | 23 | 44 |
| > 20                 | 85 | 27 | 7  | 9  |

Table 2. Epilepsy and level of mental retardation

| Level               | Epilepsy (N = 184) | Non-epilepsy (N = 1023) | % with epilepsy |
|---------------------|--------------------|--------------------------|-----------------|
| Borderline (N = 125) | 113                | 12                       | 9.6             |
| Mild (N = 369)       | 333                | 36                       | 9.7             |
| Moderate (N = 363)   | 320                | 43                       | 11.8            |
| Severe (N = 214)     | 167                | 47                       | 21.9            |
| Profound (N = 136)   | 90                 | 46                       | 33.8            |

Table 3 provides details on the aetiological factors. Among the epileptics individuals those with post-infective states rank highest (13.6%). None with Down's Syndrome had epilepsy. This concurs with the finding of Veall (1974) and O'Donohoe (1981). However, Corbett (1981) reports that young children with Down's Syndrome suffer from febrile convulsions and some of them have a form of pyridoxine dependent myoclonic epilepsy. Veall (1974) observes that persons with Down's Syndrome have increasing tendency to epilepsy as they grow older.

Table 3. Aetiological factors

| Aetiology          | Non Epilepsy (N = 1023) | Epilepsy (N = 184) | \( \chi^2 \) | P   |
|--------------------|-------------------------|--------------------|--------------|-----|
| Down's Syndrome    | 68                      | 6.6                | -            | -   |
| Post infective states | 55                      | 5.4                | 13.6         | 1.70| NS  |
| Post traumatic     | 4                       | 0.4                | 2.2          | 7.53| <.05|
| Birth anoxia       | 82                      | 8.0                | 3.3          | 5.22| <.10|
| Hydrocephaly       | 5                       | 0.5                | 3            | 1.6 | 3.08| NS  |
| Prematurity        | 15                      | 1.5                | 1            | 0.6 | 1.02| NS  |
| Metabolic          | 26                      | 2.6                | 3            | 1.1 | 0.45| NS  |
Among other aetiological factors, birth anoxia, post traumatic conditions and hydrocephalus tend to be associated with seizures. Associated conditions of mental retardation and epilepsy are seen at Table-4. Epilepsy is found to be relatively more in all the four associated conditions namely cerebral palsy, behaviour problem, hyperkinesia and psychosis. Corbett (1981) in his Camberwell study found that 60% of children with cerebral palsy had seizures, the rate being highest in spastic children. O'Donohoe (1981) also observes that individuals with cerebral palsy tend to have epilepsy. However, he maintains that perinatal brain damage is the cause for any of the chronic brain syndromes such as cerebral palsy, mental retardation and epilepsy.

Table 4. Associated conditions

| Condition         | Non Epilepsy (N=1023) | Epilepsy (N=184) | x²  | p  |
|-------------------|-----------------------|------------------|-----|----|
| Cerebral Palsy    | N     | %    | N   | %   | .546 | NS  |
| Behaviour problems| 129   | 12.6 | 35  | 19.0|     |     |
| Hyperkinesis      | 116   | 11.3 | 28  | 15.2| 2.23 | NS  |
| Psychosis         | 32    | 3.1  | 17  | 9.0 | 1.50 | NS  |

Lechtenberg (1985) concurs with our finding that behaviour problems are more frequently found among epileptic individuals. He observes that epilepsy intermittently disturbs brain activity which plays a role in learning and precipitating behaviour abnormalities in these children. In the present study statistically significant differences were not observed between the epileptic and nonepilepsy groups on the four associated conditions.

SKILL TRAINING IN INDIVIDUALS WITH EPILEPSY:

Skill training for the mentally retarded individuals is generally need based and individualised due to the nature of the condition. To develop a training programme for a mentally retarded individual, their current level of functioning in various areas such as self help, motor, communication, social, academic and vocational skills are assessed. Based on the need, an individualised programme is developed and implemented for each child. As the nature of training is such, a cross sectional study on role of epilepsy and such other factors on the effectiveness of skill training cannot be made. Individuals case studies were hence resorted to.

Ten individuals with epilepsy and varying levels of mental retardation belonging to age groups ranging from 1 year to 19 years of both the sexes were selected for the study. Graphs were plotted with the time (monthly followups) on X axis and the progress in skill training and the intensity of seizures on the Y axis. Four skills each were taken in seven cases. In cases 6 and 10 only three skills were taken and in case 7 only two were taken for training. Scorings for each of the skills was done as mentioned earlier. The maximum score would be 100 if four skills are taken, 75 for three skills and 50 for two skills. The scales on x axis were adjusted based on the number of followups and on y axis based on the number of skills taken for training and the intensity of fits. In case number 9, in addition to the three skills taken up, reduction in abusive language was taken up. Scorings for this was done on the scale of 5:20% less, 10:40% less, 15:60% less, 20:80% less, 25: totally absent. The percentage reduction was as per the parental perception, with the initial problem as the baseline.

Graphs from 1 to 10 show the relationship between the occurrence of epilepsy and progress in skill training. In graphs 1 to 5 it is seen that there is a definite correlation between the occurrence of epilepsy and a decline in the functional level. In case 1 the precipitation of a psychotic attack grossly reduced the functional level. In case 2 myoclonic seizures were associated with generalized tonic clonic convulsions. In case 3 occurrence of a generalized tonic clonic seizure brought down the scores on current level of functioning. In case 4 in the initial phases along with myoclonic epilepsy there were spells of crying. In case 5 the full blown generalized tonic clonic seizure were getting controlled. However scores on abortive seizures were persistent. In cases 6 to 10 no definite correlation was found between the occurrence of seizures and progress in skill training, though in cases 6 and 7 correlation is seen at certain stages of the followup.

The effect of epilepsy on intellectual functioning has been a subject of debate. As early as 1940 Somerfield-Ziskind and Ziskind as reported by Hirtz and Nelson (1985) found that children with untreated epilepsy scored less on intelligence tests when compared to those on medication. Low scores on IQ tests among epileptic children when tested with the matched controls were reported by Meller and Lomić (1977). On the other hand O'Donohoe (1981) observed that
Graphs 6-10. Relationship between no. of seizure attacks and progress in skill acquisition.

- Seizure frequency and skill acquisition.
- Time, money, and use of the right hand.
- Social skills and dressing.
- Feeding and hygiene.
- With and without abusive words.
- Time and money.
- Skill training and generalized tonic clonic seizures.
- Encephalitis and generalized tonic clonic seizures.
- Birth asphyxia and generalized tonic clonic seizures.

No. of Sessions (months) vs. Skill Training Score.

No. of Fits vs. Skill Training Score.
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seizures themselves, even when frequent are seldom responsible for gross decline in intelligence unless the attacks are of long duration or there are major episodes of status epilepticus. Yousef (1985) reported that intense and frequent seizures, brain damage, related behaviour problems and attention deficits have all been impediments to learning in children with epilepsy.

Most of the studies on epilepsy and learning correlate the scores on intelligence and seizures and not on the level of functioning of the child (Lechtenberg, 1985; Hirtz and Nelson, 1985; McIntyre, 1982; Masland, 1985). These studies did not focus on periodic monitoring of progress in specific skills. In the present study such a follow up was attempted and a definite correlation of occurrence of fits and a decline in current that might have influenced the accuracy of results may be, home training, age of the child, skills chosen and influence of drugs. It could be argued that the decline in skill training during programme and priority being given to the control of fits rather than seizure per se. This argument would bear more weight when the child has frequent attacks.

The evaluations in this study were summative at the time of each follow up, both for the number of fits as well as the scores in the skill training. The child's performance in the skills was evaluated wherever feasible objectively. These factors could be controlled if the study is conducted in an institutional setting. With the current trend on deinstitutionalisation, such studies may not be totally feasible. NIMH does not have residential/institutional facilities and hence home training was resorted to.

Lechtenberg (1985) points out that severity of learning problems in epileptic children are in part related to the age at which the children first have seizures. However, his finding was based on epileptic children with normal intelligence. Similarly, Reynolds (1981) observed that barbiturates and hydantoins may have an adverse influence on cognitive performance. Chaudhry and Pond (1961) on the other hand earlier reported that the decline intelligence may be due to seizure frequency rather than drug effects. It can be seen that the literature as well as the present study do not firmly establish a causal relationship between seizures and decline in learning.

ACKNOWLEDGEMENTS

The authors thank the Director, NIMH for permission to publish this paper. We thank our clients and the parents of the followed up group for cooperating with us in monitoring the progress of children. The secretarial help rendered by Ms. Naga Rani and Mr. A. Venkateswara Rao is highly appreciated.

REFERENCES

Chaudhry, M.R. and Pond, O.A. (1961). Mental deterioration in epileptic children. J. Nervi. Neurosurg. Psychiat., 24, 213-219.

Corbett, J.A. (1974). Epilepsy and mental retardation. In: (Ed) M.J. Parsonage, Total care in severe epilepsy, Proceedings of 6th International symposium on epilepsy, Belgium 1974, International Bureau for Epilepsy, London.

Corbett, J.A. (1981). Epilepsy and mental retardation: In: (Eds) E.H. Reynolds, and M.R. Trimble, Epilepsy and Psychiatry, London, Churchill, pp 136-146.

Hirtz, L.G. and Nelson, K.B. (1985). Cognitive effects of antiepileptic drugs. In: (Eds) T.A. Pedley and B.S. Meldrum, Recent advances in Epilepsy-2, London: Churchill, pp 164.

Lechtenberg, R. (1985). The diagnosis and treatment of epilepsy. New York : Macmillan Publishing Co., pp 140.

Masland, R.L. (1985). Psychosocial aspects of epilepsy. In: (Eds) R.J. Porter and P.L. Morselli. The Epilepsies. London: Butterworths, pp 359.

McIntyre, H.B. (1982). The Primary care of seizure disorders. Boston : Butterworths, pp 166.

Meller, D.H. and Lowll, L.A. (1977). A study of intellectual functions in children with epilepsy attending ordinary schools. In: (Ed.) K.J. Peany, Epilepsy - The 8th International Symposium, New York : Raven Press.

O'Donohoe, N.V. (1981). Epilepsies of childhood, Postgraduate Paediatric series. London : Butterworths, pp 143- 146, 233.

Reynolds, E.H. (1981). Biological factors in psychological disorders associated with epilepsy. In : (Eds) E.H. Reynolds, and M.R. Trimble, Epilepsy and Psychiatry, London : Churchill, 264- 290.

Rutter, M.; Graham, P. and Yule, W. (1970). A neuropsychiatric study in childhood. In: Clinics in developmental medicine 35/36, Philadelphia, J.B. Lipincott.

Veal I(1974). Survey of epilepsy among mongols in subnormality hospitals. J. Ment. Defic, Res., 18.

Yousef, J.M. (1985). Medical Educational aspects of Epilepsy: a review. DPH Journal, 8, 4, 3-15.