A study on hearing status among the children in a deaf school in Dhaka city.

Pankaj Kumar Chowdhury[1], Tapas Chakraborty[2], Abul Hasnat Joarder[3], Md. Monjurul Alam[4], M. Alauddin[5].

Abstract

A prospective study was carried out from September 2004 to March 2005 HICARE School, 6/A Dhanmondi R/A, Dhaka-1209, with the aim to evaluate the type and degree of hearing loss and also to find out the causes of hearing loss among the deaf children in Dhaka city. The study included 100 deaf child aged 5-15 years with history of deafness. Out of 100 deaf children male was 55% and female were 45%. Highest number of children were found in 11-15 years of age group and among them majority were found in preschool (Nursery) classes. Onset of deafness was first suspected 48% before 1 years. Among the 100 deaf children positive family history were found in 32% of the patient among which consanguineous marriage of parents were found in 34.37% and majority (55%) of patient were found in lower classes. The etiology of deaf children were diverse. Regarding deafness in relation to gestation period 43% of patient were found in post natal period. Among the one hundred (100) deaf children, 92% of patient were presented with profound hearing loss and majority of deaf children (94%) hearing impairment type were found in sensorineural. In this study, among the deaf children only nin (9) patient were associated with other diseases like cataract, cerebral palsy, Deformed pinna and a few patient present with craniofacial deformity. From this series, pattern of management of deaf child were found that above 95% of patient initially treated by hearing aid of different types followed by educational training (like auditory, speech, and lip reading). It was interesting to note that five (5) children were fitted with cochlear implant.

Key words: Hearing status, Children deaf school.

Introduction

Childhood deafness is still a special problem in our country in terms of assessment and rehabilitation. A deaf child cannot speak or develop speech as he or she cannot hear. Speech and hearing are closely integrated. Children do not complain of impaired hearing and even parents and careers are known to be unaware of the deficit in at least 30% of affected children[1]. A partially hearing child may have defective speech and perform poorly in school and be leveled as mentally retarded. So early identification of hearing loss is desirable to optimize rehabilitation. For that complete otologic and auditory evaluation are every much essential. In Bangladesh deafness is a major public health problem. The country has a population of over 130 million and about 13 million people are suffering from variable degree of hearing loss of which 3 million are suffering from severe to profound hearing loss leading to disability[2]. Several studies have independently indicated that approximately 50% of all childhood deafness is `genetic' in etiology and a suggested incidence of 1/2000 live births is appropriate to genetic deafness[3]. In the United States approximately five thousand children (5000) are born every year that will be found to have significant hearing impairment[4]. In UK the prevalence of hearing impairment in children permanent Childhood Hearing Impairment (PCHl) > 40 HL is 133 per 100000 and for congenital only is 112 per 100000[5]. There were three major risk factors associated with hearing impairment. the first and most important major risk factor was history of staying in Neonatal Intensive Care Unit (NICU) which was 29%[3]. The second major risk factor was family history of hearing impairment in 26% and the third was presence of craniofacial abnormality at birth in 4%[5]. Hearing loss may be secondary to congenital or postnatal acquired conditions. In the United States three quarter of childhood hearing impairment is due to post natally acquired infections, drugs, hyperbilirubinemia, noise exposure and trauma. In addition to meningitis, sepsis and important infectious disease also associated with postnatally acquired hering loss. Again, congenital hearing loss is attributed to defect in child bor with either an inherited genetic defect or result of prenatally acquired conditions. The important non-hereditary cause of congenital loss includes drug exposure, prenatal infection (TORCH) and erythroblastosis foetails[4]. Awareness of the causes of deafness helps to identify high-risk groups and is therefore useful in assisting early detection. It also helps in the planning of programmes for prevention or reduction in the size of the problem[6]. Rehabilitating deaf children is often challenging and requires a significant amount of resources, expertise and experience and needs multidisciplinary team approach[7]. Now an increasing number of children born deaf or partially hearing are receiving education in normal schools. This special training should be given by teachers of the deaf and special schools are available for deaf and partially hearing children. The ultimate aim of all such training, however, should be keep the deaf or partially def child in a normal hearing environment or to return him to that

environment as often as possible and as soon as possible.[8]

In our country, the government runs seven deaf schools, where education is given free of cost. In the non-government sector there are about thirty schools for deaf. This study was carried our over a limited period of time and in a limited number of deaf children (100 cases). So far, we know that a lot of information regarding deafness of children is not available from the schools of deaf in our country. Considering the above facts, this study was undertaken to find out the hearing status among children in a deaf school.

Aims and Objectives

1. To find our Degree of hearing loss
2. To find out Type of hearing loss
3. To find out causes of hearing loss among children in a deaf school.

Materials and Methods

Type of Study: Prospective study
Place of Study: Hicare School, 6/A Dhanmondi R/A, Dhaa-1209
Duration of Study: September 2004 to March 2004

Sampling Method & Sample Size: Purposely selected 100 deaf children (age 5-15 years) in a deaf school in Dhaka city was examined.

Inclusion criteria: Age (5-15) Patients having history of suggestive deafness and clinically detected hearing impairment.

Exclusion Criteria: Age <5 years, >15 years

Data Collection Method: Data was collected by personal interview with data she and examination of ear, nose and throat.

Results

After collection, the data were analyzed according to the variable for the purpose of the study. For better understanding all data were compiled and tabulated accordingly. the results have been shown in tabular forms. The interpretations of the tables are as follows:

Table-I
Age distribution (n=100)

Age group (years)	Number of patient	Percentage of patients
5-10	44	44%
11-15	56	56%

In this study, 44% of patients were found in 5-10 years of age group and 56% of patient were found in 11-15 years of age group. The number of patient were more in 2nd decade (11-15 years).

Table-II
Sex distribution (n=100)

Sex	Number of patient	Percentage of patients
Male	55	55%
Female	45	45%

Sex distribution of the patients showed a male predominance (55%) with a male - female ratio of 1.22:1

Table-III
Age at detection of deafness (n=100)

Age	Number of patient	Percentage
<6 months	14	14%
6 months - 1 year	48	48%
1 year - 3 years	26	26%
>3 years	12	12%

Age distribution of the patients revealed majority (48%) of patient were detected within one year of age.

Table-IV
Family history of deafness (n=100)

Family history	Number of patient	Percentage
Positive	32	32%
Negative	68	68%

Table-V
Type of marriage among family positive group of deaf patient (n=32)

Marriage	Number of patient	Percentage
Consanguineous	11	34.37%
Out side relation	21	65.62%

Positive family history were found in 32% of the patient among with consanguineous marriage were found in 34.37% of patient.

Table-VI
Aetiological group (n=100)

Pattern of aetiology	Number of patien	Percentage
Infection	35	35%
Low birth wt & preterm delivery	16	16%
Hypoxia	10	10%
Neonatal jaundice	8	8%
Ototoxic drugs	6	6%
Trauma	5	5%
Metabolic disorder	3	3%
Miscellaneous	17	17%

The aetiology of deaf child were diverse. Among which infection (like rubella, influenza, varicella, meningitis) contribute 35%. However, LBW and prematurity, hypoxia, neonatal jaundice and ototocic drug also play a significant role.

Table-VII
Deafness in relation to gestation period (n=100)

Period	Number of patient	Percentage
Prenatal	14	14%
Perinatal	34	34%
Post-natal	43	43%
Unknown	9	9%

Regarding deafness in relation to gestation period 43% of patient were found in post natal period. However, no relevant history were found in 9% of patient.

Table-VIII
Degree of hearing loss in dB (n=100)

Degree of hearing loss	Number of patient	Percentage
Profound (>81 dB)	92	92%
Severe (61-80 dB)	8	8%

92% of the children presented with profound hearing loss and only 8% with severe deafness.

Table-IX
Involvement of ear (n=100)

Involvement of ear	Number of patient	Percentage
Bilateral	96	96%
Unilateral	4	4%

Majority of the patient (96%) in the series showed bilateral involvement of ear.

Table-X
Type of hearing loss (n=100)

Type of deafness	Number of patient	Percentage
Sensorineural	94	94%
Mixed	6	6%

Majority of patient hearing impairment type was sensorineural (94%).
Majority of deaf children tympanic membrane found were normal (92%).

Table-XI
Associated diseases (n=9)

Diseases	Number of patient	Percentage
Cataract	4	44.44%
Cerebral palsy	2	22.22%
Deformed pinna	1	11.11%
Cranio facial deformity	2	22.22%

Among the patient only 9 patient had associated disease like cataract, cerebral palsy, deformed pinna, craniofacial deformity etc.

Table-XII
Pattern of management (n=100)

Modalities of treatment	Number of patient	Percentage
Hearing aid & auditory training	85	85%
Hearing aid & speech t raining	6	6%
Hearing aid & lip reading	4	4%
Cochlear implant & speech training	5	5%

95% of patients were treated with hearing aid, among which 6% needed additional speech training and 4% needed lip reading. Only five patients were treated with cochlear implant.

Table-XIII
Types of hearing aid (n=95)

Types of aid	Number of patient	Percentage
Body worm	60	63.15%
Behind the ear	40	38%
In the ear and canal type	Nil	Nil

Majority of patient uses Body worm type of hearing aid (63.15%).

Discussion

A prospective study was carried out from September 2004 to March 2005 at HICARE School, 6/A, Dhanmondi R/A, Dhaka-1209, with the aim to evaluate the type and degree of hearing loss and also to find out the causes of hearing loss among the deaf children in Dhaka city.

In this study one hundred (100) deaf children aged between 5-15 years have been studied. emphasis was given on history, clinical examination and audiological investigations. Although this study had been carried out with a limited period of time and with a limited number of patients, yet this may reflect the overall situation of the society. Because this patient had been collected from a referral centre in where patient are referred from different areas of the country.

In this series, age distribution of the children presented to the deaf school showed that maximum number of patents were in the age group between 11-15 years of age [Table-L]. This delayed presentation of the patient may be due to lack of awareness, poor health care facility and also non availability of the specialist center for early detection and screening of deaf children in our country.

In this study, sex distribution of the patent showed a male predominance (55%) with a male - female ratio of 1.22:1 (Table-II). This result was supported by another study carried out by Minja BM et al[8]., WHO showed a similar sex ratio of 1.11:1.

In our study, majority of deaf children were found in preschool (Nursery) level 45% [Table-III]. However, reported from school that it was not so enough as per as age detection of deaf children in our country.

In this series, age of onset of deafness was detected 6 months - 1 years in 48%, 1-3 years in 26% and before >6 months in 14%. [Table-IV]. This result is consistent with the findings of Kubba H et al[9]. Who had done a study among the children born in Ayshire between 1991-1996. He showed that 48% of children were diagnosed before 1 year and 17% before 6 months.

A family with hereditary deafness is presented in many series[12,13,14], our study shows that positive family history were found in 32% of the patient among which consanguineous marries between parents of deaf child were noted in 34.37% of patient [Table IV,V]. This data supported a positive correlation between deafness with positive family history.

The identification of causal factors related to deafness was mainly based on history taken from the parents. In this study the aetiology o deafness were diverse. Antenatal and postnatal acquisition of infections was responsible for early onset of developing deafness, which were also reported in many other series [13,14,15,16]. In this study during pregnancy following pattern of diseases are found. Among the diseases infection were 35% (measles, mumps, varicella, influenzae, meningitis, typhoid, diarrhoea, pneumonia LBW and prematurity in 16%, hypoxia in 10%. (Proloned labour, placenta previa, others), neonatal jaundice - 8%, ototoxic drgus - 6%, trauma - 5%, metabolic disorder - 3% and miscellaneous - 17% [Table-VI]. This result was similar to the study done by Minja BM etal [17,18]. They carried out among the children at Buguruni school for the deaf in Darussalam, Tanzania, where he reported the causes of infection as unknown cause (24.2%), infection (viral - 27.1%), meningitis - 8.3%, LBW & prematrity (14.1%), neonatal jaundice - (10.9%).

Regarding deafness in relation to gestation period 43% of patient were found in post natal, 14% in prenatal, 34% in prenatal and 9% in unknown group [Table VII]. A study carried out 165 patients in a deaf school Malaysia, showed the distribution of deafness as prenatal (9%), perinatal (30.09%), postnatal (41.38%) and unknown (21.08%). This result was similar to current study.

In this series, 92% of the children presented with profound and only 8% with severe hearing loss [Tale VIII]. This result is consistent with findings of others, where profound deafness was found in 91.06% and severe sensorineural hearing loss in 6.06%.[19]

In this series, majority of patient (96%) had bilateral involvement of ear [Tale IX]. It may be due to most of the deaf children were suffering from systemic diseases in early life.

In this study, majority of the impaired patient were found to have sensorineural impairment (94%) followed by Mixed type hearing impairment 6% [Table X]. In a study based on a series (374) of Malaysian deaf school A. quadrant and G. assennato showed sensorineural in 93.08% and Mixed in 6.02%, which is similar to present study.

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In this series, among the deaf children only 9 patients had associated diseases like cataract (44.44%), cerebral palsy (22.22%), deformed pinna (11.11%) and or cranio facial deformity (22.22%) [Table XI]. Several others studies[19] showed associated other congenital malformation in a significant number of patients.

From this series, pattern of management of deaf child were found that above 95% of patient initially treated by hearing aid of different types followed by educational training (Like auditory training (85%), speech training (06%) and lip reading (4%) [Table XI]. It was interesting to note that 5 patient were fitted with cochlear implant.

In our study, most of the deaf children were found using body worm type of hearing aid (63.15%). None of them use in the ear or canal type (Table XIII). However, WHO report of an intercountry consultaiton[20] showed that currently used hearing aid in India the pocket type was dominant, where as in Indonesia were found mot frequently uses BTE (behind the ear) type.

The facts and figures mentioned here may very from series to series. Still then, as the cases were collected from a deaf school with limited period of time, this study may be of some value in reflecting certain facts regarding "Hearing status among the deaf children in Bangladesh".

Conclusion

From this study, it can be concluded that majority of deaf children were suffering from bilateral profound degree of hearing loss and type of hearing impairment was in sensorineural. Regarding the causes of deafness were found in diverse.

References

1. Susan, Snasall, Childhood deafness, In: Sophic Oliver, Joliedelf. Disease of the ear, 6th edn. Amold 1998; p. 164.
2. Alauddin M, Joarder AH Deafness in Bangladesh. In Suzuki J. Kobayashi T, Koga K (eds). Hearing impairment - An invisible disability, Springer, Tokyo 2004, pp 64-69.
3. Peckham CS, Stark O, Dudgeon JA, et al. Congenital cytomegalovirus infection: a cause of sensorineural hearing loss. Arch Dis Child 1987; 62: 1233-1237.
4. Adrian Davis. Epidimiology of hearing impairment. In: Sophic Oliver, Joliedelf, Disease of the ear. 6th edn. Amold 1998; p. 131-132.
5. Paparella MM, Forx RY, Schachem PA. Diagnosis and treatment of sensorineural hearing loss in children. J Laryngol Otol 1989; 22:51-74.
6. Sirimanna KS. Management of haring impaired infant. Semin Neonatal 2001;6:511-519.
7. Report of the informal working group on prevention of deafness and hearing impairment programme planning WHO, Geneva, 1991. with adaptations from report of the first informal consultation on future programme developments for the prevention of deafness and hearing impairment. World Health Organization, Geneva, January 1997; WHO/PDH/97.3.
8. Berg M, Pallasch H. Sudden deafness and vertigo in children and Juveniles. Adv Otorhinolaryngol 1981; 27:70-82.
9. Nikolopouios TP, Mason SM, O'Donogtue GM, Gibbin KP. Integrity of the auditory pathway young children with congenital and postmeningitic deafness. Ann Otol Rhinol Laryngol 1999; 108:327-330.
10. McCavibt ME. International surgery of deafness and services to deaf people. Proceeding of the World Federation of the deaf, Washington D.C. 1975.
11. Pal J, Bakia Ml. Deafness among the urban community an epidemiological survey at Lucknow. Indian J Med Res 1979; 62:857-868.
12. Holborow C, Markinson F, Anger N. A study of deafness in West Ahried. Intern J Paediat Otol 1982; 4:107-132.
13. Watch C, Anderhuber W, Kole W. Berghol A. Bilateral sensorineural hearing disorders in children, etiology on deafness and evaluation of hearing test. Int J Pediatr Otol 2000; 53:31-38.
14. Minja BM, Aetiology of deafness among children at the Bugurni school for the deaf in dares salaam, Tanzania, Int J Pediatr Otol 1998; 42:225-231.
15. Kubba H, The detection of childhood deafness in Ayrshire, Health Bull 1999; 57:399-405.
16. Sellars S, Beighton P. Childhood deafness in southern Africa, Anaetiology survey of 3,064 deaf children. J Laryngol Otol 1983; 97:85-899.
17. Tleri L, Masi R, Marsclla P, Pinelli V. Sudden deafness in children. Int J Pediatr Otol 1989;7:975-980.
18. Das VK. Aetiology of deafness in children from school for the deaf inMalaysia. Int J Pediatr Otol 1993; 27:21-27
19. Elango S. Aetiology of deafness in children from school for the deaf in Malaysia. Int J Pediatr Otol 1993;27:21-27.
20. Prevention and control of deafness and hearing impairment - report of an inter - country consultation. WHO, New Delhi, Dec 2002.