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Hearing Status of Children in a School of Hearing Impaired, Chattogram City, Bangladesh

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Abstract:
Background:
Childhood deafness is still special problem in our country in terms of assessment and rehabilitation. It causes communication problem, thus affects social and personal living. So hearing impairment amongst the people of developing countries is recognized as a major cause of disability.
Methods and Materials:
Thiscross-sectional study was carried out in children of integrated preschool for hearing impaired children (IPSHIC) of SAHIC(society for assistance to hearing impaired), Chattogram, Bangladesh from January 2019 to December 2019. 60 deaf children were included with age ranges 5-15 years and clinically detected hearing impairment. Data were collected by detailed history, clinical examination and audiometric findings and result were expressed in table form. The aim of this study to evaluate the type and degree of hearing loss and also to find out the causes of hearing loss among the deaf children in Chattogram City, Bangladesh.
Results:
This study included 60 deaf child age ranges from 5-15 years with history of deafness. Most frequent number of patient 33 (55%) were age group 11-15 years. Out of 60 deaf children male were 32 (53.33%), female were 28 (46.66%) and male to female ratio 1.14:1. Most of the deaf children presented with bilateral profound 53 (88.33%) hearing loss and majority 48 (80%) presented with sensorineural type of hearing loss. Family history positive in 20 (33.33%) cases and consanguineous marriage were found in 7 (35%) cases. Commonest cause of deafness was infection 22(36.66%).57(95%) deaf children treated with hearing aid of different types followed by educational training (like auditory, speech, and lip reading). 3(5%) children were filled with cochlear implant.
Conclusion:
Majority deaf children were suffering from bilateral profound degree of hearing loss and type of hearing impairment was in sensorineural. Early detection with universal neonatal screening should be practiced in our country and early rehabilitation reveals better out come.
Key words: *Hearing impaired children, children deaf school.*

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I. Introduction:

Hearing is one of the special senses, God has bestowed upon human beings. One can really appreciate the value of hearing only where one ceases to hear. Unfortunately, in a developing country like us hearing impaired individuals are rediculed[1].

Hearing related disability is becoming an issue of increasing importance worldwide. About 2/3 population with hearing loss came from developing countries[2].

It causes communication problems, thus affects social and personal living. So hearing impairment amongst the people of developing countries is recognized as a major cause of disability[3].

Childhood deafness is still special problems in our country in terms of assessment and rehabilitation. A deaf child cannot speak or develops speech as he or she cannot hear. Speech and hearing are closely integrated.

Child does 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[4].

According to the report of WHO more than 5% of the world's population has disabling hearing loss that impairs their daily life and livelihood[5].

The estimated number of people with disabling hearing loss is 360 million, of which 32 million are children under 15 years of age. In Bangladesh the prevalence of hearing impairment is 9.6% (in the better hearing ear)[6]. Similar prevalence (6.3%) also reported India[7]. Other reported prevalence rates for disabling hearing loss are 6% in Maldives, 8% in both Myanmar &Srilanka and 16.6% in Nepal[8].

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[9].

There were three major risk factors associated with hearing impairment. The first and most important major risk factors was history of staying in neonatal intensive care unit(NICU) which was 29%[9]. The second major risk factor was family history of hearing impairment in 26% and the third was presence of craniofacial abnormality at birth 4%[10].

Hearing loss may be secondary to congenital or post natal acquired conditions. In the USA, three quarter of childhood hearing impairment is due to postnatally required infections, drugs, hyperbilirubinemia, noise exposure and trauma. In addition of meningitis, sepsis and important infections disease and also associated with postnatally acquired hearing loss. Again congenital hearing loss is attributed to defect or in child born 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 foetalis[11].

Rehabilitating deaf children is often challenging and requires a significant amount of resources, expertise and experience and needs multidisciplinary team approach[12].

Experiences from other part of the world indicate that half of hearing impairments are preventable through public education, early detection and effective treatment[13]. However for proper planning of programmes or interventions, representative data are essential to begin such an intervention.

II. Aims And Objectives:

1. To find out the etiology, type and degree of hearing loss among the children in deaf school.
2. To findout the socio-demographic status.

III. Materials And Methods:

This cross sectional study was done in hearing impaired children of integrated preschool (IPSHIC) of SAHIC, 669/B, Zakir Hossain Road, Wireless More, Khulshi, Chattogram, Bangladesh. Study period was January 2019 to December 2019, selected 60 deaf children about 5-15 years in age group in where patients complaining hearing impairment or parental suspicious of hearing impairment & deafness, that why admitted in deaf school. Data was collected by detailed history, clinical examination and audiometric findings and result were expressed in table form.

Inclusion Criteria:

- Age about 5-15 years.
- History of suggestive deafness.
- Clinically detected hearing impairment.

Exclusion Criteria:

- Patients less than 5 years and more than 15 years.
- Patients and parents are not interested to enroll in the study.

Hearing test for purpose age group (5-15 years):

- Pure tone audiometry, tympanometry, SRT

Operational definitions:

1. Hearing impairment:

In line with WHO classification hearing impairment was defined according to puretone average in better hearing ear. The hearing threshold level was calculated as average of three frequencies: 0.5, 1, 2KHZ. A patient with a hearing loss of >25 dB (better ear response) was regarded as hearing impaired.

2. Grading of hearing impairment: (by WHO)

a. Profound hearing impairment >91dB
b. Severe hearing impairment 71-91dB
c. Moderately severe hearing impairment 56-70 dB

d. Moderate hearing impairment 41-55 dB
e. Mild hearing impairment 26-40 dB

IV. Results:

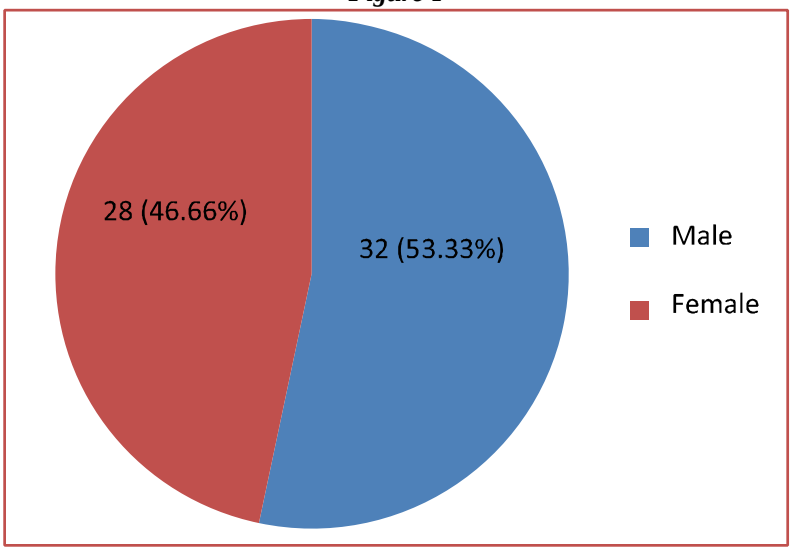
Age distribution (n=60)
Out of 60 patients, most frequent number 33 (55%) was age group 11-15 years followed by 27(45%) was 5-10 years age group which is shown in table-1

Table-1

Age group in years	Number of patients	Percentage (%)
5-10	27	45
11-15	33	55
Total	60	100

Sex distribution (n=60)
Out of 60 patients, most frequent number of deaf child were male 32(53.33%) followed by female patients were 28(46.66%), male to female ratio 1.14:1 which is shown in Figure-I.

Figure-I



Degree of Hearing loss in dB (n=60):
Out of 60 patients, 53 (88.33%) Children presented with profound hearing loss followed by 7 (11.66%) were presented with severe hearing loss which is shown in table-II.

Table-II

Degree of hearing loss in dB	Number of patients		Percentage (%)
	Unilateral	Bilateral	
Profound	00	53	88.33
Severe	00	7	11.66
Total	00	60	100

Types of hearing loss (n=60):
Out of 60 patients, most frequent number 48 (80%) were bilateral sensorineural followed by 12(20%) were bilateral mixed groups of hearing loss which is shown in table-III.

Table-III

Types of deafness	Number of patients	Percentage (%)
Sensorineural	48	80
Mixed	12	20
Total	60	100

Family history of deafness (n=60):

Out of 60 patients, most frequent number of deaf child was negative family history 40 (66.66%) followed by positive family history 20 (33.33%) which is shown in table-IV.

Table-IV

Family history	Number of patients	Percentage (%)
Positive	20	33.33
Negative	40	66.66
Total	60	100

Types of marriage among family positive group of deaf patients (n=20):
Out of 60 patients, positive family history were found 20 (33.33%) patients. Among positive family history of 20 (33.33%) patients, 7(35%) patients were found consanguineous marriagewhich is shown in table-V.

Table- V

Marriage	Number of patients	Percentage (%)
Consanguineous	7	35
Outside relation	13	65
Total	20	100

Etiology of deafness (n=60):
Out of 60 patients, most frequent number of deaf child were infection 22(36.66%) followed by low birth weight with prematurity 9(15%), birth asphyxia/hypoxia 7(11.66%), neonatal jaundice 4(6.66%) which is shown in table-VI.

Table-VI

Etiology	Number of patients	Percentage (%)
Infection	22	36.66
Low birth weight with prematurity	9	15
Birth asphyxia/hypoxia	7	11.66
Neonatal Jaundice	4	6.66
Birth trauma	3	5
Ototoxic drugs	2	3.33
Down's Syndrome	1	1.66
Cerebral palsy	5	8.33
Metabolic disorder	2	3.33
Unknown	5	8.33
Total	60	100

Management plane of deaf Children (n=60):
Out of Deaf Children, 95% of patients were treated with hearing aid, among them 6.66% need additional speech training and 5% need lip reading. Only 3(5%) patients were treated with cochlear implant which is shown in table-VII.

Table-VII

Modalities of treatment	Number of patients	Percentage (%)
Hearing aid & Auditory training	50	83.33
Hearing aid & Speech training	4	6.66
Hearing aid & Lip reading	3	5
Cochlear Implant & Speech training	3	5
Total	60	100

Types of hearing aid (N=57):
Out of 57 deaf children who used hearing aid, Majority of patients uses body worm type of hearing aid which is shown in table-VIII.

Table-VIII

Types of Aid	Number of patients	Percentage (%)
Body Worm	31	54.38
Behind the ear	26	45.61
In the ear and canal type	00	00
Total	57	100

V. Discussion:

In our study, 60 deaf children age ranges from 5-15 years were studied cross sectionally after taking relevant history, clinical examination and investigations.

Regarding age distribution out of 60 patients, most frequent number of patients 33(55%) were age group 11-15 years followed by 27(45%) patients were 5-10 age years age group. Study done by Chowdhury PK et al[14] showed frequent number of patients 56% were from age group 11-15 years followed by 44% patients were 5-10 years age group which is nearer to our study.

In our study most frequent patients 32(53.33%) were male, 28 (46.66%) patients were female and male to female ratio 1.14:1. Study done by Minja BM et al[15] showed male to female ratio 1.11:1 which is similar to our study.

In our study, regarding degree of hearing loss, most frequent number of the patients 53 (88.33%) were bilateral profound hearing loss followed by 7(11.66%) were bilateral severe hearing loss. Study done by ElangoS et al[16] showed profound deafness was found 91.06% and severe hearing loss in 6.06% which nearer to our study.

Regarding type of hearing loss, in this study, 53 (88.33%) deaf children presented with bilateral profound hearing loss and 7(11.66%) presented with bilateral severe hearing loss. 48 (80%) were bilateral sensorineural and 12(20%) were bilateral mixed type hearing loss. Study done by Meyarhoff WL et al[17], sellarsS et al[18] showed similar results as our study.

In this study, positive family history of deafness in 20 (33.33%) and negative family history of deaf children 40 (66.66%). Out of 20 (33.33%) positive family history cases, consanguinal marriage was 7(35%). Study done by Bajaj Y et al[19] showed consanguinal marriage was 33% which is similar to our study. Study done by Minja BM at al[15], Holborow C et al[20], Watch C et al[21] supported a positive correlation between deafness with positive family history.

In our study according to etiology of deafness, most frequent number of deaf children were infection 22 (36.66%) followed by low birth weight with prematurity 9(15%), birth asphyxia/hypoxia 7(11.66%) and neonatal Jaundice 4(6.66%). Study done by Chowdhury PK et al[14] showed infection 35% followed by low birth weight with prematurity 16% and hypoxia 10% which is similar to our study. Another study done by jamil ANM et al[22] also showed infection 38% followed by low birth weight with prematurity 14%, birth asphyxia 14% which is nearer to our study.

In our study, management of deaf child were found that 95% patient initially treated by hearing aid of different types followed by educational training (auditory training 83.33%, speech training 6.66%, lip reading 5%), 3(5%) patients were filled with cochlear implant. Study done by Chowdhury PK et al[14] showed similar result which is nearer to our study.

In our study, most of the deaf children were found using body worm type of hearing aid 31(54.38%) followed by behind the ear 26(45.61%). None of them use in the ear or canal type which is accordance to the report of WHO[23].

VI. Conclusion:

Majority of deaf children were suffering from bilateral profound degree of hearing loss and type of hearing impairment was in sensorineural. Early detection with universal neonatal screening should be practiced in our country and early rehabilitation reveals better out come.

Disclosure:

All the authors declared no competing interest.

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