

Original Article

Hearing Level Comparison of Noisy and Silent Area

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Abstract:

This prospective study was carried out in the Department of ENT and Head Neck Surgery, Sheikh Hasina medical college, Tangial, Bangladesh in a period of 6 months from January 2017 July 2017 among those complaining hearing loss attending in ENT out patient department. The aim of the study was to find the out pattern of hearing loss and hearing level comparison between noisy area (such as bazaar, bus stands, factory, school etc) to silent area.

In this study 103 cases of hearing impaired people were taken and the data were collected by interviewing the cases as per questionnaire from history, examination and investigation report. Working place of most of the hearing impaired people was in noisy area 88 (85.4%). Among them most of the patients was male (58%) and female was (42%) and male:female ratio 1.4:1. The commonest type of hearing loss was sensorineural type. In the right ear 55 cases (53.4%) of sensorineural type deafness, 19 cases (18.4%) of mixed type of deafness and 21 cases (20.4%) of conductive type deafness. In the left ear 46 cases (47.7%) of sensorineural type deafness, 18 cases (17.5%) of mixed type deafness and 24 cases (23.3%) of conductive type deafness. This study showed that male (58%) were mostly affected than female (42%) and vehicle drivers (25.5%) were commonest group of people. From this study we got both ears were involved by disease process in 77.6% of patients and only right ear was 14.6% and only left ear was 10% of the patient of hearing loss.

Key Words: Hearing level, Noisy area, Silent area

Introduction:

The ear disease are common in our country but its diagnosis is usually delayed, till then certain amount of hearing loss occurred. So, awareness, early diagnosis and proper treatment are needed to improve the situation. In Bangladesh a lot of people have different

type and degree of hearing impairment. It is one of the important causes that makes a person different from of handicap and detached him from the society^{1, 2}. Even a hearing impaired person become a burden of the society. Hearing impairment is such an important issue that a deaf child can not talk.

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It is congenital or acquired and according to degree of deafness, it is mild, moderate, moderately severe, severe or profound. According to type of deafness it is conductive, sensorineural and mixed. We had 103 patients were underwent details history, examination and investigation. The WHO estimated in 2005 that there were 278 million people worldwide with bilateral moderate to profound hearing loss, of whom 62 million had deafness that began in child³⁻⁵. Two-thirds of people with moderate to severe hearing loss live in the developing countries. South East Asia has the largest of hearing impairment in world and houses one-thirds of the hearing impaired population. So it should routinely done in those patients comparing hearing impairment.

Methods:

It was a prospective study, carried out in the department of ENT and Head Neck surgery, Sheikh Hasina medical college, Tangail, Bangladesh from 01.01.2017 to 01.06.2017 for 6 months. Clinically and by investigation that is pure tone audiometry done in Hearing Centre Speech and development, Tangail. proved case of hearing loss were included in the study. 103 cases of hearing impaired people attending in the department of Otolaryngology and Head Neck surgery was the study population. Data collected by interviewing the cases as per questionnaire from history, examination and investigation report of the patients and are presented by various tables and graph.

Operational definitions:

- i) Tuning fork test
 - a) Rinne test
 - b) Weber test
 - c) Absolute bone conduction test
- ii) Pure Tone Audiometry:

It is a quantitative test to measure hearing level in different frequency level by Hertz(Hz) and hearing loss level by decibel(dB).

(a) Frequency: It is the number of cycles per second. The unit of frequency is Hertz (Hz) named after the German scientist Heinrich Rudolf Hertz.

(b) Decibel (dB): It is 1/10th of a bel and is named after Alexander Graham Bell. It is a logarithmic unit and indicates ratio between two different intensities. One dB is equal to the least perceptible difference in sound detectable by human ear in frequencies concern with speech. In the clinical work the threshold of normal hearing is 0 dB.

- iii) Degree of hearing loss measurement
 - Mild: 25-40 dB
 - Moderate: 41-55 dB
 - Moderately severe: 56- 70
 - Severe: 71-90dB
 - Profound: > 90 dB

Results:

Table-I

Age distribution of the patients (n=103)

Age group	No. of patients	Percent (%)
30-39	12	11.7
40-49	10	9.7
50-59	30	29.1
60-69	27	26.2
70-79	17	16.5
>80	7	6.8
Total	103	100.0

Table-II

Working area of the patients (n=103)

Area	No. of patients	Percent (%)
Noisy area	88	85.4
Silent area	15	14.6
Total	103	100.0

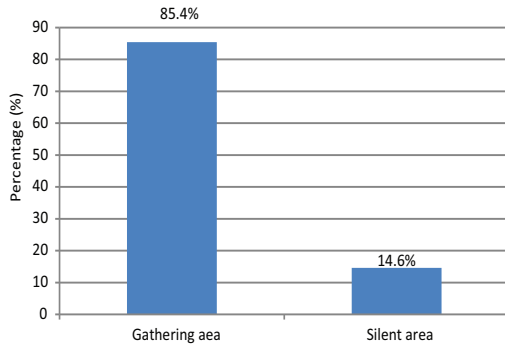


Fig-2: Graphical presentation of working area of the patients (n=103)

Table-III
Occupation of the patients (n=103)

Occupation	No. of patients	Percent (%)
Vehicle driver	26	25.2
Conductor	11	10.7
Hawker	12	11.7
Garments worker	11	10.7
Teacher	4	3.9
Service holder	10	9.7
Housewives	11	10.7
Students	2	1.9
Businessmen	6	5.8
Others	10	9.7
Total	103	100.0

Table-IV
Degree of hearing loss measurements (n=103)

Degree	No. of patients	Percent (%)
Mild (25-40dB)	34	33
Moderate (41-55dB)	21	20.4
Moderately severe (56-70dB)	20	19.4
Severe (71-90dB)	12	11.7
Profound (>91dB)	16	15.5
Total	103	100.0

Table-V
Involvement of hearing loss (n=103)

Ear	No. of patients	Percent (%)
Only right ear	15	14.6
Only left ear	8	7.8
Both ear	80	77.7
Total	103	100.0

Table-VI
Types of hearing loss (left/right) (n=103)

Types of hearing loss	Right ear		Left ear	
	Frequency	%	Frequency	%
Conductive	21	20.4	24	23.3
Mixed	19	18.4	18	17.5
Sensorineural	55	53.4	46	44.7
Normal	8	7.8	15	14.6
Total	103	100.0	103	100.0

Table-VII
Pattern of otological symptoms of the patients(n=103)

Symptoms	No. of patients	Percent
Hearing loss	31	30.1
Tinnitus	5	4.9
Vertigo	3	2.9
Absence of otological symptoms	64	62.1
Total	103	100.0

Discussion:

In this study out of 103 patients, age of the patients range from 30-79 years. 12 patients (11.7%) were between 30-39, 10 patients (9.7%) were 40-49, 30 patients (29.1%) were 50-59, 27 patients (26.2%) were 60-69, 17 patients (16.5%) were 70-79 and 7 patients (6.8%) were >80 years of age group. Most of the patients (71.8%) were in the age range 50-79. Mean age of the patients were

53.10±14.47. This study is similar to other study⁵⁻⁷.

In this study out of 103 patients, 60 patients (58.3%) were male and 43 patients (41.7%) were female and male female ratio 1.4:1. The male preponderance also found in other study that the effects of the exposure to occupational noise are larger for males than females in all sub regions and higher in the developing regions⁸.

Out of 103 patients in our study 88 patients (85.4%) were working in noisy area and 15 patients (14.6%) were working in silent area. This study also correlated with other study⁹.

In our study out of 103 patients, most of the patients who are affected by hearing loss. Among them 26 patients (25.2%) were vehicle drivers, 11 patients (10.7%) were conductor, 12 patients (11.7%) were hawker, 11 patients (10.7%) were garments worker, 4 patients (3.9%) were teacher, 10 patients (9.7%) were service holders, 11 patients (10.7%) were housewives, 2 patients (1.9%) were students, 6 patients (5.8%) were businessmen and 10 patients (9.7%) was other profession. This study is correlated with other study^{5, 10}.

In our study out of 103 patients, 34 patients (33%) were found to have mild degree (25-40dB) hearing loss, 21 patients (20.4%) were found to have moderate degree (41-55dB) hearing loss, 20 patients (19.4%) were found to have moderately severe degree (55-70dB) hearing loss, 12 patients (19.4%) were found severe degree (71-90dB) hearing loss and 16 patients (15.5%) were found to have profound degree (>81dB) hearing loss, which is related to other study^{11,12}.

From this study we got both ears were involved 77.7% of the patients, only left ear was 7.8% and only right ear was 14.6%. So both ear (bilateral) involvement were more than unilateral of hearing loss of the patients. It is correlated with the other study^{5, 11, 12, 13}.

The commonest type of hearing loss was sensorineural type. In the right ear 55 cases (53.4%) of sensorineural type deafness, 19 cases (18.4%) of mixed type of deafness and 21 cases (20.4%) of conductive type deafness. In the left ear 46 cases (47.7%) of sensorineural type deafness, 18 cases (17.5%) of mixed type deafness and 24 cases (23.3%) of conductive type deafness. This study also related with other study^{12, 14, 15}.

The majority of the persons (62.1%) among the study population had no otological symptoms like hearing loss, tinnitus or vertigo. Hearing loss was (30.1%), tinnitus was (4.9%) and vertigo was (2.9%) among the patients. This study also correlated with the other study¹²⁻¹⁶.

Conclusion:

From this study, it can be concluded that a good number of old age people in our country is suffering from sensorineural degree of hearing loss. Most of the people who are working in the noisy area (such as bus stand, bazaar, factory, school etc) that is air polluted area, are those who live in the silent area they are mostly good hearing people.

References:

1. Lunner T. Cognitive function in relation to hearing aid use. *International Journal of Audiology* 2003; 42: S49-58.
2. Michael Gleeson: *Scott-Browns, Otolaryngology & Head-Neck Surgery*; 7th edition; Hodder Arnold, London, 2008; 3: 3261-3275.
3. www.who.int/factsheet/fs300/en/index.html.
4. Browning GG, Gatehouse S. The prevalence of middle ear disease in the adult British population. *Clinical Otolaryngology* 1992; 17: 317-21.

5. SMG Rabbani, MA Chowdhury, AM Shumon, N Yasmeen, M Rashid, M Nuruzzaman, N Ahmed. Pattern and Causes of Hearing Loss Among the Patients Attending in an ENT OPD. Anwar Khan Modern Medical College Journal, Vol 5, No 2 (2014).
6. *Shrestha BL1, Amatya RCM2*. Correlation of numeric rating scale with pure tone audiogram for assessing hearing loss. Bangladesh Journal of Medical Science Vol. 13 No. 01 January'14.
7. Karen J. Cruickshanks, Terry L. Wiley, Theodore S. Tweed, Barbara E.K. Klein, Ronald Klein, Julie A. Mares-Perlman, David M. Nondahl. Prevalence of Hearing Loss in Older Adults in Beaver Dam, Wisconsin: The Epidemiology of Hearing Loss Study. Am J Epidemiol (1998) 148 (9): 879-886.
8. Deborah Imel Nelson PhD, Robert Y. Nelson PhD, Merisol Concha-Barrientos MD, PH, Marilyn Fingerhut PhD. The global burden of occupational noise-induced hearing loss. American Journal Of Industrial Medicine, Volume 48, Issue 6, December 2005, Pages 446–458.
9. R.Deepthi^a, ArvindKasthuri. Validation of the use of self-reported hearing loss and the Hearing Handicap Inventory for elderly among rural Indian elderly population. Archives of Gerontology and Geriatrics, Volume 55, Issue 3, November–December 2012, Pages 762-767.
10. Lovegrove R, Birtles G. Measurements of noisemaking toys and their application in infant hearing assessment. Australian Journal of Audiology 1983; 5(2): 47-54.
11. A. Ouaranta, G. Assennato. Cause of hearing loss in Italy. Audiological Newsletter 1997; 3: 31-33
12. Mohammad Wakilur Rahman¹, Ali Imam Ahasan², Timir Kumar Debnath³, Abul Naser Md. Jamil⁴, Raju Barua⁵, M. Nurul Amin⁶, Study on Hearing Status of Elderly Patients attending a Specialized ENT Hospital (SAHIC). Bangladesh J Otorhinolaryngol 2015; 21(2): 80-84.
13. Marcincuk MC, Roland PS. Inner Ear, Presbycusis. J University of Texas Southwestern Medical Center, May 2002; 7: 102-10.
14. Ferre Rey J, Morello-Castro G, Barber Curto JL. Risk factors involved in presbycusis. Acta otolaryngologica Esp2002; 53(8): 572-7.
15. Rosen S, Bergman M, Plester D, et-al: Presbycusis study of a relatively noise free population in the Sudan. Ann Otol rhinol Laryngol 1962; 71:727-743
16. Pramanic KK, Taous A, Lodh D, Rahman M, Aladddin M. Hearing status of elderly people: study in a tertiary level hospital. Mymansingh Med J 2009; 18(1):98-102.