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A CROSS SECTIONAL STUDY ON PREVALENCE OF HEARING IMPAIRMENT IN ADULTS RESIDING IN URBAN AREA OF GAUTAM BUDDH NAGAR DISTRICT

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Abstract

Introduction: Hearing Loss is a worldwide problem. The prevalence and incidence of this disease is increasing in both developing and developed countries. In elderly and adults, increasing age is associated with a higher prevalence. Hearing loss is also an important cause for the speech impairment, separation from the society, isolation etc. **Methodology**: A community based cross-sectional study was conducted in urban field practice area using a semi-structured questionnaire on adults (18 years and above age) to assess the prevalence and awareness of hearing impairment. **Results**: The questionnaire was given to 574 study subjects out of whom 293 (51.1%) were females and 281 (48.9%) were males. Among them, 65(22.1 %) females and 64(22.7%) males suffered from hearing impairment. Around 73% study subjects related this to age and 54 percent answered that trauma to ear can also cause hearing impairment .Among the affected individuals 33% preferred to use home remedies and 19% ignored the problem. Age, smoking, foreign body insertion in ear, ear discharge and trauma to ear are found to be statistically significant factors. **Conclusion**: The prevalence of hearing impairment in adults came out to be 22.5%. There is a need to spread awareness about hearing impairment and the available treatment options and devices such as hearing aids.

Keywords: Hearing Impairment, SNHL, CHL, Hearing Aids.

INTRODUCTION

The decadal growth of the urban population in India rose to 31.8% during the last decade (2001-2011) [1].Rapid urbanization has led to various public health challenges, including environmental pollution [1]. The 2011 Indian Census noted that 2.21% of the Indian population was afflicted with some disability. The three most common were locomotor (20%), vision (19%) and hearing (19%) [2].By 2050 nearly 2.5 billion people are projected to have some degree of hearing loss and at least 700 million will require hearing rehabilitation. Over 1 billion young adults are at risk of permanent, avoidable hearing loss due to unsafe listening practices [3]. Hearing Loss is a worldwide problem. The prevalence and incidence of this problem is increasing in both developing and developed countries. In elder adults, the prevalence increases as the age increases. Hearing loss is also an important cause for the speech impairment, separation from the society, isolation etc.

Hearing impairment is amongst the most common disability worldwide and also the most neglected one. The exact prevalence is unknown in most parts of the world. Reliable, standardized, population-based data on the causes of hearing impairment are scarce. Most of the countries of the world do not have any national program in for prevention, control and rehabilitation of hearing impaired. India has launched its National Program for Prevention and Control of Deafness in 2007. Hearing loss means

any reduction or difficulty in hearing. Hearing impairment means any level or grade of hearing loss. According to World Health Organization (WHO) pure tone average threshold of more than 25 decibels for frequencies of 0.5, 1, 2 and 4 Kilo Hertz is defined as hearing impaired [3].According to National Sample Survey Organization (2002) hearing impairment contributed to 16.55% of total disability in India. The prevalence of hearing impairment in India is 10.7% in rural areas and 6.8% in urban areas [4]. As per WHO estimates in India, approximately 63 million people, suffer from significant hearing impairment [3].

Epidemiologic studies on hearing and noise exposure are also lacking although it is the most common preventable cause of sensory-neural hearing loss [5]. Considering the seriousness of the newly arising challenge of new technologies and the cumulative effects, it is essential to study both qualitatively and quantitatively the impact of these gadgets on health if used excessively. The problem is more common in the people of lower socioeconomic status, that can be due to negligence of the ear disease, affordability to health care services, lack of awareness [5,6] and lack of resources. Studies shows that the prevalence of hearing loss is increasing because of lifestyle changes such as among the youths, it can be due to overuse of earbuds and earphones [7].Data regarding magnitude of hearing impairment in urban and rural population in our country is limited. The present epidemiological study primarily aims to estimate the prevalence of hearing impairment in urban field catchment area of a tertiary care hospital of Gautam Buddh Nagar district region and determine various factors associated with hearing impairment.

MATERIALS & METHODS

This community based observational cross sectional study was carried out by the department of community medicine over a period of 3 months from July 2023 to September 2023 in urban field practice area of medical college in National capital region, New Delhi among the adult population. Based on earlier study done in Aligarh in 2017 [8] prevalence of hearing impairment was found to be 20.5%. Taking this prevalence of 20.5%, absolute precision of 5% and 95% confidence interval with design effect of 2, sample size was calculated to be 522. Considering 10% non-response, the total sample size required was 574. List of all 8 colonies in the urban area were obtained and multistage cluster sampling technique was used at the following levels in urban area. The households in the selected colonies were covered in proportionate manner. All persons who were willing to participate were enrolled into study after taking informed written consent. Exclusion criteria were bed ridden persons, mentally disturbed persons and who don’t want to participate in the study .Information was obtained by a semi-structured questionnaire, clinical ear examination and audio-logical tests using Tuning Fork were conducted by trained personnel . The first part of the questionnaire assess the socio-demographic profile of the study. The second part had questions regarding risk factors. The third part had questions about the awareness of the person about Hearing loss. The information was collected on the spreadsheet using Microsoft Excel software. Descriptive statistics such as mean standard deviation, percentage were used to describe the data collected in the present study. Chi-square test was used to assess association between various factors related to hearing loss with 95% CI. The results were considered statistically significant with $p<0.05$. All statistical analyses were performed using Statistical Package for Social

Sciences (SPSS) 21 trial version, International Business Machines Corporation (IBM, New York, USA).

Ethical approval: This was a cross-sectional study without intervention. Consent was obtained from participants. Approval of the study protocol was obtained from institutional ethical committee and all research data was kept secure and participant confidentiality was maintained.

RESULTS

This present cross sectional study was conducted from July to September 2023 on 574 adults. Among the study population nearly 293(51 %) were females and rest of them were males being maximum population belonging to 21-40 years as shown in table 1 .Nearly 522 (91%) of the study population belonged to hindu religion .Amongst all, about 426(74 %) of the population was married and 133(23.2%) were unmarried as depicted in table no. 1 .The maximum population belonged to middle socioeconomic status as shown in table no.1 followed by lower middle socioeconomic status according to modified Kuppuswamy scale.

Using the tuning fork test, the prevalence of total hearing impairment found to be 129 (22.5%). Within this the prevalence of conductive hearing loss (CHL) was 82(14.3 %) and sensory neural hearing loss was 47(8.2 %) as depicted in figure 1 .The prevalence of conductive hearing loss is more in females while the prevalence is slightly higher in males in case of sensory neural hearing loss as depicted in table number 2. Based on the tuning fork test 8(10%), 45(55%) and 29(35%) of the affected individuals belonged to mild, moderate and severe conductive hearing loss amongst the CHL affected individuals.

Regarding the awareness about the causes of hearing impairment, only 420(73.6%) of the study subjects related this to age and only 310 (54 %) believed that trauma and foreign body insertion can lead to hearing impairment .Hardly 194 (33.75%) agreed that noise and ear gadgets can also lead to the problems in the ear. Table 3 represents the association among hearing impairment and various risk factors .Age ,smoking ,foreign body insertion in ear ,ear discharge and trauma to ear are found to be statistically significant factors with p value less than 0.05 as shown in table no 2.

Table 1: Table representing socio demographic profile of the study participants N=574

Variable		MALE Number (Percentage)	FEMALE Number (Percentage)	TOTAL Number (Percentage)
Age	18-20	27(9.6)	18(6.1)	45(7.86)
	21-30	94(33.4)	90(30.7)	184(32.14)
	31-40	84(29.9)	76(25.9)	160(27.86)
	41-50	33(11.7)	60(20.5)	93(16.07)
	51-60	33(11.7)	22(7.5)	55(9.64)
	61-70	8(2.8)	18(6.1)	26(4.64)
	>70	2(0.7)	9(3.0)	11(1.79)
Type of family	Joint	96(34.1)	88(30.0)	184(32.1)
	Nuclear	163(58)	165(56.3)	328(57.3)
	Three Generation	22(7.8)	40(13.6)	62(10.8)
Marital status	Married	195(69.4)	231(78.8)	426(74.3)
	Unmarried	86(30.6)	47(16.0)	133(23.2)
	Widowed/Separated	0	14(4.8)	(2.5)

Religion	Hindu	252(89.7)	270(92.1)	522(91)
	Muslim	17(6.4)	12(4.1)	29(5)
	Sikh	7(2.5)	6(2.0)	13(2.3)
	Christian	3(1.1)	2(0.7)	5(0.9)
	Other	2(0.8)	3(1.0)	5(0.9)
Education	Illitrate	4(1.4)	14(4.7)	18(3.1)
	Just Literate/ Primary	18(6.4)	29(9.8)	47(8.1)
	Middle School	146(51.9)	182(62.1)	328(57.1)
	High School	87(30.9)	35(11.9)	122(21.3)
	Higher Secondary School	18(6.4)	23(7.8)	41((14)
	Graduate	6(2.1)	6(2.1)	12(4.1)
	PostGraduate/Professional Degree	2(0.7)	4(1.4)	6(1)
Occupation	Unemployed/ Home-Maker	36(12.9)	205(70)	241(42.0)
	Unskilled	43(15.3)	39(13.3)	82(14.3)
	Semi-Skilled	67(23.8)	7(2.4)	74(12.9)
	Skilled	56(19.9)	11(3.7)	67(11.6)
	Clerical/Shop-Owner/Farm-Owner	60(21.3)	26(8.9)	86(14.9)
	Semi-Professional	16(5.7)	4(1.4)	20(3.5)
	Professional	3(1.1)	1(0.3)	3(0.5)
Socio-economic status	Upper Class	3(1.1)	2(0.7)	5(0.9)
	Upper-Middle Class	9(3.2)	8(2.7)	17(2.9)
	Middle Class	138(49.1)	130(44.4)	268(46.7)
	Lower Middle Class	139(49.5)	106(36.2)	245(42.7)
	Lower	18(6.4)	21(7.1)	39(6.8)
TOTAL		281(48.9)	293(51.1)	574(100)

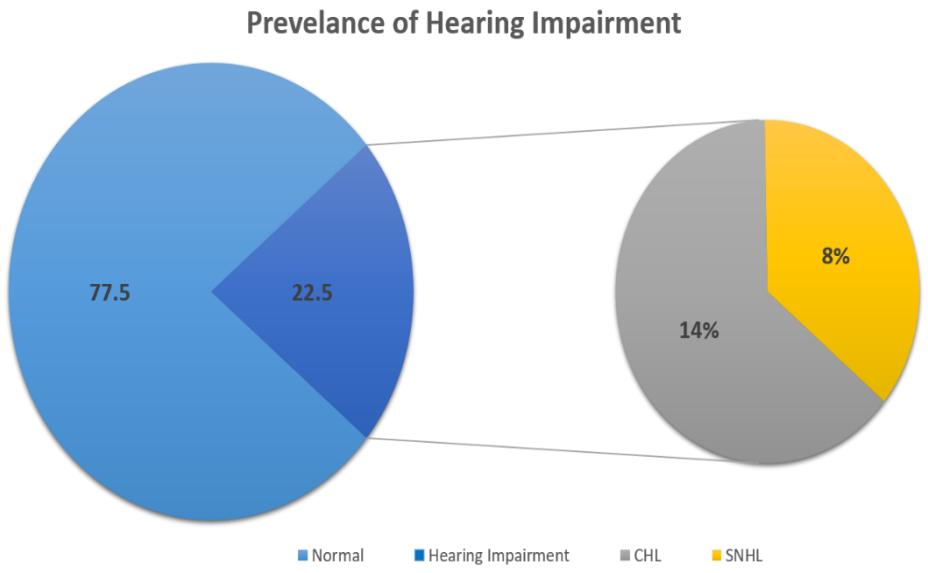

Figure 1: Prevalence of hearing impairment among study subjects (N=574)

Table 2: Table representing distribution of hearing impairment amongst the gender(N= 574)

TYPE	MALE Number (Percentage)	FEMALE Number (Percentage)	TOTAL(N=574) Number (Percentage)
HEARING IMPAIRMENT	64(49.3)	65(50.7)	129 (22.4)
Types of Hearing Impairment (n=129)			
Conductive Hearing Loss(CHL)	36(43.9)	46(56.1)	82(63.5)
Sensory Neural Hearing Loss(SNHL)	28(59.6)	19(40.4)	47(36.5)

Table 3: Table representing association of hearing impairment and various risk factors

Variables		Number (Percentage)	Hearing Impairment		Chi Square value Degree of freedom P value
			Positive(129) Number (Percentage)	Negative(445) Number (Percentage)	
Age	18-60	537(93.5)	109(18.9)	428(74.5)	22.63 1 0.0001
	>61	37(6.4)	20(54.1)	17(45.9)	
Gender	M	281(48.9)	64(22.8)	217(77.2)	0.029 1 0.865
	F	293(51.1)	65(22.2)	228(77.8)	
History of Foreign Body Insertion	Yes	207 (36)	112(54.1)	95(45.9)	186.44 1 0.001
	No	368(64)	17(4.6)	351(95.4)	
History of Trauma	Yes	166(29)	78(47)	88(53)	80.550 1 0.0001
	No	408(71)	51(12.5)	357(87.5)	
History of Ear Discharge	Yes	127(22.1)	84(66.1)	43(33.8)	178.45 1 0.0001
	No	447(77.9)	45(10.1)	402(89.9)	
Smoking	Yes	162(28.2)	95(58.6)	67(41.4)	169.1 1 0.0001
	No	412(71.8)	34(8.3)	378(91.7)	

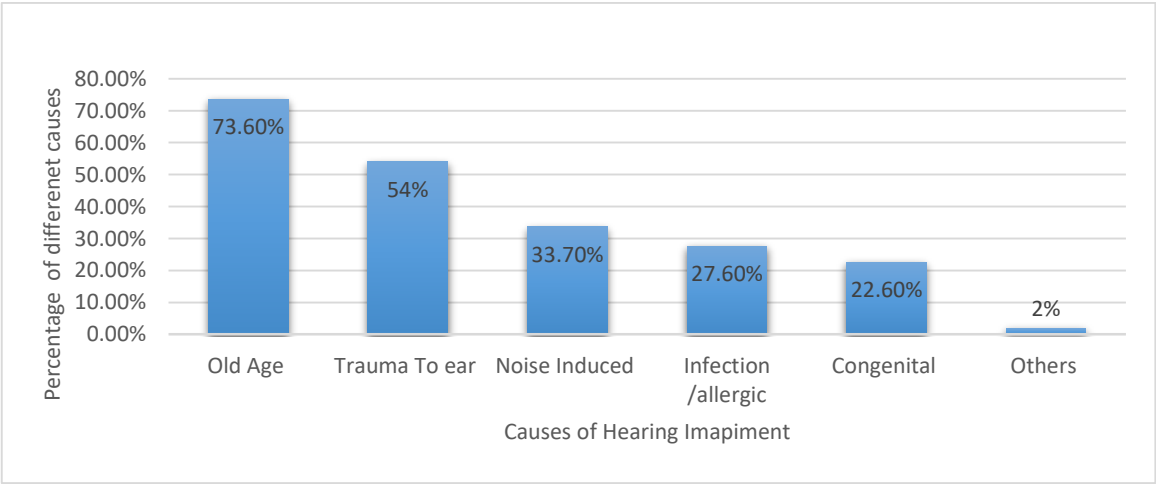

Figure 2: Graph representing awareness about different causes of hearing impairment among study subjects (N=280, multiple response)

*Multiple response

DISCUSSION

This cross sectional study included 574 study participants comprising of nearly 51 percent of the females and rest 49 percent if males. As compared to the national data [1,3] and the studies conducted by ,we have more of females .the majority of the population belonged to 21-40 year age groups similar to the findings of the study conducted in and Aligarh [8], Telangana [9] and Shimla [10] and This might be because of the decadal difference in the collection of data .The study have more of employed population engaged in either skilled, unskilled and being a shopkeeper. Nearly 30 percent of the females are also engaged in skilled or unskilled work in contrast to the study done by Nigam M [7] , Mohindroo S [10],Verma RR [11] and Garg S [12] .This might because our study area was a urban area .Nearly 74 percent of the study subjects are married similar to the findings of the study done in Shimla [10] and Delhi [12]. As the study was conducted in urban resettlement colony ,the maximum population belonged to lower or middle class of socio economic status by modified Kuppuswamy scale unlike the studies done in Aligarh [8] and similar to study done in Delhi [12].

The overall prevalence of the hearing impairment was found to be 22.5 % which is relatively more as compared to study done by statistics report [2] ,ICMR [4] , a study by Bright et al [9], Mishra A [13] similar to the study done in Aligarh [8] and Delhi [12] and quite less in comparison to study done in Brazil [14] and Nigeria [15] .The more prevalence of conductive hearing loss might be due the ambient noise in the study area as is near to the construction site and due the the seasonal variation of respiratory tract infections .The study says more of SNHL in Geriatric population similar to the findings of study conducted by Rajaram Rao [5]. Yalamanchali S [16], Deepthi R [17].There is significant association with age similar to the findings of study Gupta A [18] and smoking with the study done by Marbaniang SP [19].

Limitations : There are some limitations of this study. Firstly the sample size is small ,the results cannot be generalized .Secondly few risk factors for example history of drug intake especially ototoxic drugs have been missed .Furthermore, because the educational qualifications of the participants varied, their understanding may differ regarding the risk factors may be different.

CONCLUSIONS

Our study has shown that a higher percentage of hearing impairment . Lifestyle factors (smoking tobacco and chewing tobacco) significantly affect hearing and hearing difficulty, along with the sequential treatment for these ailments, were significantly affected by various socio-economic characteristics. Since hearing loss has been found to have predominantly sensorineural or conductive hearing loss, an early intervention and quality patient education was necessary for prevention of hearing impairment in majority of cases.

Based on our findings, we recommend that additional attention shall be given to understand the strategies that may advocate a higher use for hearing aids among older adults and regarding the use of gadgets now a days. Although a well-planned health structure is in place in India, we suggest that this system of health structure shall be re-examined to establish and integrate the various needs of older adults. There is a need to integrate a comprehensive public health approaches into interventions for older adults and geriatric population with hearing impairments.

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