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Hearing Loss Due To Traffic Noise – A Case Study of Una Town

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Abstract

Road traffic noise is likely the most thorough and inescapable kind of noise pollution and is in charge of negative effects that are destructive to nature and the nature of group health of mankind. Residential area/towns close by roads are additionally casualty of the issue, extraordinarily have the high danger of hearing loss due to the traffic noise exposure. The Objectives of the present review were to concentrate the attributes of hearing loss and survey the predominance of hearing loss because of traffic on 52 people working 8 to 12 hours close to the periphery of NH 8E going through Una Town by performing audiometric test. Consequence of the present study demonstrates that hearing impairment are common in people persistently exposed to traffic noise. The effect of high-level traffic noise leads to temporary threshold shift and if any person is exposed to such noisy environment may suffer from permanent threshold shift after a long period of time.

1 Introduction

Urban areas are majorly under the cover of traffic noise. Traffic noise produces disturbance and ill effects on people as compared to other sources of noise. In India, work carried out by Central Pollution Control Board directed in 1989–90 revealed that road traffic contributes around 55% of total noise contamination. In urban areas, engines and fumes arrangement of automobiles, littler trucks, transports and two wheelers are the real contributors of traffic noise. This kind of noise can be expanded by narrow lanes and tall structures that created a barrier in which traffic noise resonates. Noise induced hearing loss is a sensorineural hearing loss which on long introduction to abnormal state of extraordinary noise can harm and decimates sensory hair cells of the internal ear prompting to perpetual hearing loss which is typically two-sided and demonstrates a comparable pattern in both ears. Noise levels beneath 30 dBA for the most part don't present a hazard to hearing.

The objective of this study is to bring into notice the hearing impairment among people working or dwelling along the periphery of the National Highway 8E in Una town. Audiometric testing was done on 52 such people and the hearing loss and type of impairment was noted.

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2 Literature Review

S.T. Ingle, B.G. Pachpande, N.D. Wagh, S.B. Attarde (2005) done the poll study and also audiometric test on thetraffic policemen, working in the uproarious environment for no less than 10 to 12 hours day by day and gathered information in regards to hearing to status of the policeman. 84% percent of the specimen revealed hearing to loss and expressed at any rate some difficulty in hearing by one or both ears. By audiometric test it was observed that limit normal more noteworthy than 25 dB(A) hearing to level was 80%, 70% and 46% for binaural low recurrence normal (250, 500 and 1000 Hz), for binaural mid-recurrence normal (1000, 2000, 3000 and 4000 Hz) and for binaural high recurrence normal (3000, 4000, 6000 and 8000 Hz) separately in the traffic policemen.

DavorŠuškovic, mag. ing. el. techn. inf. (September 2012) studied the Characteristics of the Noise-Induced Hearing Loss and stated that the level of the sound pressure proficient to deliver harm is around 130-140 dB and fluctuates between people. In his review that the recommended permissible noise presentation to 90 dBA for 8 hours, or 115 dBA for 15 minutes as per Occupational Safety &Health Administration.

Garreth Prendergast, Hannah Guest et al (October 2016) with the help of normal audiograms studied the effects of noise exposure on young adults and stated that the effects of exposure are significantly saw in more aged people or are more effortlessly seen at higher characteristics frequencies than the 3 to 6 kHz region.

TengkuHanidza T.I, Amirah A M Jan et. al. (2013) evaluated the audiograms of the grass cutting workers in Malasiya. All workers were under 8hours of noise exposure. Their study indicate that that five out of 18 (27.8 %) of the workers exceeded the permissible level 90 dB(A), and 15 out of 18 (83.3 %) exceeded the action level 85 dB(A). this lead to impairment in ears of workers and in some cases Noise Induced Hearing Loss was observed

Putu Alit Suthanaya (2015) done the review in DenpasarCity and expressed that the extent of engine cycle rules the road activity (around 75%) and its volume was observed to be the most noteworthy movement noise indicator. They arrangeda model demonstrating the connection between traffic development and increment in noise level. Keeping different components consistent, the expansion of 100 engine cycles will build movement noisier LA eq for around 0.3 dB. The expansion in LA10, LA50 and LA90 are 0.4, 0.4 and 06, separately. - 2.33% is the normal mistake of the anticipated esteem from the deliberate esteem for Leq . Normal error for L10, L50 and L90 is +0.39%, - 1.04% and +0.002%, separately. Considering a normal speed of vehicles between 23-49 km/hour, this model of activity commotion level is useful to anticipate vehicle clamor level for Authority Street.

3 Methods

The study was held at the various sites of the Una town) located at 20.8235°N, 71.0409°E Gujarat which is becoming unevenly on the edges of NH 8E.. People who are engaged in any activity like business etc and also the one who dwell, nearby the NH 8E were motivated to participate in the study. 52 such people who were exposed to traffic noise for at least 8 hours daily and were working or dwelling in such environment for more than one year were selected for study. Subjects from different age groups were considered to carry out the audiometric test. The subjects with inherent age hearing loss were neglected.

Figure 1: Map of Study Area

Audiometric testing of the subjects was done in the noise confined audiometric space to guarantee that the subjects were not presented to activity noise inside 8 hours before testing, to maintain a strategic distance from the temporary threshold shift . Utilizing adjusted Elkon audiometer comprising of customary headphones, the audiometric test was performed. The listening to limits was measured at 500, 1000, 1500, 2000, 3000 and 4000. The edge midpoints were figured as the binaural low recurrence (500, 1000 and 1500Hz), the binaural mid-recurrence (1500, 2000, 3000 and 4000Hz) and the binaural high recurrence (3000 and 4000) normal. Listening to weakness can be characterized as an edge normal more prominent than 25 dB according to Gomez et al. (2001)

The test was conducted in morning as well as in evening of the same day and same subjects, to find out the temporarythreshold shift value. Temporary threshold shift values at varying frequencies as present in audiogram and for different age groups were found out. Also the presence, degree and type of impairment were noted by audiometry.

4 Results

Table 1 is a concise account of the presence and the types of hearing impairments based on the audiograms of the audiometric test. As shown in table 25% of subjects below age 20 years and 13% of the total subjects between age group 20 to 40 were found to be having good hearing without any impairment. In the remaining subjects who belonged to age groups of above 40 were found with at least a minor impairment. 15% and 9% of the total subjects were found under the influence of unilateral impairment in the right ear. and left ear respectively. Majority of the subjects, almost 65% were suffering from the unilateral impairment. This type of impairment is found more in the audiogram of subject above age 30 years.

Table 1: Presence and Type of Hearing Impairments

Hearing impairment					
Age Groups	**No Impairment**	**Unilateral (Right ear)**	**Unilateral (Left year)**	**Bilateral**	**Total**
<20	3	1	2	6	**12**
%	25	8.33	16.66	50	100
20to 40	2	3	1	9	15
%	13.33	20	6.66	60	100
40 to 60	0	4	1	10	15
%	0	26.66	6.66	66.66	100
>60	0	0	1	9	**10**
%	0	0	10	90	100
total	5	8	5	34	**52**
%	9.61	15.38	9.61	65.38	100

In light of audiometric, Table 2 demonstrates the classification of the subjects by nearness and level of listening to disability. As the recurrence ranges expands, the assessments of listening to disability additionally increment. Utilizing a cut off of >25 dB HL, the most minimal commonness of listening to debilitation is 84.61% for the binaural low recurrence normal, trailed by 88.46% for the binaural mid-recurrence normal and 86.53% of binaural high recurrence normal. In the vast majority of the subjects who had listening to weaknesses, a normal limit was found in the scope of 25–55 dB HL. Here Low recurrence is the normal limit at 500, 1000, 1500 and 2000 Hz; mid-recurrence is the normal edge at 1000, 1500,2000, 3000 and 4000 Hz and high recurrence is the normal edge at 3000 and 4000 Hz

Table 2: Presence and Degree of Hearing Impairment Based On Audiometric Threshold Average (N= 52)

Presence and Degree of Impairment (dB)		**No Imairment<=25**	**Impairment >25**	**>25 to <=35**	**>35 to <=50**	**>50**
Threshold Average (dB)	Low Freq.	8	44	16	27	1
	%	15.33	84.61	30.76	51.92	1.92
	Binaural Mid- Freq.	6	46	16	28	3
	%	11.53	88.46	30.76	53.84	5.76
	Binaural High Freq.	7	45	13	25	7
	%	13.46	86.53	30.8	48.07	13.46

Table 3 summarizes the average temporary threshold shift based on difference in threshold values

at low frequencies, mid frequencies and high frequencies noted in morning and evening audiograms of the subjects. The average temporary threshold shift values (dB) decrease as the frequency increases. Also the temporary threshold shift decreases with respect to age.

Table: 3 AvgTemp.Threshold Shift

	Frequencies					
Age Groups	**500**	**1000**	**1500**	**2000**	**3000**	**4000**
<20	11.87	6.2	5.2	4.76	2.06	7.9
20 To 40	6.3	9.2	8.4	7.93	3.03	2.06
40 To 60	10.9	7.5	7.15	8.4	2.3	3.03
>60	9.95	9.6	7.5	7.15	8.4	2.3

On an average temporary threshold shift value is noted approximately from 8 dB to 10 dB, The effect may disappear after few hours. Time to recover temporary threshold shift varies from person to person. According to many literatures, if human beings are exposed to such a noisy environment for more than 8 hours daily may lead to hearing loss or minor impairment, depending upon the level of noise and age of person.

5 Conclusion

The review demonstrates that the general population working for 8 to 12 hours or staying close to the Highway are presented to abnormal state of noise produced due to traffic especially because of heavy vehicle. This may lead to temporary threshold shift and may decrease the hearing capacity of any human being. If any person is working in such noisy environment for more than 1 year is affected and may undergo unilateral or bilateral hearing impairment because of permanent threshold shift People lying under the age group 20 to 40 are majorly affected by such high levels of noise. In some cases it may lead to deafness. .

In the present study majority (65%) of subjects were having bilateral impairment, 9% of total subjects were facing unilateral impairment, in the left ear and 15% of total subjects were affected in right ear, on an average, up to 10 dB threshold shift was observed in the both the ears of the people working or dwelling along the periphery of the Highway.

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