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Assessment Of Hearing Status In Rickshaw Drivers Of Karachi

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Objectives: To assess the hearing status of the rickshaw drivers of metropolitan city of Karachi.

Study Design: Cross sectional study.

Methodology: A total of 128 rickshaw drivers with minimum experience of two years were selected and pure tone audiometry was performed to assess hearing status. Data gathered through structured questionnaire after verbal and written consent. History was taken regarding ears and hearing followed by local examination of both ears in each subject to rule out the presence of wax or any otherabnormality.

Results: The average age of the participants was 46.25±15.20 years. The mean driving experience was 14.88 ± 6.27 years. Out of 128 rickshaw drivers, hearing impairment was observed in 112 (87.5%) cases while only 16 (12.5%) had normal hearing. Only 7 (5.47%) drivers were using any protective device due to excessive exposure to noise. Rickshaw drivers are exposed to excess noise on roads in Karachi and most of themare suffering from noise induced hearing loss. Secondly most of them are unaware and ignorant about this problem and do not use any protective measures.

Key Words: Occupational noise, Professional hazard, Hearing status, Pure tone audiometry.

INTRODUCTION:

Excessive exposure to occupational noise results in impaired hearing and is now recognized as a potential professional hazard which is an uprising problem on a global scale[1]. For improved social and economic development, a disease-free environmentand worker's health is essential. Noise has become a growing concern as a workplace hazard andit is one of the chronic health concern that not only causes gradual impairment but also disturbs the quality of life of the patient[2].Globally, occupational noise results in 16% of the disabling hearing loss in adults[3] and in USA more than 28 million persons are suffering from occupational hearing loss[4]. Sweden spend approximately 100 million dollars annually for hearing impairment compensations and to provide risk free environment for workers[5]. The average cost per hearing loss claim has been calculated by the Canadian compensation board to be 14000 Canadian dollars[6].

Unfortunately, there is no well-defined legislation and comprehensive regulations in Pakistan except Pakistan National Environmental Quality Standards (PEQS) which deal with motor vehicle noise and permit the maximum noise emission limit of 85 dB[7]. A study conducted in Pakistan shows that prolonged exposure to noise for upto 8-12 years results in noise induced sensory neural hearing loss in workers[8].Environmental noise is the major offender of hearing loss and also a very common environmental stress factor in the developed industrial cities[9]. To the best of our knowledge, no national survey has been conducted to date for the assessment of noise level in metropolitan cities of developing countries. Nevertheless, random studies in different cities have shown that the noise level is much greater than the acceptable limits in most of areas, approximately as high as 70 - 90dB[7]. There is very limited scientific data regarding prevalence, severity, level of noise exposure and degree of hearing loss due to occupational exposure to noise in Pakistan[10].

The aim of this study is to assess the hearing status in rickshaw drivers who belong to a metropolitan city of Karachi.

METHODOLOGY:

A cross-sectional survey was conducted on 128 rickshaw drivers from different areas of Karachi city. Study was conducted from July 2016-August 2016.After the approval of study protocol by research and ethical review board, written informed consent was taken from each participant.

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A detailed history was taken regarding ears and hearing problem followed by local examination of ears, which was carried out in each subject to rule out the presence of wax or any abnormality like perforation in tympanic membraneetc. Interview based on a structured questionnaire was conducted. All the questions were asked, and responses noted down in detail by senior RMOs. Afterwards, pure tone audiometry was performed on all the selected subjects.

The inclusion criterion for this study was drivers of rickshaw having minimum of two years of experience in Karachi city. The exclusion criteria were subjects with any middle ear disease like, chronic suppurative otitis media, otitismedia with effusion, ear wax, tympanic membrane perforation or otosclerosis, subjects having previous history of head or ear trauma and use of hearing aids because of any reason.

Collected data was entered and analyzed using SPSS software version 17. Frequencies and percentages were computed for categorical variables and analyzed using chi-square test while mean and standard deviation were computed for quantitative variables and analyzed by test and analysis of variance. P-value of <0.005 was considered as significant.

RESULTS:

A total of 128 rickshaw drivers were enlisted for this study and all were males (100%). The mean age of the participants was 46.25±15.20 years, the range being 16 to 70 years. Regarding duration of driving, 42 (32.81%) had 2 to 10 years of experience, 58(45.31%) had 11 to 20 years of experience and 28(21.88%) had more than 20 years of experience.The mean driving experience was 14.88±6.27 years with range of minimum 2 years and maximum 25 years. Most of the rickshaw drivers were driving for more than 8 hours a day and 6 and 7 days per week.

There were 83(64.8%) drivers suffering from different problems related with hearing while 45 (35.2%) had no complaint related with hearing (fig 1). Among these 83 drivers, 10(7.8%) were complaining of ringing in the ears, 16(12.5%) had difficulty in hearing during the mobile phone usage, 41(32%) had difficulty in communication in one to one conversation and 16(12.5%) had difficulty in understanding in the presence of background noise (fig. 1).There were 61(47.7%) drivers who responded that they were facing these problems since they have been employed but had not undergone any hearing tests. Ten (7.8%) drivers responded about being examined and hearing assessment done by the doctor in the past.

On pure tone audiogram, out of 128 rickshaw drivers, hearing impairment was detected in 112 (87.5%) cases while only 16 (12.5%)were not suffering fromany hearing impairment. 17 (13.3%)had mild impairment, 32(25%) had moderate, 19 (14.8%) had severe and 12 (9.6%)had profound impairment in both ears (Table 1). There were 3 (2.3%) cases, who had mild hearing impairment in left ear and severe hearing impairment in right ear and 7 (5.5%) had

Hearing loss	Duration of rickshaw driving in years								
	Right Ear				Left Ear				
	2-10	11-20	>20	Total	2-10	11-20	>20	Total	P-Value
No Impairment	16 (38.1%)	3 (5.2%)	3 (10.7%)	22	13 (31%)	3 (5.2%)	0 (0%)	16	
Mild	14 (33.3%)	7 (12.1%)	0 (0%)	21	17 (45.5%)	6 (10.3%)	0 (0%)	23	
Moderate	6 (14.3%)	29 (50%)	3 (10.7%)	38	6 (14.3%)	26 (44.8%)	7 (25%)	39	0.005
Severe	3 (7.1%)	19 (32.8%)	13 (46.4%)	35	3 (7.1%)	16 (27.6%)	3 (10.7%)	22	
Profound	3 (7.1%)	0 (0%)	9 (32.1%)	12	3 (7.1%)	7 (21.1%)	18 (64.3%)	28	
Total	42	58	28	128	42	58	28	128	

Table 1: Comparison of hearing impairment in each ear with duration of driving experience

Hearing loss	Awareness about the ill effects of noise				
	Right Ear		Left Ear		
	Yes	No	Yes	No	P-Value
No Impairment	10	12	7	9	
Mild	3	18	3	20	
Moderate	0	38	0	39	0.005
Severe	0	35	0	22	
Profound	3	9	6	22	
Total	16	112	16	112	

Table 2: Comparison of hearing impairments in each ear with or without awareness about the ill effects of noise health

Hearing loss	Use of protective devices				
	Right Ear		Left Ear		
	Yes	No	Yes	No	P-Value
No Impairment	4	18	4	12	
Mild	3	18	3	20	
Moderate	0	38	0	39	0.005
Severe	0	35	0	22	
Profound	0	12	0	28	
Total	7	121	7	121	

Table 3: Comparison of hearing impairments in each ear with or without use of protective devices

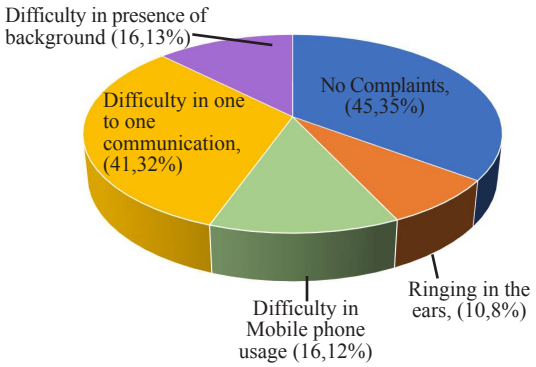

Fig. 1 Complaints regarding hearing in all participants (n = 128)

moderate hearing impairment in left ear and severe hearing impairment in right ear. There were 3 (2.3%)caseswho had moderate hearing impairment in right ear and severe hearing impairment in left ear. Profound hearing impairment was detected in the left side ear in 13 (10.2%) persons.Among these 13 cases 4 (3.1%) had slight, 3 (2.3%) had moderate and 6 (4.7%) had severe hearing impairment in right side. There were 6 (4.6%) cases who had only left ear hearing impairment in which 3 (2.3%) had slight and 3 (2.3%) had profound impairment while hearing impairment in only right ear of the rickshaw drivers was not observed in any case.

Table 1 compares the degree of hearing loss in each year with duration of experience as rickshaw driver. More driving experienced persons had more severe impairment which shows high association of experience and noise exposure (p=0.005).

There were only 16 drivers (12.5%) who were aware about ill effects of noise on health such as hearing loss, headache, depression etc. and only 7 (5.47%) out of 128 participants were using some protective device in the presence of excessive noise. Table 2 shows the degree of hearing loss in each ear in persons with or without this health awareness. It depicts that no impairment was significantly high in those cases who had awareness about ill effects of noise on health.

Use of protective devicesis associated with less hearing impairment. It was observed that, severity of hearing impairment of rickshaw drivers was significantly high in those drivers who did not use protective device as compare to those who used protective device (p=0.005) as show in table 3.

DISCUSSION:

Noise induced hearing impairment is the most dominant, leading and avoidable work-related disease in many developing countries[11]. Furthermore, occupational noise is the commonest cause of noise induced deafness in adults[12]. Exposure to high intensity sound may initially cause temporary hearing loss but later permanent hearing loss occurs. Severity of deafness depends upon on the exposure time, sound intensity and upto some extent frequency of the sound. Karachi is a enormous mega city with a total length of all the roads approximately 8,000 km with around 1.8 million vehicles which is growing with 9% increase per year[13].

Rickshaw is a very common cause of occupational hearing impairment specially in the metropolitan city of Karachi[14].A rickshaw is a three-wheeled taxi which has a pair of stroke engine for two passengers, which is used widely all over Asian countries due to its cheaper fare rates. In Karachi, rickshaw drivers remove rickshaw silencers to gain extra mileage. It has a noise level of 90dB inside the vehicle. Karachi being one of the largest city of Pakistan has a big population of rickshaws in it where 49% of whole country's rickshaws are present and approximately 70,000 rickshaws are registered in this city. Many a times rickshaw drivers use low grade fuels due to which much noise and harmful gases are emitted. These rickshaw drivers are exposed to heavy noise throughout the working hours along with heat, smoke, body vibration etc. It is generally accepted as a fact that excessive noise exposure and hearing loss are inter-related, and this fact is supported by various epidemiological studies which compared the prevalence of hearing impairment in different categories of occupations, particularly in noisy occupations[15,16]. The mean age of the participants in our study was 46.25±15.20 years while a similar study byAslam et al[9] in metropolitan city of Lahore, mean age was 41.35 years.

A similar study done on rickshaw drivers of Karachi found hearing impairment in 81.1% of the drivers included at higher frequencies[17]. In our study we also found hearing impairment in majority of the rickshaw driver. 87.5% of the drivers had hearing impairment in the left ear and 82.8% had impairment in the right ear in our study. The mean rickshaw driving experience in both these studies were also similar ie. 13 years in other study and 14.88 years in our study. Both these studies clearly show strong association of hearing impairment with rickshaw driving.

The effect of noise is not only limited to the drivers and passengers only, rather it also effects the residents and workers around the busy roads and streets. A study conducted recently in Karachi where 5 spots were selected, and sound levels were recorded between 100 to 110 dB throughout the day[18]. Hearing assessment was done among 125 cases who are residents and workers in these areas. It showed an alarming situation where only 17.6% had normal hearing and all others have hearing impairment from mild to moderately severe in nature. Another study from Karachi also showed similar resultswhere maximum peak noise level was found over 101 to 110 dB in different areas[19]. Many other studies had been done on noise induced hearing impairment in the metropolitan city of Karachi related with noise of traffic, industries, aviation, shipyard etc[20-25]. A very interesting study was conducted in Lahore where they

compared simple reaction time in response to some sound stimuli in rickshaw drivers and control group[26]. This study concluded that noise exposed rickshaw drivers take more time to respond to auditory stimuli than control group. A study in Iran on professional drivers showed 37.5% having hearing loss in the right ear and 41.8% of the drivers having hearing loss in the left ear in one or more frequencies of sound[26]. Noise induced hearing impairment has the highest incidence in different countries of the Asia where most of these countries are developing[28].

Another important aspect of this study was the awareness of rickshaw driver related with the ill effects of noise on health. There were only 16 drivers (12.5%) who were aware of these ill effects and majority are ignorant about this very important health related issue. Similarly, only 7(5.47%) participants out of 128 used protective devices in the presence of excessive noise. So, there is strong need to educate these drivers and general public about the hostile and unfriendly effects of noise on health. There is also difference in hearing loss in right and left ear because of different exposure to sound during driving depending upon the right or left hand driving rules of the country[29]. This is not applicable on rickshaw which is open from both sides and there is equal exposure to noise on both ears. But in contrast, in our study 22 drivers had normal hearing on right side while only 16 had normal hearing in left ear which means left side is more affected than right.

If noise exposure can be reduced, then it will also decrease the tendency of drivers to cause accident and injury.If the driver is unable to hear auditory warning signals, then appropriate action cannot be taken in time by themand may result in accident. The noise exposure torickshaw drivers is thus interfering with the safety of driver daily life, asin presence of excessive noise, warning signals or horns from other vehicles may not be heard. Periodic assessment of rickshaw drivers for detecting any hearing loss at initial level should be done. Use of protective devices should be encouraged through workshops etc. There should also be periodic assessment of rickshaws and other vehicles for noise and engine parameters.

CONCLUSIONS:

Rickshaw drivers are exposed to excess noise on roads in Karachi and most of them are suffering from noise induced hearing loss. Secondly most of them are unaware and ignorant about this problem and do not use any protective measures.

CONFLICT OF INTEREST:

None

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