INTRODUCTION

Noise is considered as an undesirable sound, however it is mainly a subjective perception as desirable sound by one person may be regarded as noise by another person. Physically there is no difference between noise and sound. Globally, occupational hearing loss is now considered a recognized problem which results due to excessive exposure to noise. The age related hearing loss increases with passage of time, whereas continuous or intermittent noise exposure is responsible for most rapid hearing loss during the first 10 – 15 years of exposure. Noise has emerged as the most important “stress factor” in most of the humans. Sleep disturbance and annoyance are considered as most negative psychologically effects of noise. Studies show that noise is responsible for higher risk for hypertension and myocardial infarction. A person is predisposed to develop disease secondary to a numbers of environmental factors such as noise which is an important cause of occupational hazard. World health organization now considers noise pollution to be third most hazardous type of environmental pollution after air and water pollution. Noise induced hearing loss occurs in months and years of exposure to high levels of noise resulting in hearing threshold shift. Noise pollution in an urban environment has increased due to growing crowd. Hearing loss because of noise is included in the top 10 work related problems and this is also the most common irreversible health hazard among the workers. The workers who spend maximum time at their work place are exposed to high levels of noise exposure. According to 1994 USA statistics more than 28 million Americans have work related hearing loss and worldwide approximately 600 million workers are affected with occupational noise. Noise related problems are not just confined to Europe, United States and other developed countries, most of the Asian and Latin American countries also facing this growing hazard. Industrialization in urban areas has resulted in migration of millions of people from rural to urban areas with expansion of cities and increased demand for transportation means. Congestion of traffic, more noise emission and in adherence to traffic rules and regulations has greatly contributed to noise related health problems. Normally in nature sound do not exceed beyond 80 dB. In Pakistan, noise pollution is generally ignored which needs effective legislation and implementation. Pakistan National Environmental Quality Standards (PEQS) allow the maximum permissible noise emission limit of 85 dB for motor vehicles. Levels of noise above 85 – 90 dB if prolonged for a sufficient period of time may cause damage to the organ of corti and leads to permanent hearing loss. According to rules laid down by National Environment Quality Standards, Environmental Protection Agency, maximum permissible noise emission allowed from motor vehicles in Pakistan is 85 dB. But the rules are hardly enforced and there is no proper system of maintenance certificates for public vehicles before they are

ABSTRACT

OBJECTIVE: To study the effects of noise pollution on hearing of rickshaw drivers in Karachi.

STUDY DESIGN: Cross sectional study.

PLACE AND DURATION: This study was conducted in Karachi from 5th May - 30th June 2014.

METHODOLOGY: Seventy five male subjects from different professions were selected in Group A, while one hundred and six male auto rickshaw drivers were selected in Group B. Details of sample were collected in questionnaire. Hearing tests of selected sample was conducted on low and high frequencies through Audiometry in sound proof room. Grades of hearing impairment were classified according to WHO criteria. Data was collected and compiled on SPSS version 14.

RESULTS: Audiometry revealed 88 % of subjects as normal in Group A, comprised of subjects from different professions with 12 % showing mild to moderate hearing impairment both at low and high frequencies. Group B comprised of rickshaw drivers, showed 24.5 % normal subjects at low frequency and hearing impairment in 81.1% subjects (P<0.001 ) at high frequencies. There were cases of severe hearing loss among subjects in Group B but no profound hearing loss in either group.

CONCLUSION: A significant hearing impairment was found in rickshaw drivers. Hearing loss among 12 % subjects from general population is also a matter of concern.

KEYWORDS: Hearing Loss, Noise Pollution, Noise Induced Hearing Loss, Audiometry, Autorickshaw Drivers
brought to roads. Also the motor vehicle Rules 1969: section 158 states that every vehicle shall be so constructed and maintained as not to cause noise when in motion. Studies conducted in Karachi, Lahore, Peshawar, Rawalpindi and Quetta have revealed that average noise level is about 95dB±5 in a given day. A study conducted in Faisalabad showed that people were constantly exposed to noise level of 93.5 dB in some localities. The most important contribution in this noise pollution are auto rickshaws, that emits noise level of up to 100-110 dB. Hearing capabilities of drivers are directly affected by noise produced by vehicular traffic. There is usually a very slow and gradual damage to hearing organ resulting in impaired hearing without any alarming symptoms.

Most of the auto rickshaw in Karachi produces noise and auto rickshaw drivers are constantly exposed to high levels of sound for considerable period of time every day. This study was conducted to measure the hearing loss among auto rickshaw divers in Karachi and comparing them with hearing loss of general population. Study provides magnitude of problem so that an appropriate action would be taken.

**METHODOLOGY**

It is a cross sectional, epidemiological study carried out from 5th May to 30th June 2014 in Karachi. The study was conducted after approval from Ethical Review and Research Committee, Jinnah Medical and Dental College Karachi. Total of 106 auto rickshaw drivers and 75 subjects from general population were selected through purposive sampling. Subjects from both of these groups were male adults and were selected on the streets. Minimum age was 22 years and maximum age was 55 years. Subject selected were free from any otological disorders as assessed from history and ear examination while conducting audiometry. Subjects from both groups were excluded with presence of metabolic disorders like diabetes mellitus, hypertension, family history of deafness, history of use of ototoxic drugs or high grade fever.

Data collection Tool: A semi structured questionnaire was used to record the details of subjects in two groups of auto rickshaw drivers and general population. The questionnaire was filled at the time of examination, mentioning general information, working details, general medical history related to ears. Local examination was conducted in subjects for the presence of wax, any disease of ear or perforation in tympanic membrane. Audiological assessment was conducted on all subjects at Eye and Hearing Care Centre, Ibn-e- Seena Hospital Complex, University Road Karachi and Optical Palace, M A Jinnah Road Karachi. MADSIN CONRA and MADSIN ITTERA 2 Audiometers were used. Pure tone audiometry was carried out at following frequencies: 500, 1000, 2000, 3000, 4000, 6000 and 8000 Hz. Audiometry was performed in sound proof room. Degree of hearing impairment was classified according to World Health Organization (WHO) criteria as shown in table I. All the data was collected and compiled using SPSS version 14.

**RESULTS**

Among 181 subjects included in the study, all were males and at least five years in present job. All subjects were living in Karachi for at least five years. Group A comprised of 75 subjects from general population (non rickshaw drivers) with minimum age of 31 years and maximum 55 years with mean age of 43 years. Group B consists of 106 rickshaw drivers having minimum age 22 years and maximum 54 years with mean age of 38 years. Group A comprised, of subjects from different professions like teachers, doctors, guards, salesmen, shopkeepers, researchers, office assistants, gardeners, computer operators etc, living and working in different areas of Karachi with 5 to 35 years experience in their present profession. Mean working experience of subjects in Group A (n=75) was 11.5 years with average of 11 hours daily work. Eighteen percent of subjects in Group A work 7 days a week while 52.6 % work six days a week. Mean experience of driving rickshaw was 13 years among subject in Group B. They drive rickshaws for 10 - 18 hours/day (Average 14 hours/day). 89 % rickshaw drivers work 7 days a week while 11 % work 6 days a week. Results analyzed on low frequencies i.e 500, 1000 and 2000 Hz and high frequency results i.e 3000, 4000 and 6000 Hz are shown in Table-II. Hearing impairment in two groups is analyzed in Table-III. Results of hearing loss in both groups do not show any noticeable difference between left and right ear impairment.

**TABLE - I: GRADES OF HEARING IMPAIRMENT**

<table>
<thead>
<tr>
<th>Grades of hearing impairment</th>
<th>Audiometric ISO value</th>
<th>Performance</th>
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<tbody>
<tr>
<td>0-No impairment</td>
<td>≤ 25 dB</td>
<td>No or very slight hearing problem</td>
</tr>
<tr>
<td>1- Slight impairment</td>
<td>26 – 40 dB</td>
<td>Able to hear whisper Able to hear and repeat words</td>
</tr>
<tr>
<td>2- Moderate impairment</td>
<td>41 – 60 dB</td>
<td>Spoken in normal voice At 1 meter Able to hear and repeat words</td>
</tr>
<tr>
<td>3- Severe impairment</td>
<td>61 – 80 dB</td>
<td>Using raised voice at 1 meter Able to hear some words</td>
</tr>
<tr>
<td>4- Profound impairment</td>
<td>≥ 80 dB</td>
<td>Shouted in better ear unable to hear and understand even a shouted voice</td>
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hearing loss at both low and high frequencies levels. None was reported severe or profound hearing loss. In our study no difference was found in left and right ear hearing impairment and both sides effected equally. Some researchers have reported asymmetric hearing loss in noise pollution and occupational noise, causing left side being affected more than right side.21

**CONCLUSION**

Rickshaw drivers are exposed to excessive noise in Karachi. As high as 81 % of them are suffering from various degree of hearing impairment due to long hours of working and exposure to elevated levels of noise pollution. Hearing impairment in general public is 12 % which is alarming and need concern.

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**REFERENCES**

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