

ORIGINAL ARTICLE

Noise Induced Hearing Loss of Traffic Polices: Study of 30 Cases

Md. Mazibur Rahman¹, Md. Daulatuzzaman², Niamatullah Khan³**Abstract :**

A cross sectional study was done in the department of otolaryngology of Central Police Hospital, Rajarbagh, Dhaka., during the period of January 2005 to December 2007 to find out noise induced hearing loss of traffic polices and to raise awareness for early diagnosis and treatment and also preventive measures of noise induced hearing loss. Thirty patients who were diagnosed as a case of hearing impairment by detailed history, clinical examination and related investigations were included in the study who were exposed to noise 0-20 years. Common chief complaints of the patients were impairment of hearing (100%), tinnitus (50%), dizziness (20%), aural discharge (6.66)%. Medical history of the patients were diabetes (6.66%) and hypertension (26.66 %). 40 % patients were smoker and 60 % patients were non smoker. Associated other disease like chronic suppurative otitis media (CSOM) was present in 13.33 %. Pure tone audiometry revealed normal hearing 3.3 %, conductive hearing loss 10 %, sensorineural hearing loss 73.33 %, mixed hearing loss 13.33 % and normal hearing 6.66 %, mild hearing loss 50 %, moderate type of hearing loss 36.66 % and moderately severe 3.33 %, severe hearing loss were 3.33 %. Treatment of the patients were given by vitamin B₁, B₂, B₆, cochlear vasodilators such as vinpocetine and hearing aids. Patients were advised to change to other department of police service. Those traffic police persons are vulnerable of noise induced hearing loss determined by patients complain, clinical examination and investigations like PTA, were advised to be changed to other department of police service.

Introduction:

Noise induced hearing loss refers to reduction in auditory acuity associated with noise exposure¹. This situation may be temporary and described as temporary threshold shift. The hearing loss may be permanent and this is described as permanent threshold shift.

The effect of noise or any acoustic trauma is of considerable occupational/industrial and public health importance. Repeated exposure to high level of noise is a major cause of deafness particularly in certain occupations and in places of public or private environment where there is over amplification of sound. Proximity to explosions or to gun fire is also liable to result in deafness. In nature, sound seldom exceeds 100 dB. Industrial noise produces louder noise pollution, which tends to last much larger. These include aircraft noise, noise caused by construction equipment and riveting tools.

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About 50%-60% of all industrial workers are exposed to 85 or more dB for 8 hour a day. Other causes i) Noise from metal drill ii) Music from personal cassette player iii) Mining iv) drop forging, pole driving v) noise from hydraulic horn of buses and trucks. vi) Pop music instruments also causes deafness in groups of people.

Acoustic trauma may cause sensory cell damage by direct mechanical action, by direct metabolic disturbances resulting from impaired blood circulation or as a result of altered permeability of cell membrane of outer hair cells of cochlea of inner ear.

The inner hair cells are more resistant to acoustic trauma/NIHL regardless of their site but greater hearing loss inner than the outer hair cells. The hair cells and the cochlear nerve endings can degenerate within days following exposure to sound. In region where the organ of Corti is completely destroyed, the cochlear neurons undergo a slow progressive retrograde degeneration over a period of months resulting in almost 90% loss of cochlear neurons including the ganglion cells within the spiral ganglion.

An increased risk of noise induced hearing loss (NIHL) was noted in persons taking moderate doses of aspirin or salicylate.

W.H.O Resolution about NIHL, 1998-10: Traffic noise has emerged in recent years as an ever present but often underestimated pollutant in our lives. In Europe, the population exposed to levels above 65 dB from 15% in 1980s to 26% in the early 1990s. For comparison, speech can be understood fairly well with background noise levels up to 55 dB. Environmental noise affects health and well being physically, mentally and socially. There is ample evidence showing that high

noise levels interfere with speech and communication, cause sleep disturbance, decreased learning ability and scholastic performance, increase stress related hormones, blood pressure changes, ischemic heart disease as well as the use of psychotropic drugs.

Many studies have shown that noise exposure can cause degeneration to the sensory cell, especially the outer cells in the cochlea of the ear. The degeneration of other sites was also reported, including the primary cochlear nerve endings and synapses, the secondary neurons of the posterior caudal part of the ventral cochlear nucleus and the octopus cell area of the ventral cochlear nucleus was also reported. Other animal studies have shown that noise can induce degeneration of the auditory pathway ascending to the superior olivary complex and inferior colliculus⁷. Predisposing factors of noise induced hearing loss are genetic factors, smoking, diabetes and cardiovascular disease such as hypertension, ototoxic drugs exposure. The patient is far more likely to be male, usually in early middle age. The presentations of the patients are impairment of hearing, tinnitus and dizziness. The symptoms are often have been slowly progressing for many years. Otological examination would be normal. The corner stone of investigation is a pure tone audiogram, with both air and bone conduction to identify any conductive hearing loss. The classical audiometric pattern is of a high tone hearing loss with a notched appearance centred on 4 or 6 KHz, with some recovery at 8 KHz. Treatment measures is mainly preventable. Persons who have to work at places where noise is above 85 dB, should have pre-employment and then annual audiograms for early detection. Specific

treatment includes isolation and protection of noise environment, to avoid further damage hearing aid may help the patient, vitamins, cochlear vasodilators, hearing aids and auditory training.

Materials and method:

A cross sectional study was done in the department of otolaryngology of Central Police Hospital, Rajarbagh, Dhaka., during the period of January 2005 to December 2007 to find out noise induced hearing loss of traffic polices and to raise awareness for early diagnosis and treatment and also preventive measures of noise induced hearing loss. Thirty patients who were diagnosed as a case of hearing impairment by detailed history, clinical examination and related investigations were included in the study who were exposed to noise 0-20 years.

For the collection of relevant data, a pre tested data sheet and structured questionnaire was used in interview. The purpose of the study was explained clearly to the patients. One of

data sheet was used for each patients. The findings were recorded in the data sheet. All collected dates were checked and verified thoroughly to reduce the inconsistency. The numerical data obtained from this study were compiled and analyzed using SPSS, V-10.

Results:

In this series, age of the patients were 25-35 years were 20 %, 36 – 45 years were 40 % and 46-55 years were 40. The chief complaints of the patients were impairment of hearing 100 %, tinnitus 50 %, dizziness 20 % and others complaints 6.66 %. 6.66 % patients were diabetic and 26.66% patients were hypertensive. 40 % patients were smoker & 60 % patients were non smoker. Pure tone audiogram shows normal hearing 3.33 %, conductive hearing loss 10 %, sensorineural hearing loss 73.33 % and mixed hearing loss were 13.33 %. Type of hearing loss were normal 6.66 %, mild hearing loss 50 %, moderate hearing loss 36.66 %, severe hearing loss 3.33 %.

Table – I: Age distribution of patients

Age group (years)	Number of patients (n-30)	Percentage (%)
25 – 35	6	20
36 – 45	12	40
46 - 55	12	40

Table – II: Chief complaints of the patients

Symptoms	Number of patients	Percentage (%)
Impairment of hearing	30	100
Tinnitus	15	50
Dizziness	6	20
Others complaints	2	6.66

Table – III: Medical history of the patients

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Disease	Number of patients	Percentage (%)
Diabetes	2	6.66
Hypertension	8	26.66

Table – IV: Personal history of the patients

Smoking	Number of patients	Percentage (%)
Smoker	12	40
Non smoker	18	60

Table – V: Associated ENT abnormalities of the patients

ENT abnormalities	Number of patients	Percentage (%)
Associated CSOM	4	13.33

Table – VI: Pure Tone Audiometry of the patients

Type of hearing Loss	Number of patients	Percentage (%)
No hearing loss	1	3.33
Conductive hearing loss	3	10
Sensorinural hearing loss	22	73.33
Mixed hearing loss	4	13.33

Table – VII: Pure tone audiometry of the patients

Type of hearing Loss	Number of patients	Percentage (%)
Normal	2	6.66
Mild	15	50
Moderate	11	36.66
Moderately sense	1	3.33
Severe	1	3.33

Discussion:

Noise induced hearing loss means reduction in auditory acuity associated with noise exposure¹. Noise pollution has increased tremendously in last few decades. It is the contribution of modern civilization with rapid industrialization and other source of noise production due to scientific advancement. Various sources of noise are various industrial noise, piling, drilling, generators, welding,

uncontrolled use of electronic horns in Cars, Bus, Minibus and Lorries, loud speakers, mikes, bomb blast, traffic and underground noise and aircraft noise particularly jet engines⁵. Hazards of noise pollution are auditory and non auditory hazards. Auditory hazards are reversible sensorineural deafness, irreversible sensorineural deafness and progressive sensorineural deafness. Non auditory hazards are psychological problem, stress reaction of ill patients, rise of blood

pressure and various cardiac problems. Factors influencing noise induced hazards are intensity of sound, frequency of sound, acute or chronic exposure, type of noise, period of exposure each day, total period of exposure, close or open space⁶.

Individual susceptibility, Age of patient (children and elderly people are more susceptible) and co-existing ear disease. Noise induced hearing loss damage to hair cells starting in the basal turn of cochlea. Outer hair cells are affected before the inner hair cells.

From this study, it can be concluded that the traffic polices working in noisy environment are susceptible to noise induced hearing loss. So, traffic polices should have annual audiograms for early detection, hearing aids and medication if deafness occurred and change to other police department.

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