Original article

Noise Induced Hearing Loss among Khartoum International Airport Employees

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Abstract:

Background: Noise-induced hearing loss [NIHL] was incriminated to be the second most common sensorineural hearing loss, after age-related hearing loss.

Objective: This study aimed to investigate noise induced hearing loss among employees of Khartoum international air port.

Material and Methods:

The study population included sixty adult male employees selected randomly from noisy sections as exposed group. Employees with any middle ear problems, those who received recently drugs that affect hearing, those with congenital hearing problems, and those who were exposed to excessive noise elsewhere in the past were excluded.

The control group consisted of forty employees selected randomly from non noisy working places matched for age and sex.

Audiometric measurement was done to all participants and environmental noise level was measured by noise dosimeter and sound level meter.

Results:

The sound level recorded in the airport was greater than the accepted level. The results showed high incidence of NIHL among employees (55%), especially those in most noisy areas and who were not wearing suitable hearing protection devices.

Discussion and Recommendations:

These findings indicated that sound level in the airport exceeded the accepted level and the incidence of NIHL was high .The employees should wear appropriate hearing protection devices, and the hearing conservation program should be implemented.

Key words: sensorineural, environmental noise, industrial, occupational.

In the recent decades Sudan has witnessed progressive industrial development that may be accompanied by many occupational problems and hazards especially in the absence of safety precautions and control measures in work environment .One of these hazards is loud sound especially in noisy places like Khartoum International Airport.

Noise is defined as unwanted sound[1]. It is one of the most common occupational and environmental hazards but it is usually under estimated [1,2,3]. Outside of work; many persons pursue recreational activities that can produce harmful noise. Occupational sources of noise include chain saws and other power tools, amplified music and recreational vehicles such as snowmobiles and motorcycles[4]. Some types of toys for children can produce sounds capable of causing permanent hearing damage[5].

Noise-induced hearing loss [NIHL] is a sensorineural hearing deficit that begins at the higher frequencies (3,000 to 6,000 Hz) and develops gradually as a result of chronic exposure to excessive sound levels[6].

Acute exposure to short-term impulsive noise will result in acoustic trauma[7]. This can result in immediate hearing loss that may be permanent

The symptoms of NIHL increase gradually over a period of continuous exposure. The individual may not be aware of the loss, but it can be detected with a hearing test. Both forms of NIHL can be prevented by the

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regular use of hearing protectors such as earplugs or earmuffs[8].
The objectives of the study was to investigate the prevalence of noise induced hearing loss among Khartoum international airport employees and to asses the effect of using personal hearing protection devices and duration of exposure on it.

Materials and methods:-

The study was a cross sectional study, done in Khartoum international air port in Khartoum province between October 2003 to April 2004.
The study population included sixty adult male employees selected randomly from noisy sections as exposed group after excluding employees with any middle ear problems, those who recently received drugs that affect hearing, those with congenital hearing problems and those who were exposed to excessive noise before being employed in the airport.
Khartoum international airport was divided into three sections, based on distance from noise source. Twenty employees from each section were selected
The control group was forty employees selected randomly from non noisy workplaces matched for age and sex.
All the subjects were interviewed to obtain information about their personal data, feeling of tinnitus, personal hearing protection usage, and awareness about noise hazards.
Audiometric measurement was done for all participants using Hort Man model DA 323D Type: 115 audiometers. Environmental noise level was measured using Bruel and Kajaer type 2203 sound level meter and Bruel Kjaer type 4428 noise dosimeter which measure the average sound level exposure for the employee during a working shift.
Data were analyzed using SPSS computer program. P values less than 0.05 were considered to be statically significant.

Results:-

The sound level and the incidence of NIHL were highest in section 1(99db) are shown in table 1.

Table 1:-Sound Level and incidence of NIHL at the three sections of the airport.

Location of work	SL(dB)	NIHL
Section 1 (n=20)	99	70%
Section 2 (n=20)	93	55%
Section 3 (n=20)	83	10%

SL= sound level

The dosimeter readings were 93, 87 and 81 dB for the employee in the three zones.

Left ear alone was affected equally as both ears together (45.5 %), but right ear alone was less affected (9 %).
NIHL was detected in 60% of the employees working in the airport more than five years and in 17% in those who worked for 5 five years or less in the airport.
The study showed that 55% of affected employees do not use personal hearing protection devices (PHPD) while 45% used it, but even those who used it, most of them (81 %) used them irregularly.

Discussion:
The sound levels recorded in Khartoum airport in section 1(99 dB) and 2 (93 dB) were greater than the accepted level which should be less than 85 dB[9].
The percentage of NIHL among exposed group was more than control group (55%and 5%respectivly).This may indicate the deleterious effects of high noise level recorded in these sections. Such an effect of exposure to high sound is confirmed in the literature[10].
The study showed that both ears were affected equally as left ear alone, although it was frequently reported in the literature that left ear was usually affected more[11].

There was an increase in hearing loss with increase duration of work as reported in the literature [12].

The protective effect of personal hearing protection devices was documented elsewhere [13]. However, our study showed no statistically significant reduction in incidence of NIHL among employees who were wearing personal hearing protection devices. Irregular usage of the devices probably explains that and points to lack of proper health education in this sector of the community, and also disclose the immense need for rigorous adoption of safety measures by the authorities.

Conclusions:-

Sound level in Khartoum airport was above the accepted level and the prevalence of NIHL among employees was high.

The employees did not wear suitable hearing protective devices regularly during working hours. This needs attention and encouragement and the initiation of an active hearing conservation program.

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