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ASSESSMENT OF NOISE INDUCED HEARING LOSS AMONG WORKERS AT ABEID AMANI KARUME INTERNATIONAL AIRPORT (AAKIA) ZANZIBAR

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Abstract

Background: Noise-induced hearing loss (NIHL) is a hearing impairment resulting from exposure to an excessive loud sound that damage the structures and/or nerve fibers in the inner ear that respond to sound.

Objective*: This study aimed to assess noise induced hearing loss (NIHL) among workers at Abeid Amani Karume International Airport (AAKIA) in Zanzibar.*

Methodology: The Cross-sectional design was used to assess noise induced hearing loss (NIHL) among workers at AAKIA. The non-probability sampling technique was used to recruit 170 participants. Structured Questionnaires were used to gather data on demographic, and potential contributing factors to hearing loss. While an audiometry examination was used to test the participants hearing ability and checklist for direct observation was used to assess safety practice among the workers.

Results*:* The study revealed that of 170 AAKIA participants 52% were male. Among them 116 (68%) aged between 20 - 40 years, while 49 (29%) aged between 41 - 50 years. In general, the study indicated that 97% of the responses(workers) has low awareness of noise induced hearing loss. The audio-metric measurement indicated that only 1% of the respondents have normal hearing level (<25 dB). 81% with slight(mild) hearing loss (25-40dB), while 16% with moderate hearing level (41-60dB). Only 2 % of workers are in severe level of hearing loss (61-80dB) Direct observation shows that only 37% of workers found to wear hearing protection devices.

Conclusion*:* Low awareness on NIHL and use of protective gears pose a threat to the prevalence of NIHL among the workers at the AAKIA. AAKIA management should make strong effort to raise awareness, to improve safety practice so as to prevents its worker from NIHL.

Keywords: ***Noise Induce Hearing Loss, Abeid Amani Karume International Airport, and Hearing protection device***

Introduction

Noise induced hearing loss (NHIL) occurs among workers exposed to excessive level of noise for long durations (1) study aimed to determine the frequency of noise-induced hearing loss among AAKIA employees and evaluate the impact of exposure time and personal hearing protection devices. Hearing aid fittings and vitamin supplements (B1, B2, B6, B12, and folic acid) were used as treatment for the majority of patients with sensor neural hearing loss. lack of knowledge and trained workers to protect themselves with noisy environment, and un available or un uses of protective device on working area are the factors that caused hearing levels of the airport workers to be impaired (2) Among the most prevalent types of serious health issues is noise-induced hearing loss, which is mainly avoidable and likely more common than traditional pure tone indicates. Threshold testing According to conventional wisdom, symmetrical mild to moderate hearing loss with accompanying tinnitus is linked to noise-induced damage to the cochlea. However, a considerable proportion of patients have asymmetrical thresholds and depending on the exposure, severe to profound hearing loss. According to Tanzania's Occupational Safety and Health Act (OSHA) No. 5 of 2003, employers must provide and maintain effective personal protective equipment (hearing protection devices) for workers' use. They must also perform comprehensive pre-placement and periodic medical examinations, which in this case include ear screening. These tasks will aid in the development and efficient implementation of workplace noise-control measures, including extensive hearing conservation programs, to prevent workers from developing hearing loss.

The progressive loss of hearing in both ears are mainly caused by noise pollution at work, Zanzibar forms Airports Authority, modernize aviation infrastructure.(Tanzania). Retrieved 17 January 2013.Although there is always a chance of occupational noise exposure in any workplace, certain employees are more vulnerable than others to higher levels of noise exposure. The normal sound level in the airport was higher than what was considered acceptable, and there was a high incidence of NIHL. As a result, the employees at AAKIA had a higher level of noise exposure than their exposure level, and they were working as usual without wearing the proper hearing protection devices. A lack of knowledge, attitude, and practices regarding noise-induced hearing loss, as well as the implementation of a hearing conservation program, were also contributing factor

MATERIALS AND METHODS

Research Design

The Cross-sectional design was used to assess noise induced hearing loss (NIHL) among workers at AAKIA. The non-probability sampling technique was used to recruit 170 participants. Structured Questionnaires were used to gather data on demographic, and potential contributing factors to hearing loss. While an audiometry examination was used to test the participants hearing ability and checklist for direct observation was used to asses safety practice among the workers.

Area and the Population of the study

The study was conducted at Abeid Aman Karume International Airport that located in Unguja Island. approximately 5 kilometer of the Zanzibar City. The airport was previously known as Kisauni Airport but currently known as Abeid Amani Karume International Airport (AAKIA). The airport has three terminals: Terminal 1 currently used as the airport office and for VIP flight, Terminal 2 for domestic flights and the New Terminal 3 for international flights.

Population of the study

The study targeted the population of workers and Officers from different departments of AAKIA who can provide better information about hearing.

Sampling method

The study was conducted by purposive sampling of different AAKIA stakeholders tabulated at table 1. The study involved 170 respondents whom were randomly selected from different stake holders operated at the airport, and their distributions area, include Airlines, Ground handlers, Security, drivers, loaders, Mashala, customer care service and supervisors

Table 1: Sample frame of the study

S/N	**Stakeholders**	**Population number**		
		Total	Female	Male
1.	D nata	34	14	20
2.	Emigration	22	09	13
3.	Health Workers	42	14	28
4.	Transworld	18	08	10
5.	ZAA	30	12	18
6.	ZAT	24	09	15

Inclusion criteria

Employees who agree to participate and who are subjected to noise in their workplace meet the inclusion requirements.

Exclusion criteria

Employees in the areas where occupational noise exposure is not present, as well as those working without consent.

Data collection

the data was collected by using survey questionnaire, checklist for direct observation and audiometry measurement.

Questionnaire

Structured Questionnaires were used to gather data on demographic traits and potential contributing factors to hearing loss. This included age, years of employment, history of noise exposure at work, current smoking, use of long-term medications, exposure to chemicals or organic solvents, wearing hearing protection when working in noisy environments, head injuries or trauma, ear infections as a kid or adult, and tinnitus. Information was also gathered regarding any family members who had hearing loss, known congenital hearing loss, childhood otitis, and any history of ear-related illnesses (such as diabetes or hypertension). The participants were questioned about their ear discharge, the time and date they left work (in hours), whether they had symptoms of upper respiratory illnesses (such as running nose), and the last time they were exposed to loud noises that interfered with communication. The questionnaires were administered by the researcher and assistant researchers. The questionnaires were composed of both close-ended and open-ended sets of questions, for involving pre-test and actual data collection.

Checklist for ear protection device

Direct observation was performed using checklist for ear protection. Assessment included observations on the availability of safety sign and symbols, safety practices, use of hearing protective device and level of noise on working area. The observation was carried out during working hours.

Pure Tone Audiometry

A systematic methodology was used to perform an audiometric measurement (pure tone eudiometry) during an ear-screening at the Ear, Nose and Throat Department (ENT) Mnazi Mmoja Referral Hospital. Later, an occupational physician conducted an otoscopy; if the ear canal was totally blocked by cerumon or wax, the latter were cleared, and a new eudiometry appointment was placed.

Background noise in the test booth on the sound proof room was monitored by a calibrated hand-held Sound Level Meter (BELL&HARP) PLUS Diagnostic Audiometers, AU1DC (22241967), and checked for conformity with Air (DD45), standard (B71). Quick Start Guide Rev (11-2022.03.21). Registro ANVISA;(80117580687). REF (10146) With Calibration Certificate; (9-28-22/9-28-23). By MK invesntistsrl-Corso Stati Uniti, (1/3- 35127), Pd (Italy). The highest background noise level in booth with Audio cup earphones having lower test limit of 5 dB at 31.5 Hz. The best results were obtained by conducting eudiometry in the morning before any work exposure. Additionally, the city is quieter in the morning than it is during other times of the day, when participants can be subjected to environmental noise at higher levels.

Data Analysis

Basic statistical techniques were used in the data analysis. The cutoff point for statistical significance was set at 0.05. All statistical analyses were conducted using version 26 of the Statistical Package for the Social Sciences (SPSS) software.

Ethical Clearances

The approval of this study was issued by Zanzibar Health Research Ethical Committee (ZAHREC) of the Ministry of Health Zanzibar. The study participants were informed on the purpose of the study and those who agreed to participate were provided written consideration procedure

Result of the study

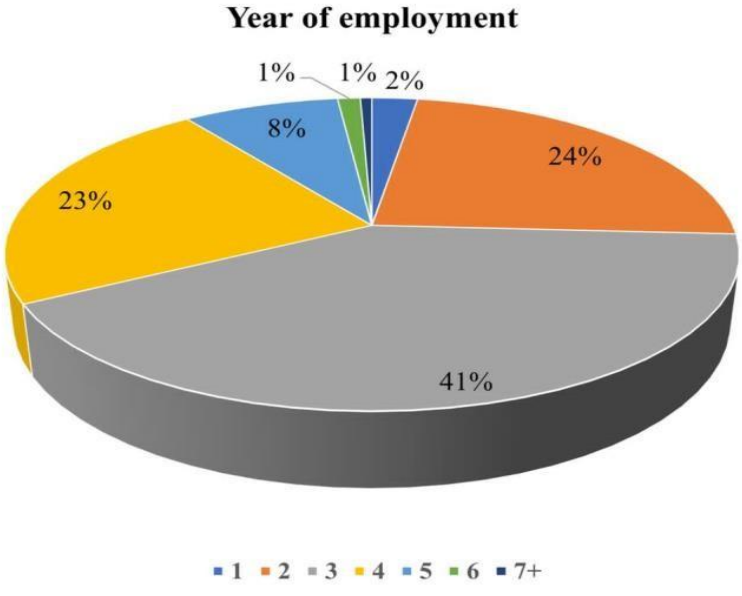
General Demographic characteristic of the participants

Total of 170 AAKIA participants were enrolled in this study, 52% were male. Among them 116 (68%) aged between 20 - 40 years, while 49 (29%) aged between 41 - 50 years. Only 3% were above 51. (Table 2).

Table 2 Age groups of the respondents.

	Age group	Frequency	Percent
	20-30	61	36
	31-40	55	32
	41-50	49	29
	51+	5	3
		170	100.0

The result indicated that 41 % of the respondents spent 7 years of working in their department, 24% 6 years, 23% 5 years, 8% 4 years, 2% 3 years. 1% 2 years of working in their departments as in Figure



1.0.

75% of them did not have a history of medical treatment to hearing loss, 84% of them did not history history of head injury or trauma in their medical history, however 87% of the respondents found to have ear infection in their medical history. The analysis results indicated that 91% of the respondents had not been exposed to noise in their history and this mean their exposure to noise began after being employed only, 9% of the respondents had been exposed to noise in their life history.(Table 3).

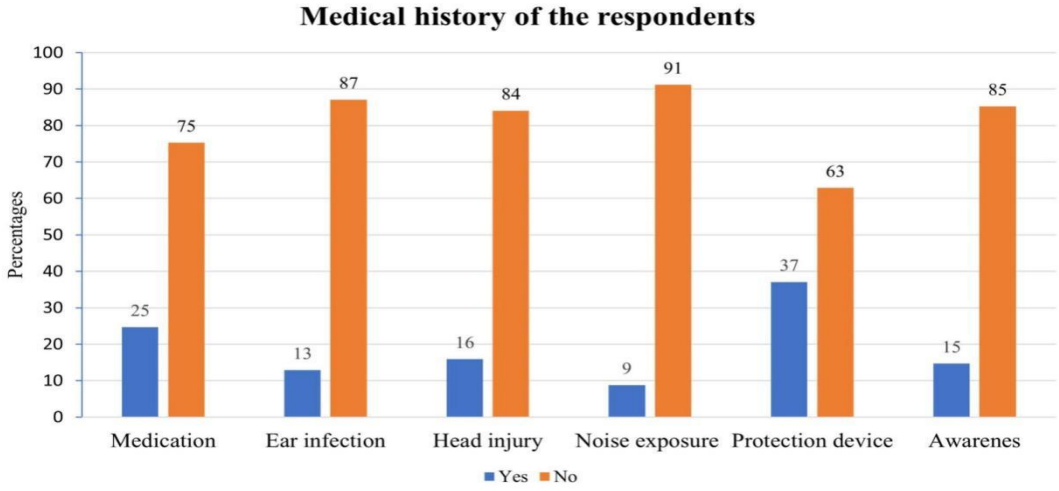


Figure 2. Medical history of the respondents and their experienced hearing disturbances

Awareness of noise induced hearing loss

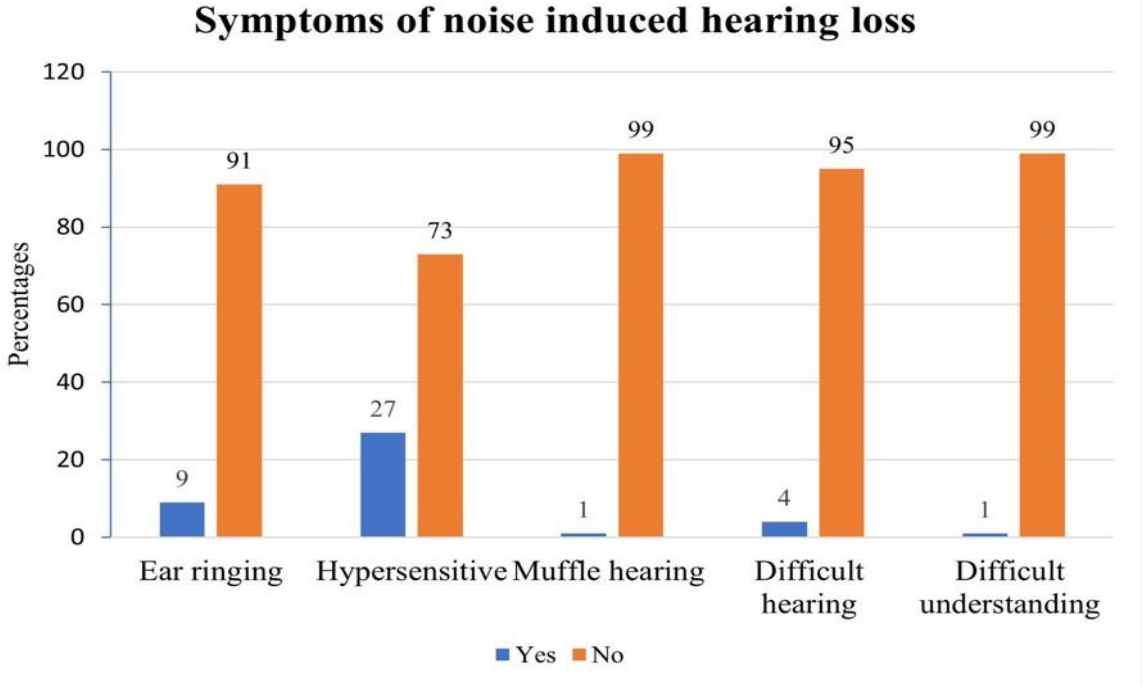
In general, the results of the analysis indicated that majority of respondents 97% of the responses has low awareness on noise induced hearing loss and 85.3% of them did not attend and engage into training on work safety

2.Prevalence of Noise induces hearing Loss and its symptoms among AAKIA

The audiometric measurement indicates that only 1% of the respondents have normal hearing level <25 dB level based. 81% found with slight hearing 25-40dB, while 16% with moderate hearing level (41-60dB). Only 2 % of workers are in severe level of hearing 61-80dB risk of hearing loss noise condition.

Table 3. Hearing level of the respondents in relation to decibel level

dB Level		Frequency
	Normal (<25dB)	1
	Slight (25-40dB)	138
	Moderate (41-60dB)	28
	Severe (61-80dB)	3
		170



The result showed that 9% of the respondent observed to have ear ringing problem, 27% of the respondent experiences the problem of hypersensitive to certain sound, 0.6% of them experience muffle in hearing the speech, 4.1% of the respondents (workers) experience some difficult in hearing high pitch sound and 6% experience difficult in understanding speech over phone.

Direct observation

Majority of the respondents are not wearing hearing protection devices , only 37% of observed workers found to wear hearing protection devices as seen in the figure 3.

3.DISCUSSION AND RECOMMENDATIONS

The aim of this study was to assess noise induced hearing loss among workers at Abeid Amani Karume International Airport (AAKIA) Zanzibar. The results indicated that 91% of the respondents had not been exposed to noise in their history before being employed. According to Tak et al. (2009), around 22.4 million workers are exposed to potentially dangerous noise levels every day.

An occupational noise exposure reports to be one of the most common workplace risks. Moreover, the successful application of hearing conservation programs in the workplace helps prevent hearing loss brought on by occupational noise (WHO, 2013).

The result indicated that 41 % of the respondents have spent 7 years of working duration in their department, followed by 6 years (24), 5 years (23%), 4 years (8%), 3 years (2%). 2 year 1% of the respondents have spent 1 year of working in their departments. Some studies have suggested that a wide range of NIHLs are related to the duration of work. Utilizing full protection is the greatest way to combat occupational noise, which is currently thought to be incurable and the most common cause of NIHL in adults.

The study reveals that majority of AAKIA workers have no historical medication of hearing problems. People who have medical history of hearing problem might be more at risk especially when they continue to noise exposure in there working sections.

In this study majority of the respondents 63% are not wearing hearing protection devices. This exposure to noise and the tendence of not wearing protective hearing device can accelerate the cause of hearing loss to workers. Also 37%of the respondents seemed to wear hearing protection devices to avoid hearing loss. Awareness and enforcement of wearing protective hearing device should be made to avoid ineffectiveness of work and hearing problems. However, the cost of hearing protection may be prohibitive for the majority of impoverished countries. According to WHO estimates, just 10% of the world's need for hearing aids is now satisfied, and only 3% of people in developing countries have access to one. However, because they live in low- and middle-income countries with a dearth of audiologists and other hearing health care specialists, approximately 80% of people with hearing loss are unable to get hearing health care services (WHO, 2013). It seemed that 85.3% of the respondents do not have tendency of attending to training related to health and work safety. Having no knowledge of working safety can increase the risk of being exposed to noise and lead to hearing loss. Regular training should be done to the workers so that they can be protected against noise.

In relation to Symptoms of noise induced hearing loss majority of AAKIA workers do not experience difficult in hearing speech or conversation over phone and this is good for effective communication in the work place.

4. Sample Size

People made up the sample population that participated in the department chosen for airport activities. It also made the assumption that neither the Tanzanian general public nor personnel exposed to noise had any recorded information regarding hearing loss. Using the Cochran formula (Cochran 1977), the study sample size was, in fact, determined based on Westerberg (2008):

$$n = \frac{(Z)2xp(1-p)}{E2}$$

Where:

n = required minimum sample size

z = the standard normal value under 95% confidence level (i.e.,1.96)

p = the expected proportion will be (i.e., 17%; Westerberg2008)

E = the margin of sampling error (5% or 0.05)

therefore:

$n =$

n = 216

Considering the small population size of the workers at the AAKIA in Zanzibar which is estimated to be 922, the finite population correction for proportion formula (Israel 2003) was used to adjust the sample size: no

$$n = 1 + (no - 1)$$
$$N$$

where:
n = adjusted minimum sample size
no = the calculated required minimum sample size
N = the population size (workers at the AAKIA)
therefore:
216

$$n = 1 + \frac{(216 - 1)}{922}$$

n= 170
Low awareness on NIHL and use of protective gears pose a threat to the prevalence of NIHL among the workers at the AAKIA. The AAKIA management should make strong effort to raise awareness, to improve safety practice so as to prevents its worker from NIHL.

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