

Knowledge, Attitude and Practices on Prevention of Noise Induced Hearing Loss Among Factory Workers in Tanzania



Massawe E^{1*}, Mawala S², Ntunaguzi D¹, Kischevo P² and Bweli M¹

¹Department of Otorhinolaryngology, Muhimbili University of Health and Allied Sciences, Tanzania

²Department of Otorhinolaryngology, Muhimbili National Hospital, Tanzania

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*Corresponding author: Massawe ER, Department of Otorhinolaryngology, School of Medicine, Muhimbili University of Health and Allied Sciences, Tanzania

Abstract

Background: Noise-induced hearing loss (NIHL) is sensory deafness caused by long-term exposure of the auditory system to a noisy environment. The pathogenesis of noise-induced hearing loss is complex. Various theories try to explain this, such as the oxidative stress theory, but none perfectly explains the occurrence of noise-induced hearing loss. There is no treatment which can completely reverse the damage. More research is required to explore the pathogenesis and to better guide clinical practice. Preventative strategies, such as educating the public about hearing health, should be adopted to reduce the harm of noise-induced hearing loss [1-3].

Objective: The main objectives were to explore the knowledge, attitudes and practices among factory workers in Ilala regarding noise induced hearing loss and the use of hearing protective devices in NIHL prevention. Noise induced hearing loss is a well-known entity in daily practice of Otorhinolaryngology (ORL).

Methodology: A descriptive cross-sectional design was used to assess knowledge, attitude, practices among factory workers. A study was conducted in Cement Factory and minor factories in, Dar Es Salaam, Tanzania. Non-probability convenience sampling technique was used to obtain all 185 participants. The data was collected using Kiswahili questionnaire with close ended questions. All participants were consented before participating in study, and all the responses were coded and entered in a computer software programme statistical package of social sciences (SPSS) for data analysis.

Results: Large proportion of participants were males (79.5%), aged 26-35years old (34.6%) and with primary education (48.6%). 70.3% were aware of NIHL their main source of information being their teammates. Level of knowledge were 49.2% 40.8% and 10.0% for high, moderate and low levels respectively. Knowledge was influenced by gender and working experience. 84.6% had good attitude on prevention of NIHL which was largely influenced by education level. Only 19.2% had good practice on prevention of NIHL.

Conclusion: There is still a problem among factory workers to practice prevention of noise induced hearing loss despite of knowledge they have

Keywords: Knowledge; Attitude; Practice; Noise induced hearing loss; Factory workers

Abbreviations: ACC: Accident Compensation Cooperation; CDC: Centres for Diseases Control and Prevention; dB: Decibels; HL: Hearing loss; KAP: Knowledge, Attitude and Practice; NHIL: Noise Induced Hearing Loss; ORL: Otorhinolaryngology; OSHA: Occupational Safety and Health Administration; PPE: Personal Protective Equipment's; PTA: Pure Tone Audiometry; SPSS: Statistical Package for Social Services; SRT: Speech Reception Threshold; WHO: World Health Organization

Introduction

Noise induced hearing loss is the gradual bilateral sensorineural hearing loss that occurs due to the effect of workplace noise. In all workplaces there is always risk of exposure to occupational noise, but some workers are more susceptible to

a higher exposure of workplace noise in comparison to others. Noise-induced hearing loss is one of the most common forms of major health problem, is largely preventable and is probably more widespread than revealed by conventional pure tone

threshold testing [2,3]. Noise-induced damage to the cochlea is traditionally considered to be associated with symmetrical mild to moderate hearing loss with associated tinnitus; however, there is a significant number of patients with asymmetrical thresholds and, depending on the exposure, severe to profound hearing loss as well.

A wide variety of NIHLs are work related. Occupational noise is the most common cause of NIHL in adults which is up to now considered incurable and the best approach to it is to utilize maximum protection. An effective noise exposure prevention programme consists of identification of sources of noise and implementation of controlling measures and regulations at working environments as well as performing periodic audiologic evaluation of those who are working at noisy environment [4]. Worldwide, more than one billion people are affected by hearing loss. Noise-induced hearing loss (NIHL) is reported among the most prevalent occupational diseases. However, little is known about the current level of knowledge and attitude towards NIHL among general population [5].

Hearing impairment is still a major challenge for public health organizations. According to the World Health Organization (WHO), there are approximately 466 million people living with disabling hearing loss, including approximately 34 million children. Furthermore, of these, nearly 90% live in middle and low-income countries. Previous reports have also highlighted the significance of noise-induced hearing loss (NIHL), both work- and recreational activity-related NIHL. In the United States, the estimated percentage of individuals with hearing impairment is around 14.4% of adults aged 18 years and above, and approximately 10 million of them suffer from hearing loss due to noise exposure. In the UK, approximately 11 million people have a hearing impairment [6].

Besides loud noise, there are many other risk factors (modifiable and non-modifiable) which can induce progression of noise-induced hearing loss. Modifiable risk factors include smoking, diabetes and lack of exercise, and non-modifiable risk factors include aging, race and genetics. These factors can overlap with noise and accelerate the occurrence of noise-induced hearing loss. Different genders respond almost equally to noise, but gender influences acoustic risk-taking behaviors, boys engage in significantly more high-risk noise activities than girls. Older people and those who have ever suffered from sensorineural hearing loss are more susceptible to noise. Approximately 23% of those between the ages of 65 and 75 years suffer from mild or severe hearing loss. Over the age of 75 years, about 40% have hearing impairment [7,8].

Noise induced hearing loss as the great burden was reported by ACC that it increases the cost each year in rehabilitation centres in New Zealand. The total cost was almost \$43 million in 2004/05, over double those just five years earlier. Across the variety of

industry, academic, narrative, and government sanctioned sources on noise-induced hearing loss, one clear thread is evident: that noise-induced hearing loss is a significant and widespread public health issue, it leads to substantial negative impacts upon the lives of those that are afflicted, and while there is no cure for those that are already affected, the condition itself is regarded as essentially preventable [9].

Problem statement

Noise-induced hearing loss is identified as a significant public health issue worldwide. There is some evidence that the number of new cases is declining in some European countries but increasing in others. Interestingly consistently in the surveys there is apparent increase in the number of people who believe that they are exposed to dangerous noise levels in the workplace [10]. It has been reported that more than one billion people worldwide are affected from noise induced hearing loss [2,3,5]. Also, there is a study conducted in South Africa that showed greater prevalence of NIHL among mine workers [11]. While it is difficult to precisely define and catalogue the disorder, somewhere in the region of 180 million people worldwide may currently be affected with a further 600 million at a high risk of developing it due to excessive noise exposure levels.

Construction, agriculture, manufacturing and metalworking industries show a higher prevalence of noise-induced hearing loss and the greatest losses are consistently among men above the age of 45 years [12]. Occupational Safety and Health Administration (OSHA), has reported that 22 million Americans are exposed to "potentially damaging" noise in the workplace every year. About one-third of Americans in these kinds of workplaces do, in fact, experience noise-induced hearing loss, the CDC has reported [13]. Prevention for NIHL is most used since the problem is still not curable. Action to prevent noise-induced hearing loss is necessary, especially because many causes of permanent hearing loss are preventable. Due to greater development of industries and urbanization in both developed and developing countries NIHL has emerged to be the problem of public health importance [6, 12].

Societal changes are increasing exposure to noise. Although the sensitivity of each individual is different, sound intensity over 85dB can cause noise-induced hearing loss. High levels of noise exposure usually come from occupational noise (such as factories) or recreational noise (such as personal music players). There are also few studies done on prevention on noise induced hearing loss [14]. In Tanzania there was a study conducted that showed many people to have poor knowledge, attitude and practice on prevention of NIHL [15].

Rationale

The purpose of this study was to assess the level of knowledge, attitude and practices among factory workers on prevention of

NIHL. Determining the predictors of knowledge, attitude and practice of noise induced hearing loss (NIHL) among factory workers was important because it may help prevent a serious irreversible noise induced hearing loss [16]. Also, the results of this study will help health practitioners to emphasize more on the prevention of NIHL among the factory workers and the society at large. The results also provide evidence for forming policies which are more effective and influence better response basing on the ground realities. The study also serves as an opportunity for other colleagues to get knowledge and being aware about noise induced hearing loss on how to prevent it emphasizing more to reduce exposure to noise and to use PPE's [17]. The data obtained from this research serves as a platform of data for further research and for comparison of statistics all over Tanzania.

Broad objectives

To assess knowledge, attitude and practices on prevention of noise induced hearing loss among factory workers in Tanzania.

Specific objectives

- a) To assess knowledge on prevention of noise induced hearing loss among factory workers
- b) To assess attitude on prevention of noise induced hearing loss among factory workers.
- c) To assess practices on prevention of noise induced hearing loss among factory workers.

Materials and Methods

Study design

Descriptive cross-sectional study was used to assess knowledge, attitude and practice on prevention of NIHL among factory workers. This was the study of choice because it was meant to collect information once and there was no follow up of participants, it was also cheap, relatively easy to perform and not

time consuming. The study was conducted in April to July 2021. A quantitative method was employed. Such a design was chosen to meet the objectives of the study

Study Area

Cement Factory and minor publishing industries in Tanzania.

Study population

All factory workers with noise exposure.

Inclusion criteria

The inclusion criteria were all factory workers that are on exposure to noise in their working environment and who consented to participate.

Exclusion criteria

Workers in other sections that are not on occupational noise exposure and those who were unable to read Kiswahili.

Data collection methods

Data was collected using Kiswahili questionnaires that were having closed ended questions. This was involving pre-test and actual data collection.

Investigation tools and validity and reliability issues

To test for validity in this study the employed research tool (questionnaires) was pretested and revised to ensure that it gives intended information. The pretest involved a small number of participants that conducted a day before actual data collection day. The essence of pretest study was to ensure that the questionnaire measures and give the required information.

Ethical considerations

The ethical clearance was obtained from the Institute of reviewer board of Muhimbili University of Health and Allied Science. Informed consent was obtained from the study participants before enrolment.

Result

(Tables 1-9)

Table 1: Social Demographic Characteristics of Participants.

Variable	Frequency	Percent (%)
Gender		
Male	147	79.5
Female	38	20.5
Total	185	100
Age group (years)		
16-25	43	23.2
26-35	64	34.6

36-45	43	23.2
46-55	22	11.9
56-65	10	5.4
66-75	3	1.6
Total	185	100
Level of education		
Primary education	90	48.6
Secondary education	61	33
Tertiary education	34	18.4
Total	185	100
Working experience (years)		
0-5	114	61.6
10-Jun	43	23.2
>10	28	15.1
Total	185	100

Majority of the participants were males 147(79.5%) followed by females 38(20.5%), whereby many of them 64(34.6%) were aged between 26 to 35 years while the least respondents were the elders 3(1.6%) aged between 66-75 years. Most of them 90(48.6) had primary education compared to 34(18.4%) respondents who had university and diploma education. In terms of working experience, 114(61.6%) respondents had a working experience of 0-5 years while 28(15.1%) respondents had been working for more than 10 years.

Table 2: Knowledge on awareness of NIHL.

	Frequency	Percent (%)
Yes	130	70.3
No	55	29.7
Total	185	100

Among 185 respondents, 130 (70.3%) had awareness on noise induced hearing loss while 55(29.7%) were not aware on noise induced hearing loss.

Table 3: Source of information on knowledge of NIHL.

	Frequency	Percent (%)
Working mates	59	45.4
Social media	39	30
Working experience	32	24.6
Total	130	100

Out of 130 respondents, 59(45.4%) got information on knowledge of NIHL from their working mates, 39(30%) from radio, tv and newspapers, 32(24.6%) from their working experience.

Table 4: Distribution table on level of knowledge on prevention of NIHL.

	Frequency	Percent (%)
Low	13	10
Moderate	53	40.8
High	64	49.2
Total	130	100

Among 130 of respondents who ever heard of NIHL, 64(49.2%) had high knowledge on prevention of NIHL followed by 53(40.8%) who had moderate knowledge.

Table 5: Association between level of knowledge and socio-demographic characteristics of the participants.

Variable	Level of knowledge			Total, n(%)	X ²	p-value
	High, n(%)	Moderate, n(%)	Low, n(%)			
Gender						
Male	56(54.4)	34(33.0)	13(12.6)	103(100.0)	13.391	0.001
Female	8(29.6)	19(70.4)	0(0.0)	27(100.0)		
Total	64(49.2)	53(40.8)	13(10.0)	130(100.0)		
Age group (years)						
16-25	7(38.9)	10(55.6)	1(5.6)	18(100.0)	11.556	0.316
26-35	20(42.6)	23(48.9)	4(8.5)	47(100.0)		
36-45	17(45.9)	14(37.8)	6(16.2)	37(100.0)		
46-55	13(68.4)	4(21.1)	2(10.5)	19(100.0)		
56-65	5(71.4)	2(28.6)	0(0.0)	17(100.0)		
66-75	2(100.0)	0(0.0)	0(0.0)	2(100.0)		
Total	64(49.2)	53(40.8)	13(10.0)	130(100.0)		
Level of education						
Primary education	19(41.3)	22(47.8)	5(10.6)	46(100.0)	5.879	0.208
Secondary education	24(46.2)	21(40.4)	7(13.5)	52(100.0)		
Tertiary education	21(65.6)	10(31.2)	1(3.1)	32(100.0)		
Total	64(49.2)	53(40.8)	13(10.0)	130(100.0)		
Working experience (years)						
0-5	35(47.9)	34(46.6)	4(5.5)	73(100.0)	10.737	0.03
10-Jun	20(54.1)	9(24.3)	8(21.6)	37(100.0)		
>10	9(45.0)	10(50.0)	1(5.0)	20(100.0)		
Total	64(49.2)	53(40.8)	13(10.0)	130(100.0)		

Males 56(54.4%) had high level of knowledge followed by 34(33.0%) who had moderate knowledge. Majority of females 19(70.4%) had moderate knowledge, and this had shown by statistical association between level of knowledge and gender with p-value of 0.001. As the age group of the participants increases also their level of knowledge increases, this is shown in those having high level of knowledge while those aged between 16-25, 10(55.6%) had moderate knowledge. High level of knowledge was increasing as the level of education increases, at the same time those who had primary level of education about 22(47.8%) had moderate level of knowledge on prevention of NIHL. In working experiences 20(54.1%) participants had high level of knowledge on prevention of NIHL had a working experience of 6-10 years while 10(50%) participants that had moderate knowledge had a working experience of more than 10 years and this was statistically significant with p-value of 0.03.

Table 6: Level of attitude on prevention of NIHL.

	Frequency	Percent (%)
Good	110	84.6
Poor	20	15.4
Total	130	100

Out of 130 participants, 110(84.6%) were found to have good attitude towards prevention of noise induced hearing loss. Participants had provided their view on attitude towards prevention of NIHL as follows; 95(73.1%), 115(88.5%), 107(82.3%), 116(89.2%) agreed that excessive exposure to noise can cause permanent noise induced hearing loss, importance of preventive measures on noise induced hearing loss, role of periodic audiometry in detecting NIHL, Training and health education for workers regarding methods on self-protection towards noise should be done on time to time respectively. At the same time 20(15.4%) participants had poor attitude on prevention of NIHL.

Table 7: Association between level of attitude and sociodemographic characteristics.

Variable	Level of attitude		Total, n(%)	χ ²	p-value
	Good, n(%)	Poor, n(%)			
Gender					
Male	88(85.4)	15(14.6)	103(100.0)	0.257	0.612
Female	22(81.5)	5(18.5)	27(100.0)		
Total	110(84.6)	20(15.4)	130(100.0)		
Age group (years)					
16-25	16(88.9)	2(11.1)	18(100.0)	0.741	0.981
26-35	39(83.0)	8(17.0)	47(100.0)		
36-45	31(83.8)	6(16.2)	37(100.0)		
46-55	16(84.2)	3(15.8)	19(100.0)		
56-65	6(85.7)	1(14.3)	7(100.0)		
66-75	2(100.0)	0(0.0)	2(100.0)		
Total	110(84.6)	20(15.4)	130(100.0)		
Level of education					
Primary education	40(87.0)	6(13.0)	46(100.0)	7.581	0.023
Secondary education	39(75.0)	13(25.0)	52(100.0)		
Tertiary education	31(96.9)	1(3.1)	32(100.0)		
Total	110(84.6)	20(15.4)	130(100.0)		
Working experience (years)					
0-5	59(80.8)	14(19.2)	73(100.0)	2.563	0.278
10-Jun	32(86.5)	5(13.5)	37(100.0)		
>10	19(95.0)	1(5.0)	20(100.0)		
Total	110(84.6)	20(15.4)	130(100.0)		

Majority of the participants had good attitude towards prevention of NIHL, whereby 88(85.4%) were males and 22(81.5%) were females. For those having good practice 16(88.9%) were aged between 16-25 years of age. Those having tertiary education, 31(96.9%) had found to have good attitude on prevention of NIHL and this was statistically significant as the p-value was 0.023. It has shown that as the working experience increases also the level of attitude increases this was for those having good attitude. At the same time 14(19.2%) participants who had poor practices had a working experience of 0-5 years.

Table 8: Level of practice on prevention of NIHL.

	Frequency	Percent (%)
Good	25	19.2
Poor	105	80.8
Total	130	100

Majority of the participants 105(80.8%) had poor practices on prevention of NIHL followed by 25(19.2%) who had good practices.

Table 9: Association between level of practices on prevention of NIHL and socio-demographic characteristics.

Variable	Level of practices		Total, n(%)	X ²	p-value
	Good, n(%)	Poor, n(%)			
Gender					
Male	22(21.4)	81(78.6)	103(100.0)	1.446	0.229
Female	3(11.1)	24(88.9)	27(100.0)		
Total	25(19.2)	105(80.8)	130(100.0)		
Age group (years)					
16-25	2(11.1)	16(88.9)	18(100.0)	4.998	0.416
26-35	12(25.5)	35(74.5)	47(100.0)		
36-45	7(18.9)	30(81.1)	37(100.0)		
46-55	3(15.8)	16(84.2)	19(100.0)		
56-65	0(0.0)	7(100.0)	7(100.0)		
66-75	1(50.0)	1(50.0)	2(100.0)		
Total	25(19.2)	105(80.8)	130(100.0)		
Level of education					
Primary education	5(10.9)	41(89.1)	46(100.0)	12.614	0.002
Secondary education	7(13.5)	45(86.5)	52(100.0)		
Tertiary education	13(40.6)	19(59.4)	32(100.0)		
Total	25(19.2)	105(80.8)	130(100.0)		
Working experience (years)					
0-5	9(12.3)	64(87.7)	73(100.0)	5.293	0.071
10-Jun	11(29.7)	26(70.3)	37(100.0)		
>10	5(25.0)	15(75.0)	20(100.0)		
Total	25(19.2)	105(80.8)	130(100.0)		

Majority of the participants had poor practice on prevention of NIHL, whereby 81(78.6%) were males and 24(88.6%) were females. Those aged between 16-25, 16(88.9%) had poor practice. The level of practice was increasing as the level of education increasing for those having good practice while those having primary education 41(89.1%) had poor practice on prevention of NIHL and this was statistically significant with p-value of 0.002. For those having poor practices, 64(87.7%) had working experience of 0-5 years.

Discussion

This study revealed that there were more males 147(79.5%) participants compared to females 38(20.5%). Other studies also found the same results i.e., were more males than females [5,16]. Most of study participants aged between 26-35 years. This was contrary to the study done among Malaysian workers where most participants aged 40-49 years, main reason was due to different settings. However, more than half of participants aged above 50 years [16]. This study found out that most participants were aware of the NIHL and reported that working mates were the main source of information on prevention of NIHL. Majority of the participants had high level of knowledge on prevention of NIHL. However, the study done among iron and steel workers in Tanzania, found that high proportion of participants suffers NIHL because of the low-level knowledge [15].

It was found that gender and working experience had positive impact on level of knowledge on prevention of NIHL. Zulkefl et al.

[16] found out that gender had no role to the level of knowledge, however they found that working experience and age of workers to have a statistical association with knowledge level [16]. Similar study on level of knowledge done by Jacob et al. [17] found out that many participants had high level of knowledge [17]. Overall, most participants in this study had good attitude in prevention of NIHL. This was shown to be influenced by level of education of participants. Contrary to these results, it was shown that most workers have poor attitude to NIHL. Factors associated with poor attitude were reported to be perception that noise at work is inevitable and therefore taking precautions for both workers and management is important [18]. Level of education was found to have positive impact on attitude of workers in this study.

Study done by Zulkefl et al. [16] found out that attitude was influenced by level of education and working experiences, despite that the level of attitude was low [16]. Despite that high proportions of participants reported to have high knowledge and good

attitude, few of them practice preventive measures to noise induced hearing loss. Poor practices on prevention of noise induced hearing loss found to be highly influenced by level of education of participants whereby majority of the participants had primary level of education. The same results were found in other studies done in different settings [8,15,19]. Reasons for poor practices reported were poor management [20], and commitment among workers [21-27].

Conclusion and Recommendation

This study revealed that there is high level of knowledge and good attitude to prevention of noise induced hearing loss to factory workers. Surprisingly, there is poor practice to prevention of NIHL. There is still a problem among workers to practice the measures to prevent noise induced hearing loss despite of knowledge they have. Further studies have to be done on how to bridge the gap between knowledge and practices on prevention of NIHL. Management has to make sure that everyone in working area is abiding to preventive measures as per protocol. Regular health check-up and continuous education to workers for more practice in prevention of NIHL.

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