Occupational Hazard's Knowledge and Practices of Construction Workers regarding Utilization of Personal Protective Equipments

Zeinab Fekry Abd Elbaset [1], Mohammed Saad Abou Elsoud [2], Hanaa Kassem Frag [3], Farida Kamel Yousef [4]

(1) Demonstrator of Family and Community Health Nursing, Faculty of Nursing, Suez Canal University, Egypt.

(2) Lecturer of Family and Community Health Nursing, Faculty of Nursing, Suez Canal University, Egypt.

(3) Assist. Professor of Family and Community Nursing, Faculty of Nursing, Suez Canal University, Egypt

(4) Assist. Professor of Family and Community Nursing, Faculty of Nursing, Suez Canal University, Egypt

Abstract

Background: International Labor Organization showed that the construction industry is the most hazardous and accident-prone occupation in the world in which construction workers face wide variety of occupational hazards and fatality risks due to a lack of knowledge, human behavior and poor safety management. **Aim:** This study carried out to assess occupational hazard's knowledge and practices of construction workers regarding utilization of personal protective equipments at Suez Canal University. **Setting:** The study was conducted at two areas include Faculty of Computing and Information, and Institute of Information Technology at Suez Canal University. **Design:** A descriptive design was used. **Sample:** convenience sampling from selected areas, sample size was (203).**Tools:** data was collected using two tools, Tool I: Structured Interview Questionnaire: divided into two parts namely: socio-demographic data, and knowledge assessment sheet, Tool II: Observation checklist**:** utilization of personal protective equipment. **Results:** This study revealed that 81.4% of construction workers had poor knowledge about occupational hazards and 91.1% had unsatisfactory practices regarding personal protective equipment. Furthermore, there was a statistically significant relation between total knowledge of hazards and total practices of protective equipment. **Conclusions:** This study concluded that most of the construction workers had poor knowledge about occupational health hazards; most of the workers had unsatisfactory practice for wearing personal protective equipment. **Recommendations:** Developing health educational program to raise construction worker's awareness and knowledge about occupational hazards, and the proper use of personal protective equipment.

Keywords**:** *Construction Workers, Occupational Health Hazard, and Personal Protective Equipm1.*

1. Introduction

Occupational health hazards are the risks to the health of workers usually arising out of employment **(Inah, Eko, Nwachukwu, Otu, Obot & Archibong, 2019).**

The construction industry is a significant contributor to the development of a country. Worldwide, more than hundred million

workers are engaged in the construction sector **(Fathy & Sobhy, 2021; Shaukat & Fatmi, 2022).**

In Egypt, the construction industry employs about 20% of the total work force in the local market **(Abdalfatah, Elbeltagi & Abdelshakor, 2023).** The construction industry has however been classified as a high-risk industry where injuries and fatalities workplace of workers commonly happen. The rate of the occupational injuries and accidents in construction site is the highest compared to all other workplaces **(Abukhashabah, Summan & Balkhyour, 2020).**

Construction workers exposed to different types of occupational hazards which reported by International Labor Organization, physical hazards such as (noise, vibration, and extreme temperatures), chemical hazards such as (dusts and cement), biological hazards, psychological hazards and mechanical hazards like badly designed machinery and hit by equipment **(Shrestha, 2020).**

Because of the complexity of the construction environment, construction sites have a variety of risks, as previously stated. To maintain a positive safety culture, all employees should wear Personal Protective Equipment (PPE) **(Muhammad, 2022).** PPE like safety helmet, harness, boots, glove, safety vest, and goggles reduces an individuals' exposure to hazards and injuries **(Boakye, Adanu, Coffie, Adzivor & Ayimah, 2022).**

Occupational Health Nurse (OHN) can play a major role in protecting, preventing and improving the health for construction workers **(Fathy & Sobhy, 2021).** The OHN has an important role in raising awareness of construction workers about the types of workplace hazards, accidents and injuries **(Ali, Habib & Sharaa, 2021).**

Significance of the study:

International Labor Organization reported that the construction industry is the most hazardous and accident-prone occupation in the world **(Alam & Khan, 2020).** Globally, estimates that more than 60,000 fatal accidents in the construction sector occur each year **(Merchán, Gálvez and Arquillos, 2023).**

In Egypt, The average number of accidents at construction sites was 16.03 percent, and the proportion of accident occurrences

concerning the total number of people was 62.8 percent **(Muhammad, 2022).** The prevalence of work injuries among construction workers in Egypt was reported to be 46.2% **(Yosef, Sineshaw & Shifera, 2023).**

Aim of the Study

The aim of the present study was to assess occupational hazard's knowledge and practices of construction workers regarding utilization of personal protective equipments at Suez Canal University.

Objectives of the Study :

- Determine the level of occupational hazard's knowledge of construction workers.
- Identify the level of practices of construction workers regarding the utilization of personal protective equipment.
- Determine the relationship between occupational hazard's knowledge and practices of construction workers regarding the utilization of personal protective equipment.

Research Questions:

- Does the level of occupational hazard's knowledge of construction workers is good?

- Does the level of practices of construction workers regarding the utilization of personal protective equipment is satisfactory?

- Is there a significant relationship between occupational hazard's knowledge and practices of construction workers regarding the utilization of personal protective equipment?

2. Subjects and Methods

Study Design: -

A descriptive study design was applied in this study.

Study setting:

The present study was conducted at two areas include faculty of Computing and Information, and Institute of Information Technology at Suez Canal University.

Study population:

The target population of the study were construction workers of the previous mentioned settings who approved to participate in the study were involved in this study (203 construction workers).

***Sample technique:**

Convenience sampling technique used to collect research participants according to the inclusion criteria to reach the determined sample size.

***Sampling criteria**

Inclusion criteria:

1- Construction workers free from chronic diseases e.g. heart, chest diseases.
2- Duration of work experience more than one years.

D-Tools of data collection:

The data were collected by using two tools:

Tool (1): Structured interview questionnaire:

It was adopted from **Buyite, (2007).** It was divided to two parts: -

Part (I): characteristics of the studied participants: It was included socio-demographic characteristics such as age, marital status, educational level, years of experience, income, etc.

Part (II): Assess construction workers knowledge regarding occupational hazards.

It used to assess construction workers knowledge regarding occupational hazards. It consisted of 34 items divided into five sub items which include **Physical hazard** (13 items) such as measures used to reduce the effect of sun rays, symptoms of dehydration). **Chemical hazards** (7 items) such as common routes for entry of dust, fumes and gases into the body, causes of dust at construction site).

Biological hazards (4 items) such as (common mosquito-borne diseases a construction site worker might get at the work place, routes of transmission of diseases in the construction site), **mechanical hazards** (7 items) such as reasons for sustaining injuries due to machines), and **psychosocial hazards** (3 items) such as causes of stress at workplace.

Scoring system:

Scoring system of studied construction workers was calculated as the following:

The total number of items were (34), every item have more than one correct answer and for each knowledge question, a correct response was scored one, the total scores of grades were (172) grade for all questions. The

total score calculated by summing up and converted into a percent score. Construction workers total level of knowledge classified as follow:

≥76 % Good level of knowledge

51-75% Average level of knowledge

≤50% Poor level of knowledge

Tool (2): An observational checklist: utilization of personal protective equipment:

It used to measure practices regarding the utilization of personal protective equipment among construction workers adopted by **Oluwafemi et al., (2017)**. It was contained eight items such as protective cap, glove, long boots, facemask, safety glasses, earplugs, safety belts and protective jackets.

Scoring system:

The total number of items were eight, it was scored as done = one for using personal protective equipment (PPE) and Not done = zero for not using. Each item has a maximum score of one and total score of items were eight grades for all questions. Construction workers total level of the utilization of personal protective equipment classified as follow:

> 50.0% graded as satisfactory practices.

≤ 50% graded as unsatisfactory practices.

***Pilot study**

The pilot study was carried on 10% = (21) construction workers from the total sample of them to test the eligibility of the field and validity and reliability of tools content. In addition, to determine the approximate time needed for the data collection and then modifications done according to the pilot study results. The sample included in the pilot excluded from the study.

*** Face validity:**

Tools submitted to a panel of three experts in the field of community nursing from Suez Canal University, who revised the tool's clarity relevance, applicability, comprehensiveness and understanding. Modifications applied based on their comments.

***Tools reliability:**

Reliability was done by Cornbrash's Alpha Coefficient was used to assess the internal reliability of the tools .The questionnaire

value was 0.967 and observational checklist value was 0.859.

***Field of work**

After the permission to carry out the study from responsible authorities obtained, the purpose of the study explained by the researcher to each study participants emphasizing on using of collected data for the purpose of the scientific research. Confidentiality of all collected information strictly assured.

The researcher was responsible for collecting the data during the whole period of the study from the beginning of last week of July 2022 and lasted until the end of November 2022. The researcher attended to the previous mentioned place three day per week (Saturday - Maundy- Thursday).

The researcher, with the help of the engineer who was responsible for these projects at the previous mentioned areas, arranged to meet the study workers in the caravans, where the interview can be done with complete privacy to reduce their worries, in addition to the time available for them, which was from 12 p.m. to 1 p.m. The researcher interviewed each worker individually using the previously mentioned tools.

On interviewing the researcher was introduced herself to each construction worker, gave them a brief idea about the aim of study and its expected outcome. A verbal consent obtained from each participants to participate in the study before data collection. The study tools filled out by the researcher and answered within 20–25 minutes then collected and during interview, the researcher read questions from data collection sheet and explained to the participants. Then the researcher observed each construction worker his actual application of the wearing of personal protective equipment while working (actual practices of using personal protective equipment such as gloves, masks, safety boat, protective jackets, etc.) as well, the researcher interviewed 4-5 construction workers per day.

Ethical consideration:

The ethical research considerations in this study included the following:

- The study reviewed by the Research Ethics Committee (REC) in the Faculty of Nursing, Suez Canal University with approved code

(137/1-2022). The oral consent of the participants taken after explanation the aim and nature of the study. Assuring the workers who participated in the study voluntary; also, they was assured that the information was renowned confidentiality and was used for the research purpose only, and they had the right to refuse participation and withdrawal from the study at any time.

Statistical design:

Data collected through the questionnaire were coded, entered and analyzed using Statistical Package for the Social Sciences (SPSS version 20). Data where be presented in order of frequency and percentage and tabulated in tables and graphs.

3. Results:

Table 1 shows that 36.1% of the studied participants their age ranged between 36 and 40 years old, with mean 36.47 ± 8.44, regarding education, 49.7% of them were illiterate, and 62.6% of them were married, regarding income, 71.4% of them did not have enough income.

Figure (1) demonstrates that 81.4% of the studied participants had poor levels of knowledge regarding their occupational health hazards. While only 8.4% of the studied participants had good levels of knowledge regarding their occupational health hazards.

Table (2) shows that 98.0 % of the studied participants didn't wear safety glasses as required, 93.1% of them didn't wear earplugs when exposed to loud sound or noise, while 33.0 % of them were wearing protective jackets during working, 18.7% of them were wearing a protective cap (helmet) when working on site.

Figure (2): clear that 91.1% of the studied participants had unsatisfactory level of practice regarding utilization of personal protective equipment s, while only 8.9% of the studied participants had a satisfactory level of practice regarding utilization of personal protective equipment.

Table (3) illustrates that there was a statistically significant relation between the total level of knowledge of studied participants about occupational health hazards and the total level of practice regarding utilization of personal protective equipment.

4. Discussion:

Construction sector is an important sector and contributed significantly to national development. However, this sector poses higher risk to accident. This is due to fact that construction site can be considered as a dangerous zone to workers and to the public. Occupational health and safety are important in constructing sites as a large number of laborers work in risky environments and Personal protective equipment (PPE) is not available in most working places, and available PPE is not effectively used due to a low level of awareness. **(Gurung et al., 2021)**.

The present study showed the sociodemographic characteristics of the studied participants revealed that ‹the mean age of the studied participants was 36.47 ± 8.44 years. This is findings was in the line with **(Kalubowila, Gunasekera, Seneviratne, Subasinghe, Premakeerthi, Ranatunga & Yapa, 2022)** who studied (Knowledge on prevention of occupational health hazards and utilization of safety measures among construction trade workers in Colombo District) who reported that, the mean age of their sample was 35.69 ± 8.71 years. This may be due to middle-aged workers have good muscle power, stronger than younger and older ones, and they are more motivated to do the job to gain income because of the need to feed their families.

Related to the studied participants' educational level, the present study revealed that slightly less than half of the studied participants were illiterate. This finding was in the line with **(Shukla & Lal, 2017)** who studied (Hearing loss and morbidity among construction site workers in National Capital Region of Delhi, India) who reported that, slightly less than the half of the sample were illiterate. This is may be due to work in the construction industry does not require certificates, but depends on skills are not necessary learned in formal education but can rather be learned from experience.

Concerning the marital status, the present study revealed that married persons constituted less than two third of the participants. This finding was in the same line with **(Shukla & Lal, 2017)** who reported that married workers was less than two third of the sample. While this finding was in contrast with **(Adhikari & Wagle, 2021)** who studied (Awareness and Practices on Occupational

Safety among Building Construction Workers in Pokhara Metropolitan) who reported that, about more than three quarter of the studied sample were married.

Concerning the studied participants' level of knowledge regarding their occupational health hazards. The finding of the study revealed that most of the studied participants had poor levels of knowledge regarding occupational health hazards. While few number of them had good levels of knowledge regarding occupational health. This finding was in contrast with (**Oluwafemi, etal., 2018)** who studied (Knowledge of Occupational Hazards, Attitude and Practice of Occupational Safety Measures Among Construction Workers in Different Building Sites Located in Ibeju-Lekki Local Government Area of Lagos State) who reported that, nearly two third of the studied sample had good knowledge of occupational hazards. From the researcher point of view, the low level of knowledge about occupational hazards exhibited by the respondents may be due to little, no effort been made by the institutions to educate this category of workers about occupational hazard at construction sites.

Concerning safety measures that used by construction workers. The present study revealed that the majority of the studied participants did not use safety glasses as required and earplugs when exposed to loud sound or noise. While little number of them used protective cap (helmet) when working on site. These findings were in the line with **(Adhikari and Wagle, 2021)** who studied (Awareness and Practices on Occupational Safety among Building construction Workers in Pokhara Metropolitan) who reported that that majority didn't use safety glasses as required and earplugs when exposed to loud sound or noise, while minority of the sample used protective cap (helmet) when working on site. From the researcher point of view, this finding is may be because shortage in supply and personal equipment provided to the construction workers, lack of firm policies on occupational health and safety and lack of awareness among construction workers regarding importance of using safety measures to prevent occupational hazards.

Concerning the studied participants' total level of practices regarding utilization of personal protective equipment. The present study revealed that the majority of the studied

participants had an unsatisfactory level of practice regarding utilization of personal protective equipment, while only few of them had a satisfactory level of practice regarding utilization of personal equipment. This findings was in the line with **(Oluwafemi etal., 2018)** who studied (Knowledge of Occupational Hazards, Attitude and Practice of Occupational Safety Measures Among Construction Workers in Different Building Sites Located in Ibeju-Lekki Local Government Area of Lagos State) who uncomfortable to use PPE, poor fit and feel hot.

The study revealed that, there was a statically significant relation between the total level of knowledge of the studied participants about occupational health hazards and the total level practice of personal protective equipment. This was agreeing with **(Oluwafemi, etal,. 2018)** who stated that, there were a statistical association between the studied sample' level of practice and knowledge of occupational hazard. From the researcher point of view, this was may be because the low level of knowledge on occupational hazards may have limited awareness of the potential risks and dangers present in their work environment. reported that the majority of studied sample had poor level of practices in the utilization of personal protective equipment and few of them had high level of practices in the utilization of personal protective equipment. From the researcher point of view, the low level of PPE practices could be due to the lack of PPE availability in the workplace, low level of knowledge and awareness on the use of safety measures and its importance, inadequate workplace safety training,

Without a clear understanding of the hazards they face, they may underestimate the importance of using PPE or fail to recognize the need for its proper use. This lack of awareness can contribute to a poor level of practice.

5. Conclusion:

Based on the findings of the present study, it concluded that

- Most of the studied construction workers at Suez Canal University had poor level of
- total knowledge regarding their occupational health hazards as well as unsatisfactory level of total practice regarding utilization of personal protective equipment.

- There was a statistically significant relation between the total level of knowledge regarding occupational health hazards and the total level of practice regarding utilization of personal protective equipment among the studied construction workers.

6. Recommendations:

In the light of these findings, the following recommendations are suggested:

1- Periodic checkup for workers for early detection of occupational hazards to monitor the health status and early case finding.

2-Developing health educational program to raise construction worker's awareness and knowledge about occupational hazards, and the proper use of personal protective equipment.

Table (1): Distribution of the studied participants according to their socio-demographic characteristics (n=203).

Socio-Demographic Characteristics	No.	%
Age (in years)		
15 -20	8	3.9
21 -25	10	4.9
26-30	24	11.8
31 -35	38	18.7
36-40	73	**36.1**
41-50	50	24.6
$\bar{x} \pm SD$ 36.47 ± 8.44		
Education		
Illiterate	101	**49.7**
Can read and write	12	5.9
Basic education	46	22.7
General &y Technical Secondary	40	19.7
University &above	4	2.0
Marital status		
Single	45	22.2
Married	127	**62.6**
Divorced/	22	10.8
Widowed	9	4.4
Income		
Enough	58	28.6
Not Enough	145	**71.4**

Figure (1): The total score of knowledge level of the studied participants according to their occupational health hazards (n=203)

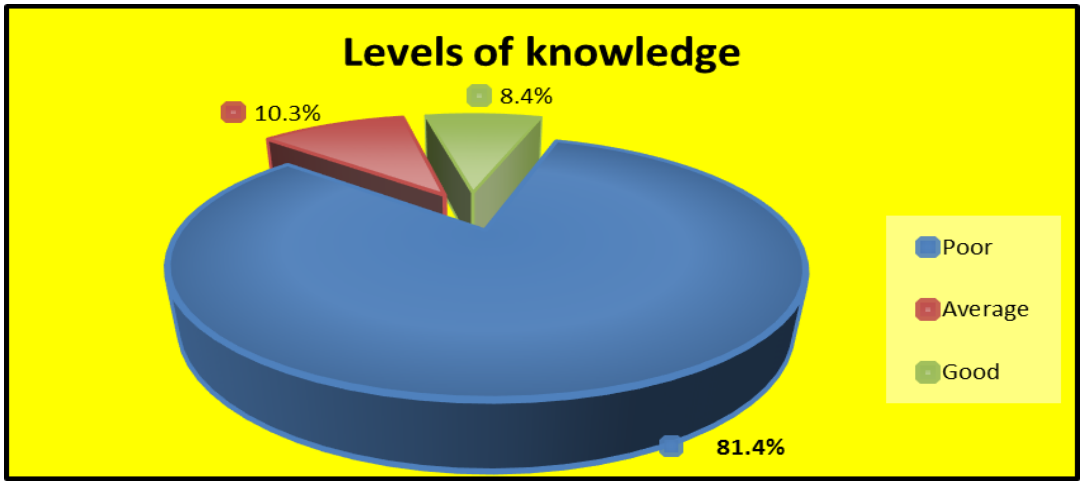

Table (2): Percentage distribution of practice of the studied participants according to their utilization of personal protective equipment (n=203).

Items	Done		Not done	
	No	%	No	%
1. Wear protective cap (helmet) when working on site	38	**18.7**	165	81.3
2. Use gloves while mixing cement	19	9.4	184	90.6
3. Wear long boots while working on sites	25	12.3	178	87.7
4. Put face mask while mixing cement	10	4.9	193	95.1
5. Wear Safety glasses as required	4	2.0	199	**98.0**
6. Use earplugs when exposed to loud sound or noise	14	6.9	189	**93.1**
7. Use safety belts while working at higher level	21	10.3	182	89.7
8. Wears protective jackets while working	67	**33.0**	136	67.0
Total percent	25	12.3	178	87.7

Figure (2): Total score of practice level of the studied participants regarding utilization of personal protective equipment (n=203)

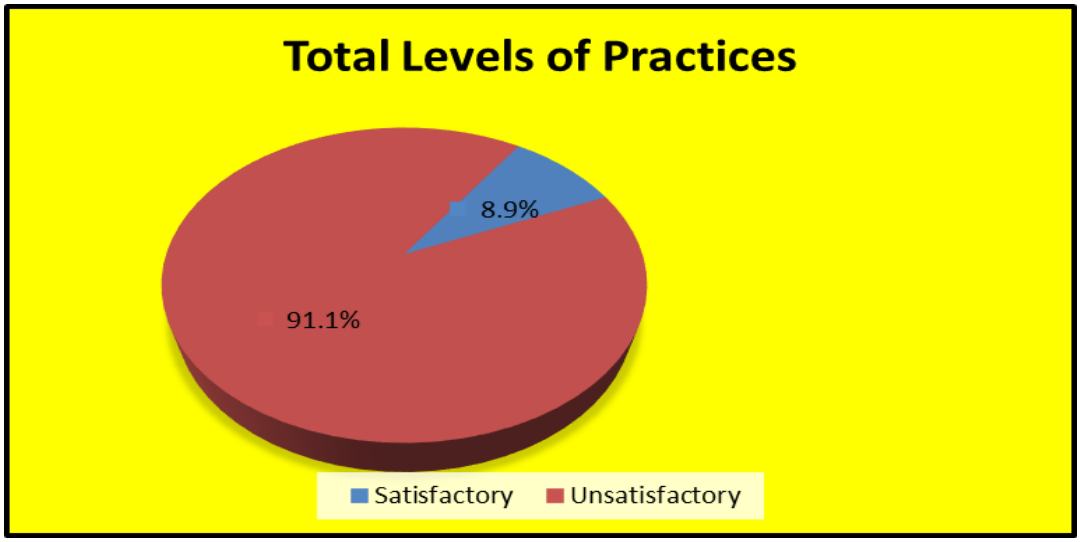

Table (3): Relation between total knowledge, total practice regarding occupational hazards of the studied participants (n=203).

Items	Total practice				X^2(P value)^{mc}
	Sat.		Un-sat		
	N	%	N	%	
Total knowledge					
Poor	0	0	165	100	168.96**(<.001*)** ^{mc}
Average	2	9.5	19	90.5	
Good	16	94.1	1	5.9	

^{MC} is Monte Carlo for Chi square test & Significant at $p < 0.05$

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