

Occupational Hazards and Compliance with Protective Measures among Blood Banks Health Care workers

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Abstract

Background: Occupational hazard or illness is a condition arising from exposure to physical, chemical, or biological agent in a workplace affecting normal physiological mechanisms and impairing health of the worker. To assess occupational hazards and compliance with protective measures among blood banks health care workers. A descriptive research design was used to conduct this study. All health care workers included 100 in 3 blood banks. Three Blood banks in Menoufia Governorate. An interviewing questionnaire consisted of three parts: Demographic characteristics of health care workers, medical history of health care workers, health care workers knowledge about occupational hazards. Observational checklists include health care workers' practices regarding compliance with protective measures and observation for work environmental condition in blood banks. 60.0% of health care workers had unsatisfactory total knowledge regarding occupational hazards in blood banks, 70.0% of health care workers had adequate total practices regarding compliance with protective measures, 70% of environmental condition bad environment at Menouf general hospital, 75% bad environment at Shibin Elkoum hospital and 60% of environmental condition bad at Sers Ellayan hospital. There were highly statistically significant relation between total knowledge of HCW and all items of their demographic characteristics and there was highly statistically significant positive correlation between health care workers total knowledge occupational hazards ,and total practices regarding compliance with protective measures in blood banks .
Recommendations: Applying health education and training programs for health care workers regarding occupational hazards in blood banks.

Keywords: health care workers, blood banks, Occupational hazard, environmental condition, and health education

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1. Introduction

Blood banking is the process that takes place in the lab to make sure that donated blood, or blood products, are safe before they are used in blood transfusions and other medical procedures. Blood banking includes typing the blood for transfusion and testing for infectious diseases. World Health Organization (WHO) recommends that all blood donations should be screened for infections prior to use. Screening for HIV, hepatitis B, hepatitis C and syphilis should be mandatory [1]. Health care staff working in blood banks and transfusion services are at risk of exposure to pathogenic organisms in blood in a number of ways [10]. The major concern after occupational hazard is the possible transmission of blood-borne pathogens. Transmission of more than 20 different pathogens by needle stick and sharps injuries has been reported. Among these, hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) are the most important. Infection by these viruses can lead to serious and even fatal

illnesses, constituting major health care problems for health care workers. Implementation of infection control and preventive measures in blood banks are as important as in other clinical departments in the health care organizations [1]. Occupational hazard is a hazard experienced to health care workers. This encompasses many types of hazards, including chemical hazards, biological hazards (biohazards), psychosocial hazards, and physical hazards. In the United States, the National Institute for Occupational Safety and Health (NIOSH) conduct workplace investigations and research addressing workplace health and safety hazards resulting in guidelines. The Occupational Safety and Health Administration (OSHA) establishes enforceable standards to prevent Health Care Workers (HCWs) hazards [14]. Preventive measures refers to policies and procedures designed to provide a safe, sanitary, and comfortable environment for the client, and health care workers to minimize the risk of spreading infections. Many infection

control protective measures, such as appropriate hand hygiene and the correct application of basic precautions during invasive procedures are simple and of low-cost, but require staff accountability and behavioral change, in addition to improving staff education, reporting, and surveillance systems [3]. The United States of America (U.S.A) and Centers for Disease Control (CDC) proposed a series of procedures for preventing occupational exposures and for handling potentially infectious materials such as blood and body fluids. These procedures, known as standard precautions (SPs), advise health care workers (HCWs) to practice regular personal hygiene [17]. Standard precautions for protection of HCW are precautions or actions designed to prevent HCWs from being exposed to blood and deep body fluids by applying the basic principles of infection control through hand washing, utilization of appropriate protective barriers such as gloves, masks, gowns, and eye shields, safe handling and disposal of needles, and safe decontamination of instruments and other contaminated equipment [8]. The risk of exposure to infection for health care workers depends on the prevalence of diseases and nature of frequency exposures. Needle-stick injuries are common accidentally expose health care workers to the blood, needle stick, my result from two hands recapping and unsafe collection of disposal waste [5], [2]. Health care workers must compliance with infection prevention and control guidelines and policies at all times, and use critical thinking, risk assessment and problem solving in managing clinical situations [15].

The Center for Diseases Control, for example, has issued the Universal Precautions (UP) guidelines to protect the health care workers from infection with blood borne pathogens [18]. Community health nurse play important role in planning, monitoring, evaluating and educating the staff with infection control measures, prevention of infection at blood bank and the major infectious diseases in blood bank , provides input into specific infection control issues, preventing outbreaks of infection between HCWs and the community and engorge compliance with protective measures [4]. In Egypt and worldwide, most health care workers give maximum attention to infection and biological hazards because hospitals are not safe workplace environment. Every year in Egypt, 165000 new cases of hepatitis and 40000 from Egyptian death /year. Hepatitis viruses cause 1.4 million deaths annually worldwide, 47% due to HBV, and 48% due to HCV, and approximately 112.5 million blood donations are collected globally [6]. The prevalence rates of HBV, HCV, and HIV collectively range from 0.02%, 0.03%, and 0.003% in high –income countries to 1.03%, 1.08% and 3.70% in low-income countries among blood donors, respectively. This represents the largest ever-iatrogenic spread of blood borne infection this is the result of HCWs not following protective measures and not adhering to the preventive measures. HCWS should be protected from these hazards and maintenance of them in their occupational environment [19]. Therefore, this study aimed to assess occupational hazards among health care workers in blood bank and their compliance with protective measures. This study aims to assess occupational hazards and compliance with protective measures among blood banks health care workers through assessing health care workers knowledge regarding

occupational hazards in blood banks. Appraising Health care workers practices regarding compliance with protective measures in blood banks. Identifying environmental conditions in blood banks. The research questions are include what are health care workers knowledge regarding occupational hazards in blood banks? What are health care worker practices regarding compliance with protective measures in blood banks? Is there relation between demographic characteristics of health care workers and their knowledge, practice regarding occupational hazards? What are the environmental condition in blood banks?

2. Materials and Methods

The subject and methods for this study will portray under the four main items as follows:

I-Technical item	II-Operational Item
III-Administrative Item	IV-Statistical Item.

2.1. Type of Sample

All health care workers reached 100 workers in blood banks. They are 36 workers in Menouf general hospital, 44 workers in Shibin Elkoum hospital and 20 workers in Sers Ellayan hospital.

2.2. Tools for data collection

An interviewing questionnaire was designed to collect the data, it developed by investigator included five parts.

2.2.1. Demographic characteristics

Demographic characteristics of health care workers as : Age, sex, job, place of work, level of education, place of residence, marital status, number of family members, monthly income, daily working hours, years of experience, Participation in a training program about occupational hazards and their source of information about workplace occupational hazards. It composed of 13 questions.

2.2.2. Assess the medical history of health problems

Assess the medical history of health problems for health care workers such as exposure to a work injury, types of exposure to injury to the musculoskeletal system, exposure to blood-transmitted diseases, exposure to needle punctures and sharp tools during work, and what is the reason. It composed of a 5 questions.

2.2.3. Assess health care workers' knowledge

Assess health care workers' knowledge about occupational hazards. Adapted from Gouda, (2014) and modified by the investigator such as meaning of occupational hazards, types of health hazards for workers, causes ,symptoms of biological hazards, causes, symptoms of chemical hazards, causes, symptoms of physical hazards, causes, and symptoms of mechanical hazards, causes, and symptoms of psychosocial hazards, preventive measures of occupational disease, policy that followed to reduce health risks ,comply with the preventive measures and ways that prevent occupational hazards. It the composed of 16 questions.

• **Scoring system**

The answers to these questions were scored as "2" for the complete correct answers, "1" for the incomplete correct answers, and "0" for wrong answer or don't know. The score of each item was stumped up and then converted into a percent score. Total score 32. Unsatisfactory knowledge < 60 % (< 19point). Satisfactory knowledge ≥ 60% (≥19 points).

2.2.4. Assess health care workers' practices

Adapted from Gouda, (2014). Such as Practice regarding compliance with protective measures

1. Hand hygiene include 10 points as wet hands with soap and water, rinse hands with running water, dry hands with clean towel or paper tissue and close tap with dry towel, also hands are washed when touch the patient. Perform any skin penetrating procedure, exposure to body fluids, take off the gloves, and touch the patient and touch the environment surrounding the patient.

2. Protective clothes include 17 points as Gloves are worn before dealing with the patient, when dealing with patients samples or fluids, cleaning and disinfecting trace of blood, gloves must be changed and hands cleaned before transferring to another patient and wash hands as soon as take off the gloves. Gown, the gown is one used whether sterile or clean, is forbidden to use the same gown for more than one patient, the gown is disposed of before leaves the patient and it should not touch the outer part when taking off the gown. Head cover is worn to prevent hair from falling out during blood transfusion. Medical Glasses are worn to prevent fluids from entering the eyes when dealing with blood; the glasses are disinfected between each to prevent infection. Medical mask is worn before any practice patient procedure, do not touch the outer part of the mask by hand, the mask is changed if it comes into contact with any liquids or when the mask gets wet. The mask is taken off before leaving the patients room and the mask is disposed of in the place designated to prevent the spread of infection.

3. Proper disposable of protective equipment include 4 points as: Remove dressing by right way to avoid infection, dispose of clothes in designated place for them, use single use clothing and clean glasses and wipe with alcohol.

4. Disposalo f danger medical waste in the blood bank include 6 points as. Put the safety box in specific place, ensure the number of pins used and that they are in the correct place, dispose of single use pins in safety box, get rid of needles without trying them in the safety box,. Do not touch the needle tip before and after use and use the one hand method in case of needing to cover the tip of the needle.

5. Practice of disinfection during blood donation include 7 points. Follow the non-touch method when inserting sterile instrument into the donor body, disinfecting the entry place of the equipment into donors body. Maintaining the non-contaminated used items such as devices and equipment, disinfect single use of supplies and tools , complete separation between work and storage areas, separate contaminated equipment and clean equipment and disinfect

the donor's surrounding after completing the blood transfusion from the donor's.

• **Scoring system**

The answers to these questions were scored as "1" for the done practice, "0" for the not done practice. The score of each item was summed up and then converted into a percent score. Total score 44 points Inadequate practice <50 % (<22 points). Adequate practice ≥ 50% (≥22 points).

2.2.5. Observation for work environmental condition

Observation for work environmental condition in blood banks, which include: Space is sufficient, well ventilation, cleanliness of place, lighting is sufficient; the tools used are safe, separate place for eating at rest time, place for washing and sterilizing machines and work equipment, place for keeping and storing machines. Equipment, place designated for the disposal of sharp tools, place to change the clothes of the medical staff , personal equipment are available, personal protective equipment are available and in good condition , and place for designated for the disposal of personal protective equipment. 13 questions.

• **Scoring system**

The answers to these questions were scored as "1" for the available, "0" for the unavailable. The score of each item was summed up and then converted into a percent score. Total score 13 points. Good environmental ≥50% (≥ 6.5 points). Bad environmental < 50% (<6.5 points)

2.3 Reliability:

Testing the reliability of tools through Alpha Cronbach Reliability analysis.

Items	Cronbach's Alpha
Knowledge	0.89
Practices	0.803

2.4. Validity

The developed tool was formulated and submitted to five experts in Community Health Nursing, at the Faculty of Nursing, Helwan University to assess the content validity, needed modifications were done.

2.5 Ethical considerations

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee, Faculty of Nursing, Helwan University. Participation in the study is voluntary and subjects will be given complete full information about the study and their role before signing the informed consent. The ethical considerations was include explaining the purpose and nature of the study, stating the possibility to withdraw at any time and confidentiality of the information where it was not be accessed by any other party without obtaining permission of the participants. Ethics, values, culture, and beliefs was respected.

2.6 Operational Item

2.6.1. Preparatory phase

It were include reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals magazines to develop tools for data collection.

2.6.2. Pilot study

Pilot study was done on 10% (10 health care workers) of the sample to examine the clarity of questions and time needed to complete the study tools .Based on the results, no modification were done . Therefore, subjects of the pilot study were included in the main study sample.

2.6.3. Field work

The official letter was issued from the Dean of Faculty of Nursing, Helwan University, and were directed to Menouf general hospital; Shibin Elkoum hospital and Sers Ellayan hospital including the aim of the study to obtain permission after establish a trustful relationship, each health care worker interviewed at the hospital to establish the study purpose. Data was collected during the three months through academic year 2022-2023, 2 days/week from 10am-12pm until needed sample was completed. The investigator collected about 4-5 health care workers per day. Informed consent was obtained from the health care workers after investigator introduce herself to them, then explain the purpose of the study.

2.7. Administrative Item

After explanation of the study aim and objectives, an official permission was obtained from the Dean of Faculty of Nursing and the General Manager of Menofiu hospital, Sers Ellayan hospital and Shibin Elkoum hospital, asking for cooperation and permission to conduct the study.

2.8. Statistical analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statically Package for the Social Science version 28, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. Comparison between total knowledge score and total reported practice score, also in this study using Chi-square test (X²). Significance was adopted at $p < 0.05$.

3. Results and discussion

Table (1) Manifests that, 58.0 % of health care workers their age were between $30 < 40$ years, the mean age was 37.40 ± 8.03 , 65.0 % of them were male, 52.0 % of them working laboratory technician 44.0% of them working in Shepin Elkoum University hospital , 52.0 % of them had university education ,55.0% of them live in rural area , 70.0% of them were married . Also, 75.0% of them their the monthly income not enough, 80.0% of them working more than 8 hours daily, 70.0% of them had $5 < 10$ years of experience, and 80.0 % of them not participated in any training program about occupational hazards. Figure (1) shows that, 50% of HCW source of information about occupational hazards in the workplace were from posters in workplace. And 10% of them their source were

from visual and audible means. Table (2) explains that, 75.0% of HCW had complain from shoulder pain, 55.0% of them had not exposed to the blood transmission diseases, and 80.0% of them had exposed to needle punctures and sharp tools during work and 87.5% of them the reason of exposure. Due to inserting a needle into a test tube or container containing a blood sample and the presence of needles and sharp tools in unexpected places such as bed sheets. Figure 2 Illustrates that, 60.0% of health care workers had unsatisfactory total knowledge regarding occupational hazards in blood banks, and 40.0% of them had satisfactory total knowledge regarding occupational hazards in blood banks. Figure (3) displays that, 70.0% of HCw had adequate total practices regarding occupational hazards in blood banks, and 30.0% of them had inadequate total practices regarding occupational hazards in blood banks. Table 3 illustrates that, there was highly statistically significant positive correlation between health care workers total knowledge, and total practices regarding occupational hazards in blood banks. According to research question 3 is there relation between demographic characteristics of health care workers and their knowledge, practice regarding occupational hazards. Table (3) Illustrates that, there were highly statistically significant relation between total knowledge of HCW and all items of their demographic characteristics ($P < 0.00$). Table (4) Shows that, there were highly statistically significant relation between total practices of HCW and all items of their demographic characteristics ($P < 0.001$). Table (5) illustrates that, there was highly statistically significant positive correlation between health care workers total knowledge, and total practices regarding occupational hazards in blood banks. The healthcare workforce represents 12% of the working population. Health care workers operate in an environment that is considered one of the most hazardous occupational settings. In addition to the usual workplace-related exposures, healthcare workers encounter diverse hazards due to their work-related activities. In spite of this knowledge, the healthcare work environment continues to be neglected by governments and organizations. Health care workers are at the greatest risk of developing blood-borne diseases through occupational exposure to blood bank and other contaminated body fluids. Occupational exposure to blood and body fluids continues to be the major public health problems and serious concern for the health care force in Egypt [7]. According to the present study, more than half of health care workers their age between $30 < 40$ years, a mean age was 37.40 ± 8.03 years. Although, more than half of them were laboratory technician, less than half of them working in Shepin Elkoum University Hospital. Also, more than half of them had university education and live in rural area. The majority of them were married the monthly income was not enough.

Table 1. Frequency Distribution of Health Care Workers regarding their Demographic Characteristics (n=100)

Demographic characteristics	No.	%
Age(years)		
20 <30	12	12.0
30 < 40	58	58.0
40 < 50	23	23.0
≥50	7	7.0
Mean ± SD 37.40±8.03		
Sex		
Male	65	65.0
Female	35	35.0
Job		
Nurse	22	22.0
Doctor	8	8.0
Laboratory technician	52	52.0
Chemists	18	18.0
Place of work		
Menouf hospital	20	20.0
Shipin Elkoum University	36	36.0
Sers Ellayan hospital	44	44.0
Level of education		
Diploma	40	40.0
University education	52	52.0
Postgraduate	8	8.0
Place of residence :		
Urban	45	45.0
Rural	55	55.0
Marital status		
Single	10	10.0
Married	70	70.0
Widowed	5	5.0
Divorced	15	15.0
Number of family members		
2	55	55.0
3-5	35	35.0
More than 5	10	10.0
Monthly income		
Enough	20	20.0
Not enough	75	75.0
Enough and saved	5	5.0
Daily working hours		
Less than 8 hours	20	20.0
8 hours or more	80	80.0
Years of experience		
1<5	20	20.0
5< 10	70	70.0
≥10	10	10.0
Participate in training program about occupational hazards		
Yes	20	20.0
No	80	80.0

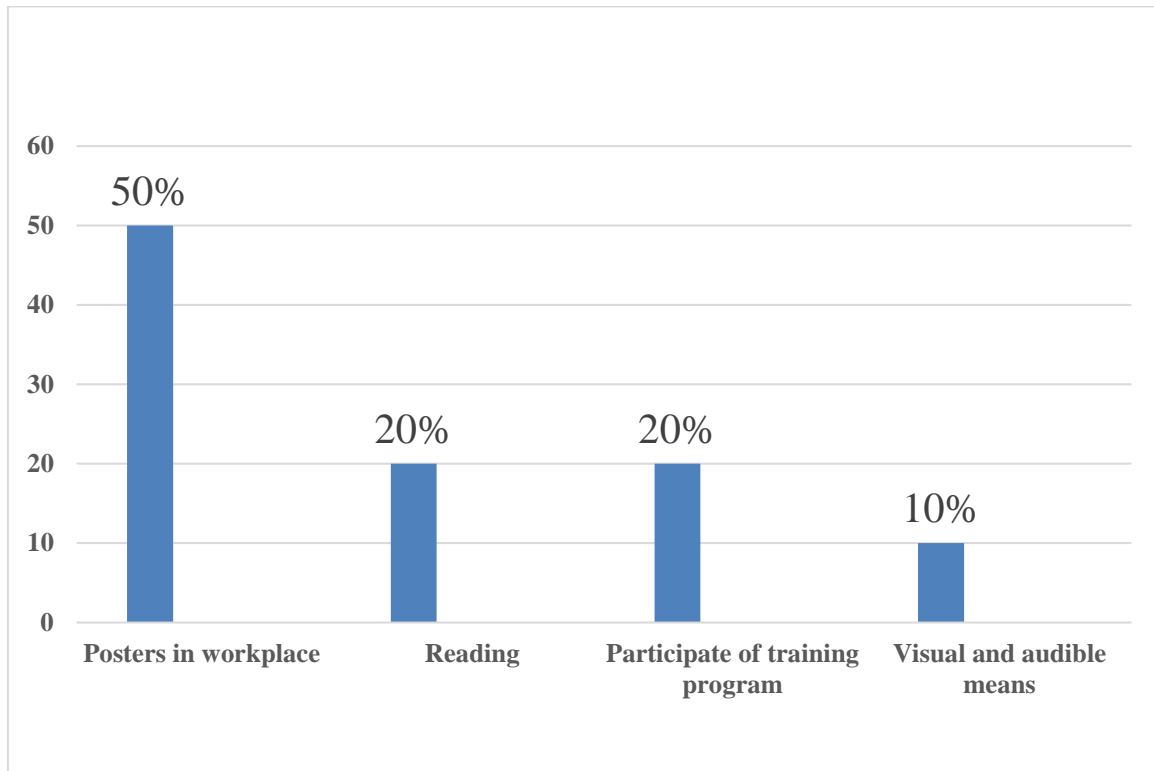


Figure 1. Percentage Distribution of Health Care Workers regarding their Source of Information about Work place Occupational Hazards (n=100).

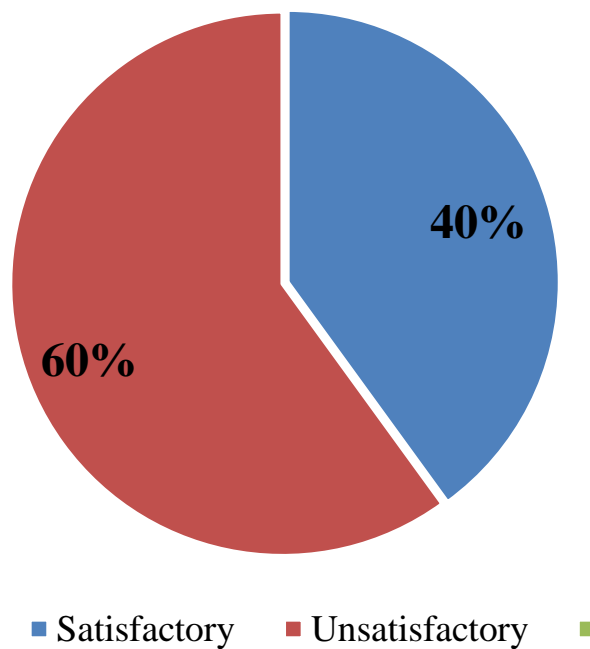


Figure 2. Percentage Distribution of Health Care Workers Total Knowledge regarding Occupational Hazards in Blood Banks (n=100).

Table 2. Frequency Distribution of Health Care Workers regarding Medical History (n=100)

Medical history items	No.	%
*Exposure to worker injury		
Acupuncture	80	80.0
Pricking with contaminated sharp instruments	10	10.0
Exposure to wounds, bruises and fractures	40	40.0
Types of exposure to injury to the musculoskeletal system		
Neck pain	70	70.0
Knee pain	60	60.0
Muscle strain	55	55.0
Shoulder pain	75	75.0
Not exposed	10	10.0
Exposed to blood transmitted disease		
Hepatitis B virus	35	35.0
Hepatitis C virus	10	10.0
Not exposed	55	55.0
Exposure to needle punctures and sharp tools during work		
Yes	80.0	80.0
No	20.0	20.0
If the answer is yes, what is the reason (n=80)		
Needle recapping	50.0	62.5
Inserting a needle into a test tube or container containing a blood sample	70.0	87.5
When dealing with sharp waste	60.0	75.0
Sudden movement of the patient when injected with the movement	50.0	62.5
The presence of needles and sharp tools in unexpected places such as bed sheets	70.0	87.5

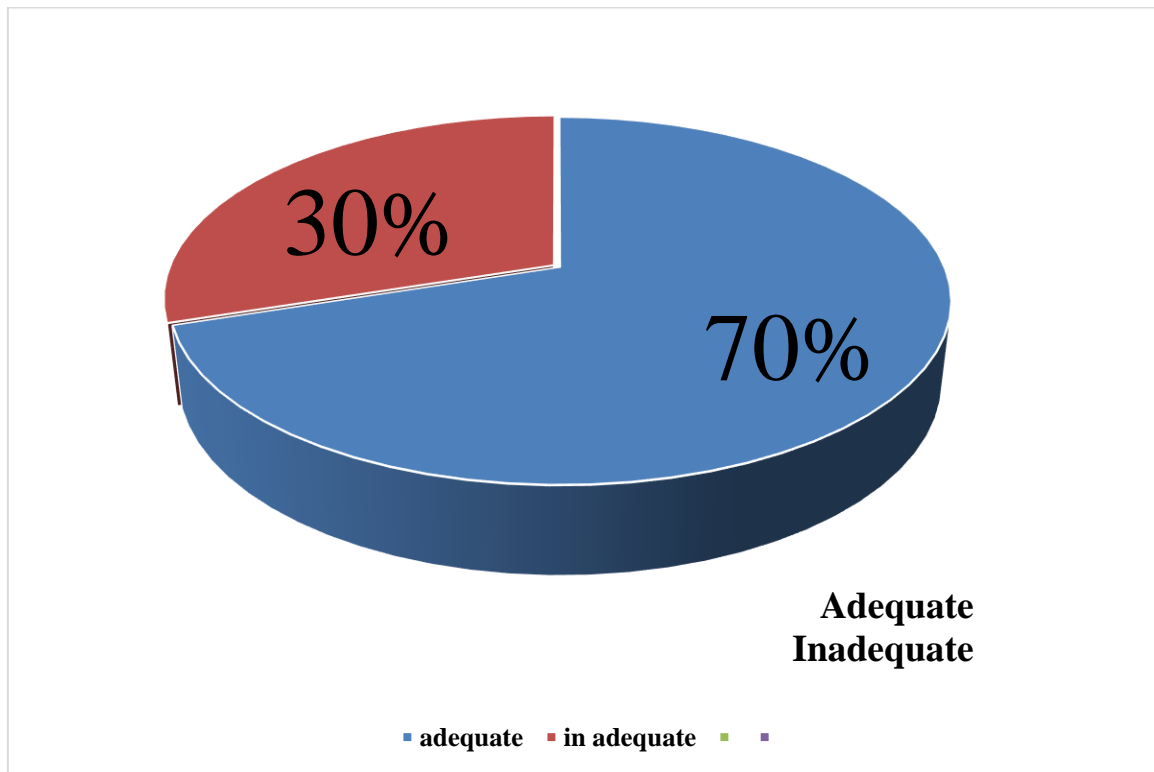


Figure 3. Frequency Distribution of Health Care Workers Total practices regarding Occupational Hazards in Blood Banks (n=100).

Table 3. Relation between Health Care Workers Demographic Characteristics and Total knowledge (n=100)

Demographic characteristics	Total knowledge				χ^2	P
	Unsatisfactory (n= 60)		Satisfactory (n=40)			
	No	%	No	%		
Age (years)						
20< 30	8	13.4	4	10.0	25.12	0.001**<
30 < 40	35	58.3	23	57.5		
40 < 50	12	20.0	11	27.5		
≥50	5	8.3	2	5.0		
Sex						
Male	40	40.0	25	25.0	22.72	0.001**<
Female	20	20.0	15	15.0		
Job						
Nurse	12	20.0	10	25.0	22.99	0.001**<
Doctors	3	5.0	5	12.5		
Laboratory technician	36	60.0	16	40.0		
Chemists	9	15.0	9	22.5		
Level of education						
Diploma	25	41.6	15	37.5	25.45	0.001**<
University education	33	55.0	19	47.5		
Postgraduate	2	3.4	6	15.0		
Place of residence						
Urban	25	41.7	15	37.5	22.22	0.001**<
Rural	35	58.3	25	62.5		
Marital status						
Single	4	6.7	6	15.0	26.23	0.001**<
Married	4	75.0	25	62.5		
Widowed	53	5.0	2	5.0		
Divorced	8	13.3	7	17.0		
Monthly income						
Enough	10	16.7	10	25.0	63.25	0.001**<
Not enough	47	78.3	28	70.0		
Enough and saved	3	5.0	2	5.0		
Daily working hours						
Less than 8 hours	10	16.6	10	25.0	26.44	0.001**<
8 hours or more	50	83.4	30	75.0		
Years of experience						
1<5	10	16.6	10	25.0	27.24	0.001**<
5<10	45	75.0	25	62.5		
≥10	5	8.4	5	12.5		
Participate in training program about occupational hazards						
Yes	10	16.6	10	25.0	25.12	0.001**<
No	50	83.4	30	75.0		

**Highly statistically significant at P < 0.001

Table 4. Relation between Health Care Workers Demographic Characteristics and Total Practices (n=100).

Demographic characteristics	Total practices				χ^2	P
	Adequate practice (n= 70)		Inadequate practice (n=30)			
	No	%	No	%		
Age (years)						
20< 30	10	14.3	2	6.6	21.18	0.001**<
30 < 40	41	58.5	17	56.7		
40 < 50	15	21.4	8	26.7		
≥50	4	5.8	3	10.0		
Sex						
Male	55	78.5	10	33.3	32.55	0.001**<
Females	15	21.5	20	66.7		
Job						
Nurse	15	21.4	7	23.4	22.17	0.001**<
Doctors	6	8.5	2	6.6		
Laboratory technician	39	55.8	13	43.3		
Chemists	10	14.3	8	26.7		
Level of education						
Diploma	17	45	25	83.3	23.52	0.001**<
University education	8	64.2	5	16.7		
Postgraduate		11.5	0	0.0		
Place of residence						
Urban	40	57.2	5	16.6	23.65	0.001**<
Rural	30	42.8	17	56.7		
Marital status						
Single	5	7.2	5	16.6	23.65	0.001**<
Married	55	78.5	17	56.7		
Widowed	2	2.8	1	3.3		
Divorced	8	11.5	7	23.4		
Number of family members						
2	40	57.2	15	50.0	22.83	0.001**<
3-5	20	28.5	15	50.0		
More than 5	10	14.3	0	0.0		
Monthly income						
Enough	10	14.3	10	33.4	23.43	0.001**<
Not enough	57	81.4	18	60.0		
Enough and saved	3	4.3	2	6.6		
Daily working hours						
Less than 8 hours	10	14.3	10	33.4	24.41	0.001**<
8 hours or more	60	85.7	20	66.6		
Years of experience						
1<5 years	10	14.3	10	33.4	22.29	0.001**<
5<10 years	55	78.5	15	50.0		
≥10 years	5	7.2	5	16.6		
Participate in training program about occupational hazards						
Yes	8	11.5	12	40.0	24.19	<0.001**
No	62	88.5	18	60.0		

** Highly statistically significant at P < 0.001

Table 5. Correlation between Health Care Workers Total Knowledge and Total practices regarding Occupational Hazards in Blood Banks (n=100)

Variable	Total practices	
	r	P- value
Total knowledge	0.38	<0.001**

** Highly statistically significant at P< 0.001

The majority of them working more than 8 hours daily, Although, the majority of them had 5<10 years of experience, and not participate in any training program about occupational hazards in blood bank (Table 1). Our study agrees with [11] in Iran, who studied “Occupational hazards to health care workers: diverse, ill-defined, and not fully appreciated” (n=90) and revealed that, 60.0 % of health care workers their age was between 30 < 40 years, the mean age was 38.2 0±8.07, 70.0 % of them were male, 58.0 % of them working laboratory technician. 55.0 % of them had university education, 59.0% of them live in rural area. 75.0% of them were married. Also, 80.0% of them they’re the monthly income not enough, 83.0% of them working more than 8 hours daily 75.0% of them had 5<10 years of experience, and 85.0 % of them not Participate any training program about occupational hazards in blood bank. Regarding health care workers medical history, most of them exposed to injury by acupuncture and three quarters of them complain from s houlderpain, more than half of them not exposed to blood transmitted diseases (Table 2), These findings were agreed with [9]in Türkiye who studied “. Occupational exposure to blood and body fluids among health care workers in mizan Tepi university teaching hospital” (n=85) and revealed that, 86% of HCws complain from work injury by acupuncture, 78.0% of them had complain s houlderpain, 58.0% of them had not exposed to blood transmission diseases. From the investigator point of view, the exposure of blood bank workers to many risks during work is due to their lack of participation in workshops on how to avoid occupational hazard during work. Also, the majority of HCWs their reason of exposure to needle punctures during work due to tubeor container containinga blood sample and the presenceof needles and sharp tools in unexpected places such as bed sheets (Table 2). These findings were similarity with [12] in Sarajevo, who studied “Needle stick injuries, sharp injuries and other occupational exposures to blood and body fluids among health care workers in a general hospital and revealed that, 80.0% of them had exposure to needle.89.0% of them the reason of exposure due to tubeor container containing a blood sample presence of needles and sharp tools in unexpected places such as bed sheets. Regarding worker’s total knowledge about occupational hazards in blood banks, the current study revealed that three-fifths of them had unsatisfactory knowledge, while two-fifths of them had satisfactory knowledge regarding occupational hazards in

blood banks. Our study agrees with [16] in Taiwan, who studied. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers (n=65) and revealed that ,63.0% of them had unsatisfactory knowledge regarding occupational hazards in blood banks, and 37.0% of them had satisfactory knowledge regarding occupational hazards in blood banks. From the point of view of the investigator, this disagreement of results could be due to lack of HCWs knowledge, which make them refer to social technology to search about occupational hazards at blood bank to raise their knowledge. Regarding relation between health care workers demographic characteristics and total knowledge, the current study revealed that, there were highly statistically significant relation between total knowledge and all items of demographic characteristics (p<0.001) (Table 3). Our study agrees with [20] in Kaduna State, Nigeria, who studied “Occupational exposure to blood and body fluids among primary health-care workers.” (n=90) and revealed that, there was a strong statistical relation between total knowledge and all demographic factors (p<0.001). From the investigator point of view, there is a close relationship between age, educational qualification, and years of experience for workers and increasing their knowledge of occupational hazards work through experience. Regarding relation between health care workers demographic characteristics and total practices , the current study revealed that, there were highly statistical significant relation between total practices and all items of demographic characteristics (p<0.001) (Table 4). Our study agrees with [17] in Ethiopia, who studied “Standard precautions: occupational exposure and behavior of health care workers” (n=55) and found a highly and statistically significant relationship between total practices and all demographic factors (p<0.001). From the investigator's perspective, there exists a strong correlation between age, educational attainment, years of experience, and the propensity of workers to engage in occupational hazards. This association is further intensified by the accumulation of work experience. Regarding correlation between, health care workers’ total knowledge, and total practices regarding occupational hazards in blood banks, the current study revealed that, , there were highly statistical significant positive correlation between total practices and total knowledge (p<0.001) (Table 5) . Our study agrees with [13] in Iran, who studied “Occupational exposure to blood and

other body fluids among health care workers at a university hospital “(n=85), revealed that, there were highly statistically significant correlation between total practice and total knowledge ($p<0.001$). From the investigator point of view, enhancing the knowledge of blood bank workers will result in improved practical proficiency and reduced occupational hazards.

4. Conclusions

Three fifths of health care workers had unsatisfactory total knowledge regarding occupational hazards in blood banks; more than two thirds of HCWs had adequate total practices regarding occupational hazards in blood bank. In addition, more than three fifths to nearly three quarters of all study settings had bad environmental condition. In addition, there were highly statistically significant relation between total knowledge, practice of HCW and all items of their demographic characteristics, there was highly statistically significant positive correlation between health care workers total knowledge occupational hazards, and total practices regarding compliance with protective measures in blood banks.

Recommendations

In the light of the results of this study, the following recommendations were suggested. Applying health education and training programs for health care workers regarding hazards in blood banks. Raising awareness of health care workers regarding compliance with protective measures at blood banks. For future research Develop, and implement researches about occupational hazards and compliance with protective measures in different settings and on large scale.

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