

Assessment Knowledge & Practices of Health Team Working in the Blood Banks Regarding to Infection Control at Assuit City.

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Abstract

Health care staff working in the blood banks and transfusion services are at risk of exposure to pathogenic organisms in blood. **The study aimed** to assess knowledge and practice of health team toward infection control in the blood banks at Assuit city. A descriptive research design was used in the study. The total number of this studied sample was 129. Two tools were used in the study; **tool 1:** Self-administrator questionnaire **tool 2:** observation check list. **Results** the present study found that slightly more than two-fifths of studied sample (41.1%) had unsatisfactory knowledge about infection control. While slightly more than three-quarters of them (75.2%) had unsatisfactory performance concerning infection control measures in the blood banks. There was a positive correlation between knowledge and performance of studied sample ($r=0.132$). While there was a negative correlation between age and years of experience with knowledge about infection control among the studied sample ($r=-0.031, -0.133$ respectively). It **concluded** that the studied sample had poor knowledge and performance toward infection control in blood bank. **Recommendations** providing training program about the infection control measures and its importance for the new employees in the blood banks. Providing continuing training courses about infection control for all health team. Distribution of a simple guide book about the infection control.

Keywords: *Blood Bank, Infection Control, Knowledge, Practice & Standard Precautions.*

Introduction

Term "Blood Bank" typically refers to a division of a hospital laboratory where the storage of blood product occurs and proper testing of blood is performed to reduce the risk of transfusion-related events (Katoch, 2011). Blood transfusion services in Egypt were fragmented and consisted of hospital-based Blood Banks. These blood banks collect, process, test and issue blood products (Ahmed & Mostafa, 2009).

Blood-banking services in Egypt are mainly hospital-based and most hospitals obtain blood from relatives and friends of patients (replacement donors) who give their blood for the sake of a specific patient. In order to try to help, these donors may hide some information about their past medical history and may constitute a higher risk for transfusion-transmissible infections (Abdel Messih et al., 2014). In Egypt there are various kinds of donors, however, the most common four types are voluntary donors, family replacement donors, paid donor, and autologous donor (Shafei, 2013).

Blood banks are obligated to provide adequate and safe blood to the community. The safest donors are found among people who donate their blood voluntarily purely out of altruism and are self-aware of their unsuitability to serve as blood donors where

there might be a slightest risk of causing health damage for blood recipients (Nwogoh et al., 2013).

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. The major concern after occupational exposure 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 (Abou El Enein & El Sheriff, 2010).

Infection control 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 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 (Bouallègue, 2013).

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; use protective barriers such as gloves and gown whenever there is contact with blood and body fluids of client; and dispose of sharps, body fluids, and other clinical wastes properly (Reda et al., 2010). Standard precautions 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 (Hafizullah et al., 2014).

The risk of infection for health care workers depends on the prevalence of diseases on clients 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 (Galal, 2010). Factors that may determine the overall risk for occupational transmission of a blood borne pathogen include the number of infected individuals in the patient population, the chance of becoming infected after a single blood contact from an infected patient, and the type and the number of blood contacts (Bartlett, & Weber, 2013, Kuhar et al., 2013 -Cosens, 2012).

Healthcare providers must adhere to infection prevention and control guidelines and policies at all times, and use critical thinking, risk assessment and problem-solving in managing clinical situations (Ontario Ministry of Health & Residential care in Canada, 2011). The Center for Diseases Control, for example, has issued the Universal Precautions (UP) guidelines to protect the health care team from infection with blood borne pathogens. Strict following of these guidelines is the cornerstone of protecting health care team from infection with blood borne pathogens (Saleh et al., 2009).

The infection control nurse has multi-faceted duties. She is involved in planning, monitoring, evaluating, updating, and educating the staff infection control measures, risk of infection and major infectious diseases in the work. She sets general infection control policy, provides input into specific infection control issues and preventing outbreaks of infection

in healthcare settings and the community (Farrah Lee, BSN & Natalie Lind, ACE, 2010).

Significant of the study

There are 4.9% of health care workers are exposed to needle stick per year and 24,000 and 8600 Egyptian health care team are infected yearly with hepatitis C virus and/or hepatitis B virus, respectively (Abd Elwahab et al., 2013).

Aim of the study

To assess knowledge and performance of health team toward infection control in the blood banks at Assuit city.

Research questions

- What is the health team's know about infection control?
- What is the current health team's performance regarding infection control?
- Is there relation between health team's knowledge about regarding infection control and their performance?

Subjects & methods

Research design

A descriptive research design was used in this study.

Study Setting

The current study conducted in the blood banks at Assuit city which are: Regional blood transfusion center at Assuit (in El-Arbeen city), El-Eman general hospital blood bank, and Assuit general hospital (El-Shamlla) blood bank, El-Eman for obstetric hospital blood bank, Assuit University hospital blood bank, El-Mabarra hospital (health insurance hospital) blood bank and South Egypt Cancer Institute blood bank at Assuit.

Study sample

Convenient sample was used: The sample included all health team members working in blood banks at Assuit city. The total numbers of studied sample were 129 and divided into - 28 doctors, 22 nurses, 25 chemistrains, and 54 lab technicians. Distribution of the following health team workers in all blood banks at Assuit city

Places	Doctors	Nurses	chemists	LAB technician
Regional blood transfusion center in Assiut	14	11	11	5
El-Eman general hospital blood bank	3	1	-	14
Assiut general hospital blood bank.	2	-	-	7
El-Eman for obstetric hospital blood bank	2	2	-	8
Assiut University hospital blood bank	4	4	5	9
El-Mabarra hospital blood bank	1	-	5	5
South Egypt cancer institute blood bank at Assiut.	2	4	4	6
Total	24	22	25	54

Study tools

Two tools were used to collect data for the present study

Tool 1

Self-administrator questionnaire sheet was developed by the researchers to collect information from the participants was included two parts:-

Part 1: Personal characteristics of health care team

It was included personal characteristics of health care team as age, academic qualification, job, sex, years of experience, marital status, attendance of conferences or educational training courses about infection control and immunization against hepatitis B virus.

Part 2: Knowledge of health care team about infection control in blood banks:

Such as definition of infection, infection control, general universal precaution of infection control, knowledge about sources of infection in blood banks and cleaning up splashing of blood, knowledge about hand washing, personal protective equipment (mask, gloves, apron and goggles), disposal of lancets, strips, lab tubes and donated needles, methods of wastes disposal (contaminated and un-contaminated wastes).

Tool 2

Observation check list was developed by researchers as hand washing, wearing gloves, change gloves between donors and steps of hand washing and removing gloves.

Scoring system

Score system in both knowledge and performance a correct response was scored (1) grade and zero for

uncorrected response (satisfactory $\geq 50\%$ and unsatisfactory $< 50\%$) (Ragab, 2015).

Validity of tools

The tools were reviewed by five experts from medical and nursing staff at Assiut University to assess and evaluate the tools' items to secure the validity of tools.

Methodology

I-Administrative phase

An official letter of approval which was obtained from the Dean of the Faculty of Nursing- Assiut University was sent to the directors of the selected blood banks of the Ministry of Health, Assiut University Hospitals and Health Insurance to carry out the study in the selected places. That letter included explanation of the purpose and the nature of the study and permission to carry out this research.

II-Pilot Study

Pilot study was carried out before starting the data collection phase on 10% of health team who were included in the studied sample to test clarity of tools and to estimate the time needed to fulfill the study tools.

III- Data collection Phase

Ethical Considerations

Informed consent for participation in the study was taken from each participant after full explanation of the purpose of the study. They were informed that their participation in this study was voluntarily. The participants were given opportunity to refuse participation and they were informed that they could withdraw at any stage of the data collection without given any reason. The studied sample was assured that any information collected would be confidential and used for the research purpose only.

Field work

- Data was collected in the period from 21st of February, 2015 to 4th of August, 2015. The researchers interviewed each person individually according to his/her work circumstances to obtain the necessary information after introducing the researchers themselves and explaining the purpose of the study. Every week about from 4 to 6 sheets was finished and data collected three days /week. The average of time taken for completing each questionnaire was around 15-20 minutes depending on the persons' responses to question.
- Observation check list is done by the researchers themselves. They were staying at morning shift to assess doctors', nurses', chemists' and lab technicians' performance before, during and after finishing the work towards universal infection control measures on the actual and clinical situation of their work.

Statistical analysis

The data obtained was reviewed, prepared for computer entry, coded, analyzed and tabulated. Descriptive statistics (i.e., frequencies, percentage, mean, standard deviation, etc) was done by using software package for statistical Science (SPSS)

Version 11.

Chi-square test and correlation were used to compare differences in the distribution of frequencies among different groups, it is considered significant when $P < 0.05$.

Results

Table (1): Distribution of the studied sample regarding to their personal characteristics in blood bank at Assiut city, 2015.

personal characteristics	No. (n= 129)	%
Sex		
Male	62	48.1
Female	67	51.9
Age		
< 30 years	54	41.9
30 - 35 years	36	27.9
> 35 years	39	30.2
Mean \pm SD (Range)	33.72 \pm 8.47 (21.0 – 57.0)	
Marital status		
Single	28	21.7
Married	97	75.2
Divorced	3	2.3
Widow	1	0.8
Academic qualification:		
Secondary school of nursing	19	14.7
Health technical institute	57	44.2
Baccalaureates (medical , nursing and science)	53	41.1
Years of experience		
< 5 years	40	31.0
5 - 10 years	47	36.4
> 10 years	42	32.6
Mean \pm SD (Range)	9.11 \pm 6.87 (1.0 – 35.0)	
Occupation		
Nurse	22	17.1
Lab technician	54	41.8
Physician	28	21.7
Chemist	25	19.3
Attending training on infection control		
Yes	42	32.6
No	87	67.4
Immunization against HBV		
Yes	88	68.2
No	41	31.8
Sources of providing vaccination		
Hospital where you work	77	87.5
Health insurance	7	8.0
Non-governmental places	4	4.5
Role in blood bank		
Make phlebotomy process/phlebotomy department	64	49.6

personal characteristics	No. (n= 129)	%
Work in serological department	33	25.6
Work in component department	25	19.4
Work in issuing department	52	40.3
Work in cross-matching department	37	28.7
Exposure to needle stick injury		
Yes	17	13.2
No	112	86.8
In case of exposure to needle stick injury:n=17		
No action	2	11.8
Squeeze the injury site	8	47.1
Wash the injury site with running water	11	64.7
Disinfect the injury site with antiseptic solution	6	35.3
Put dressing on the injury site	8	47.1

❖ *More than one answer was selected.*

Table (2) Distribution of the studied sample regarding to knowledge about infection control in blood banks at Assuit city, 2015.

Knowledge about infection	No. (n= 129)	%
Meaning of infection		
Correct	76	58.9
Incorrect	53	41.1
Meaning of infection control		
Correct	55	42.6
Incorrect	74	57.4
❖ General precaution for infection control		
None	25	19.4
Hand washing	82	63.6
Personal protective equipment	91	70.5
Infection control	14	10.9
Equipment sterilization and disinfection	5	3.9
Cleaning the work environment	30	23.3
Waste disposal	28	21.7
Occupational safety and health	8	6.2
❖ Source of infection in blood banks		
Needle stick injury	61	47.3
Blood and its component	100	77.5
❖ Action was taken in case of blood splash.		
Wear personal protective equipment	8	6.2
Clean the floor with towel then throw it in contaminated waste basket	29	22.5
Clean the floor with concentrated choler	82	63.6
Clean the floor with water and available detergent	41	31.8
Dry the floor	20	15.5
Presences of written rules for infection control in your workplace		
Yes	110	85.3
No	19	14.7
Carefully reading that rules		
Yes	93	72.1
No	36	27.9
❖ Source of information about infection control		
From curriculum in their studies	13	14.0

Knowledge about infection	No. (n= 129)	%
Books and magazines	7	7.5
Seminars and conferences	17	18.3
Manual of infection control on work place	60	64.5
Internet	26	28.0

❖ *More than one answer was selected*

Table (3) Distribution of the studied sample's performance regarding infection control measures in donation department in blood banks at Assuit city 2015. N=64.

Item	Done		Not done	
	No.	%	No.	%
Donation area is used only for donation	52	81.2	12	18.8
Any guidelines or standard operation procedures (SOPS) are available.	44	68.8	20	31.2
A separated clean area for phelopetomy process	41	64.1	23	35.9
Staff wash his/her hand before examining donors	1	1.6	63	98.4
Hand washing is done before and after examining donor	1	1.6	63	98.4
Hand washing done in between examination of donors	0	0.0	64	100.0
Hand washing before wear gloves and after remove it	0	0.0	64	100.0
Nurse makes hand washing before and after donation process	0	0.0	64	100.0
Staff wear gloves	43	67.2	21	32.8
they change gloves between donors	24	37.5	40	62.5
Staff wearing eye glass during the procedure of pheleptomy.	1	1.6	63	98.4
Staff reuse lancet for more than one donor.	3	4.7	61	95.3
Venipuncture site is disinfected	37	57.8	27	42.2
The staff use 70% alcohol as disinfection.	40	62.5	24	37.5
The disinfected procedure is done in Circular motion from inner to outer.	12	18.8	52	81.2
Closed system is applied during phelopetomy process	34	53.1	30	46.9
A new bag is used for every venipuncture	64	100	0	0
The staff recap needles after the donation procedure.	55	85.9	9	14.1
Staff put used needles in the right box.	52	81.2	12	18.8
❖ The blood bag is labeled with				
Donation date	64	100.0	0	0.0
Donation number	62	96.9	2	3.1
Blood group	48	75.0	16	25.0
Expire date	23	35.9	41	64.1
Venipuncture site is covered with bandage during donation	9	14.1	55	85.9

❖ *More than one answer was selected.*

Table (4): Distribution of the studied sample's performance regarding infection control measures in (component, serology, and issuing laboratories in blood banks at Assuit city 2015. N=96.

Items	Done		Not done	
	No.	%	No.	%
Hand washing is done before and after wearing gloves.	1	1.0	95	99.0
Standard operating procedures (SOPs) are available.	63	65.6	33	34.4
Authorized person is present.	66	68.8	30	31.2
Staff wearing lab uniform/coat	76	79.2	20	20.8
Using soap for hand washing.	82	85.4	14	14.6
Using paper towel for drying hands.	7	7.3	89	92.7
❖ Using available material for waste disposal				
Safety box for sharps	93	96.9	3	3.1

Items	Done		Not done	
	No.	%	No.	%
Container for fluid waste	15	15.6	81	84.4
General waste basket	48	50.0	48	50.0
Others	3	3.1	93	96.9
Eating food or drinks in labe	54	56.2	42	43.8
Clean the working surface before starting the work.	6	6.2	90	93.8
❖ It is cleaned, with				
Chlorox	16	16.7	80	83.3
Alcohol	11	11.5	85	88.5
Savlon	10	10.4	86	89.6
Water only	10	10.4	86	89.6
Others	10	10.4	86	89.6
Cleaning the working surface after finishing the work.	21	21.9	75	78.1
Staff wear gloves during working	85	88.5	11	11.5
Checking expiry dates of kits /reagent are checked	77	80.2	19	19.8
Equipment checked before procedure.	42	43.8	54	56.2
Hand washing after finishing the procedure	39	40.6	57	59.4

❖ More than one answer was selected.

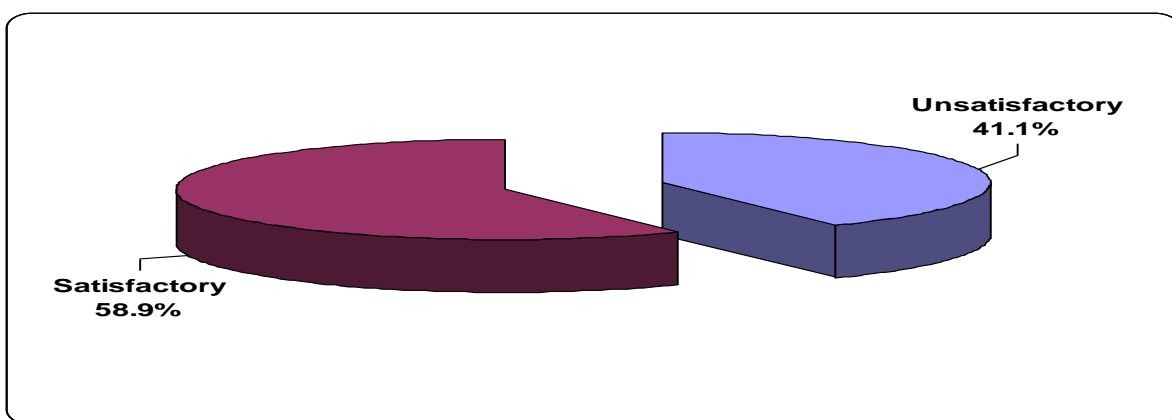


Fig. (1): Total scoring of knowledge of the studied sample regarding infection control in blood bank at Assuit city 2015.

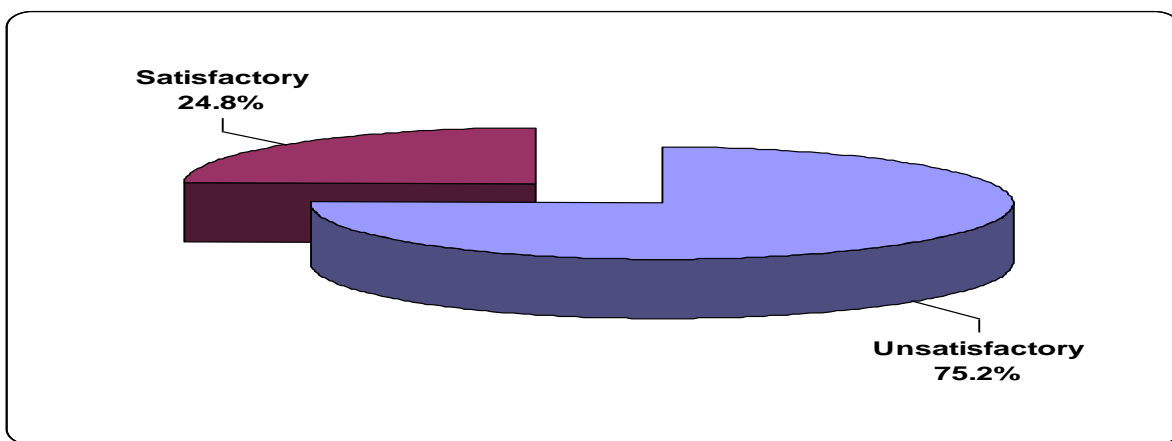


Fig. (2): Total scoring of the studied sample performance regarding measures which should be taken for infection control in blood banks at Assuit city 2015.

Table (5): Relation between total score of knowledge about infection control measures and personal characteristics among studied sample in blood banks at Assuit city, 2015.

	Level of knowledge				X ²	P-value
	Unsatisfactory		Satisfactory			
	No.(53)	%	No.(76)	%		
Sex						
Male	25	40.3	37	59.7	0.029	0.866
Female	28	41.8	39	58.2		
Age						
< 30 years	24	44.4	30	55.6	2.315	0.314
30 - 35 years	11	30.6	25	69.4		
> 35 years	18	46.2	21	53.8		
Academic qualification						
Secondary school of nursing	8	42.1	11	57.9	14.110	0.001*
Health technical Institute	33	57.9	24	42.1		
Baccalaureates(medicine, nursing and science)	12	22.6	41	77.4		
Years of experience						
< 5 years	15	37.5	25	62.5	3.389	0.184
5 - 10 years	16	34.0	31	66.0		
> 10 years	22	52.4	20	47.6		
Occupation						
Nurse	9	40.9	13	59.1	13.701	0.003*
Lab technician	32	58.2	23	41.8		
Physician	7	25.0	21	75.0		
Chemist	5	20.8	19	79.2		
Attending seminars or conferences in infection control						
Yes	19	45.2	23	54.8	0.444	0.505
No	34	39.1	53	60.9		
Attending training courses in infection control						
Yes	13	48.1	14	51.9	0.912	0.402
No	40	39.2	62	60.8		

Table (6): Relation between total score of performance about infection control measures among studied sample and personal characteristics in blood banks at Assuit city, 2015.

Items	Level of performance				X ²	P-value
	Unsatisfactory		Satisfactory			
	No.(97)	%	No.(32)	%		
Sex						
Male	53	85.5	9	14.5	6.776	0.009*
Female	44	65.7	23	34.3		
Age						
< 30 years	39	72.2	15	27.8	7.148	0.028*
30 - 35 years	23	63.9	13	36.1		
> 35 years	35	89.7	4	10.3		
Academic qualification						
Diploma of nursing	15	78.9	4	21.1	11.175	0.004*
Technical Institution of health	50	87.7	7	12.3		
Baccalaureate(medicine, nursing and science)	32	60.4	21	39.6		
Years of experience						
					7.987	0.018*

Items	Level of performance				X ²	P-value
	Unsatisfactory		Satisfactory			
	No.(97)	%	No.(32)	%		
< 5 years	28	70.0	12	30.0		
5 - 10 years	31	66.0	16	34.0		
> 10 years	38	90.5	4	9.5		
Occupation						
Nurse	18	81.8	4	18.2	11.784	0.008*
Lab technician	48	87.3	7	12.7		
Doctor	16	57.1	12	42.9		
Chemistrain	15	62.5	9	37.5		
Attending seminars or conferences in infection control						
Yes	26	61.9	16	38.1	5.896	0.015*
No	71	81.6	16	18.4		
Attending training courses in infection control branch:						
Yes	18	66.7	9	33.3	0.391	0.249
No	79	77.5	23	22.5		

Table (1): Shows the personal characteristics of the studied sample in blood banks at Assuit city. It was clear that 51.9% of the studied sample were female. Also, 41.9% of them aged less than 30 years, the table also illustrates that 75.2% were married, 44.2% of the studied sample graduated from Health Technical Institute. While 14.7% of them had a secondary school of nursing.

Also, this table illustrated that 36.4% the studied sample had job experience from 5 to 10 years. Concerning to their occupation, 42.6% of studied sample were a lab technician, while 17.1% of them were nurses. Also, this table show that 32.6 % them were attended training on infection control. This table also reveals that more than 68.2% were immunized against hepatitis B virus and 87.5% of them were taken hepatitis B vaccine from the place where they are worked. Also, this table reported that 13.2% of studied sample were exposed to needle stick injury. Concerning to action which should be taken after needle stick injury, less than 64.7% were washing the injury site with running water, while 11.8% of them didn't take any action.

Table (2): Illustrate knowledge of study sample regarding to infection control in blood banks at Assuit city. It reveals that 58.9% of studied sample had correct knowledge about the definition of infection, while 42.6% had correct knowledge about definition of infection control. This table shows more than 77.5% were reported that blood and its components are sources of infection in blood banks, and 47.3% reported that needle stick injury is the source of infection in blood banks. Concerning to the actions taken in case of blood splash this table revealed that only 6.2% of studied sample were wearing personal protective equipment. While 63.6%

clean the floor with concentrated choler. Also, this table shows 85.3% had written rules for infection control in their workplace.

Table (3): Reveals the distribution of the study sample's practice regarding infection control measures in donation department in blood banks at Assuit city. It was observed that 81.2% of the studied samples used donation area only for donation. 68.8% of studied sample has guidelines or standard operation procedures (SOPS) in their work place. It was also noticed that 98.4% of studied sample didn't make hand washing before and after examining the donors. Also, 67.2% of studied sample wearing gloves, but 37.5% were changing gloves between the donors. 95.3% of studied sample didn't reuse lancet. Also, this table shows that 57.8% of studied sample disinfected venipuncture site. 85.9% of studied sample were recapping needles after the donation procedure. While 81.2% put used needles in the right box.

Table (4): Illustrate studied sample's practice regarding to infection control measures in laboratory in blood banks. Also, 99.0% of studied sample who worked in laboratory didn't make hand washing before and after wearing gloves. While 65.6% of studied sample who worked in laboratory had available Standard Operating Procedures (SOPs). 79.2% of studied sample wearing lab uniform, and 85.4% using soap for hand washing, while 92.7% were using paper towel for drying hands after washing. Regarding to the availability of materials for waste disposal, 96.9% had safety box for sharps, and 84.4% there is not available containers for fluid waste. But only 6.2% of studied sample cleaning the working surface before starting the work.

Table (5): Reveals Relation between total score of knowledge about infection control measures and personal characteristics among studied sample in blood banks at Assuit city. It shows that there is statistical significant difference between knowledge of studied sample about infection control measures in blood banks and their academic qualification and their occupation p-value (0.001 - 0.003 respectively).

Table (6): Illustrated that relation between total score of performance about infection control measures and personal characteristics among studied sample in blood banks at Assuit city. It was observed that there is statistical significant difference between level of performance of them about infection control measures in blood banks and their sex, age, academic qualification, years of experience, occupation, and attending seminars or conferences in infection control p-value (0.009, 0.028, 0.004, 0.018, 0.008 and 0.015 respectively).

Fig. (1): Total scoring of knowledge of health team regarding infection control in blood bank at Assuit city 2015.

Fig. (2): Total scoring of studied sample performance regarding measures of infection control in blood banks at Assuit city 2015.

Discussion

The Centers for Disease Control (CDC) estimates that 5.6 million workers in the healthcare industry and related occupations are at risk of occupational exposure to blood borne pathogens, including human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and others (**Occupational Safety & Health Administration (OSHA), 2014**).

Regarding to socio-demographic characteristics of the health team members. the present study revealed that more than two fifth of participants belonged to age group (<30) years old this finding disagreed with (**Girgis et al., 2013**) who found that more than three-quarters of studied sample aged between 20 to 30 years old. Pertaining to population of the study, more than half of studied sample were females. This finding is in line with (**Girgis et al., 2013**) who reported that more than half of participants were female.

The current result revealed that nearly one-third of studied sample had attended conference related to infection control, these findings agreed with (**Mohamed, 2010**) who reported that more than two fifth of participants had attended conference related to infection control due to limit number of health team in blood bank so, it is difficult to leave work for attend training program about infection control.

Also the present study indicated that more than one tenth of studied sample exposed to needle stick injury, these result agreed with (**Nour Eldien & Ali, 2016**) who found that less than one-fifth of all participants reported exposure to needle stick or blood splash, but these result disagreed with (**All-Murr, 2013**) who reported that less than one-half of studied participants were exposed to needle stick injury, and also disagreed with Egyptian study by (**Saleh et al., 2009**) who reported about one-third of one or more exposure. The variation in exposure from one study to another could be related to workload in the different settings and the safe procedures used to reduce the risk of exposure and could be related to the best practice of no needle recapping among the participants in the current study. Concerning to studied samples' performance of infection control measures in donation department. The present study revealed that few of studied sample of health team members who work in phlebotomy department perform hand washing before and after examine the donors these results in agreement with (**Abou El Enein & El sheriff, 2010**) who found that none of the studied sample (physicians, nurses or technicians)washes their hands between donors while these findings disagreed with (**All Murr, 2013**) who reported that near of three-quarters of participants always washed their hands before and after contact with clients. Also, all Nurses who work in phlebotomy department didn't perform hand washing before and after donation process. These results are similar to (**El Houfey, 2007**) who found that less than nine-tenths of nurses didn't perform hand washing before patient's treatment and about four-fifths didn't perform hand washing after patient's treatment, these findings are disagreed with (**All Murr, 2013** and **Labrague et al., 2012**) who reported that the vast majority of participants always washed their hands after exposure to blood fluid or body fluid due to insufficient knowledge about importance of hand washing before and after contact with client or donor and lack of supervision of authorized person . Regarding to personal protective equipment the current study found that more than two-thirds of studied sample who work in phlebotomy department worn gloves, only more than one-third who change the gloves between the donors these results in agreement with (**All Murr, 2013**) who reported that slightly more than two-fifths of participants always wore gloves when withdrawing blood and vein puncture process ,these results in line with other study conducted by (**Mohamed, 2010**) who found that about half of studied sample wore gloves and slightly more than two-fifths of studied sample change gloves after each patient. But these results in contrast with (**Abou El Enein & El sheriff, 2010**)

who found changing gloves in between donors is rarely done by most of blood bank workers. That may be due to insufficient equipments and over load of work.

The present study found that all studied sample who worked in phelptomy department are used a new bag is used for every venipuncture that similar to (Mohamed, 2010) who found that the vast majority of studied sample used anew syringe for each injection.

Regarding studied samples' practice of infection control measures in laboratories. The current study reported that few of studied sample worked in laboratories departments who washed their hands before and after removed the gloves ,these results are similar to (Abou El-Enein & El Mahdy, 2011) who found that few of participants who washed their hands or alcohol rub after removing gloves (7 out of 190 opportunities) .Also agree with (Amaran, & Onwube, 2013) who reported that few of studied sample were doing hand washing before wearing the gloves, and slightly more than one tenth of studied sample wash hands after removal of gloves.The present study disagreed with (Abou El Enein & El sherif, 2010)who found that all technicians kept washing their hands before leaving the laboratory working area, that may be due to the lake of knowledge about the purpose and importance of hand washing for safe their self from infection.

The recent study found that about two-thirds of studied sample worked in the lab had Standard Operating Procedures (SOPs) that result disagreed with (Abou El Enein & El sherif, 2010) who reported that no availability of Standard Operating Procedures (sops) in the blood bank labs.

The presented study also reported that the majority of studied sample worked in lab worn gloves during their working in lab these results agreed with (Abou El Enein & Elheriff, 2010) who revealed that nearly four fifths of studied sample wore gloves during work in laboratories. The present study also observed that vast majority of studied sample worked in lab had safety box for sharps these findings are disagreed with (Amaran, and Onwube, 2013) who observed few of studied sample had a sharp disposal system in their various workplaces.

Regarding to knowledge and awareness about universal precautions among studied sample of health team members, the present study showed that less than three fifths of them had satisfactory knowledge regarding infection control measures and slightly more than two fifths of them had unsatisfactory knowledge regarding infection control measures these results in a line with (El-Houfy, 2007 & Vaz1 et al., 2010) who found that the level of knowledge among health care team was satisfactory regarding

infection control. But these results disagreed with (El Sayd et al., 2014), who reported that the majority of the participants had a low to moderate level of knowledge about infection control.

As regard the Relation between level of knowledge and personal characteristics of studied sample, the current study revealed that there was no significant statistical study between knowledge with sex of studied participants of health care team p-value(0.866). These findings were in contrast to study of (El-Murr 2013), who found that there was a significant correlation between knowledge about universal precautions and gender of participants p-value(0.0001). These results may be due to lake enough training programs about infection control.

Concerning to age, years of experience and training course, the current study revealed that there was no significant statistical study between knowledge and age, training course and years of experience of studied participants of health team , these findings were in agreement with (Fashafsheh, et al., 2015)who reported that there is no relationship between knowledge regarding infection control and age, years of experience, and training course of the studied group. These results may be due to insufficient training courses in infection control, lack of periodic refreshment courses about update knowledge and infection control or reading update knowledge toward infection control and absence of guidance.

In relation to academic qualification, the present study revealed that there was significant association between knowledge toward infection control and academic qualification of studied sample p-value(0.001).These results disagreed with (El Murr, 2013) who found that there are not significant between different academic degrees or academic qualification and knowledge about standard precautions(SPs) measures of different educational levels of participants.These results may be due to they had knowledge about infection control in their curriculums during their study every one as the level of academic degrees.

Regarding to level of performance of studied sample the present study found that unsatisfactory performance among three quarters of studied sample had unsatisfactory level of performance and only about one quarter had satisfactory level of performance, These findings are in the same line with several studies carried out by (Mohamed, 2010, El-Houfey, 2007 & Gamal, 2005) who found that most of health team workers have poor performance related to infection control. Also disagreed with (Yakob et al., 2015) who found that practice of health care workers was not sufficient to standard level of universal/standard precaution. These findings may be attributed to lack of supervision from senior

staff, work overload, and insufficient training program about infection control or workshop.

The current study found that there was significant statistical association between performance level of standard precautions measures and gender of studied sample, these findings are disagreed with (El Murr, 2013) who reported that no statistically significant association between practice level of standard precautions measures and gender of participants.

Conclusion

Based on the results of the present study, it was concluded that: It concluded that the health team had unsatisfactory knowledge and performance toward infection control in blood bank.

Recommendations

Based on the previous findings of the present study, the following recommendations are suggested

- Providing training program about the infection control measures and its important for new employees of health care team in blood banks.
- Providing continuous refreshment training courses about infection control programs and about evidence-based practice in infection control for all health care team.
- Providing closed supervision from infection control team to health care team working in blood banks.
- Availability of guide book for the health team containing updating knowledge and performance in the field.

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