

Infection Control Practices in A University Blood Bank, Alexandria, Egypt

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ABSTRACT: **Background:** The adoption and implementation of sound measures for the control and prevention of infection in blood banks is as important as it is in other clinical departments in the health care organizations. **Objectives:** assessment of the infection control practices in Alexandria University Blood Bank (AUBB) and identification of annual seroprevalence of viral hepatitis among blood donors in AUBB in the last 10 years. **Methods:** Cross sectional descriptive study was conducted at AUBB. The sample included 10 physicians, 27 technicians and 18 nurses. Based on the average daily attendance of blood donors, each physician was observed while examining 30 patients. Each nurse was observed while bleeding 30 patients. Each technician was observed while taking samples from 30 patients while each of the technicians working inside the laboratories was observed for 30 occasions. Observation was done by using especially designed checklists. All the blood bank staff under study was interviewed by using specially designed structured questionnaire. Review of the blood bank registers was done to identify annual seroprevalence of viral hepatitis among blood donors in AUBB in the last 10 years **Results:** The AUCBB was found to be deficient of many resources required for proper implementation of infection control practices. The majority of health care worker in the blood bank including physicians, technicians and nurses were not trained on infection control procedures. Only 5.5 % of nurses was trained. Half percent (50 %) of the physicians, 39% of the nurses and 66.6 % of technicians washed their hands before starting work but, none of them washed hands between donors. All technicians, 80 % of nurses and 90 % of the physicians wore gloves. There are no policy and procedures for occupational hazards exposure to blood and body fluids or to sharp injuries although there is high incidence of needle stick injuries specially among nurses (94.4%). The vaccination coverage to HBV vaccine is poor especially among nurses. Regarding, the frequency of positive results to Transfusion Transmissible Infections (TTIs) as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) among blood donors in AUBB in the last 10 years, the average prevalence of HBS Ag positive cases among blood donors was 1.46 % and the average HCV positive is 4.62 %. HIV prevalence was 5 per 100,000. It is observed that the trend is decreasing from the year 2000 to the year 2009. **Conclusion and Recommendations:** Development of policy and procedure manual for infection control in AUBB with supply of resources such as equipment and materials needed for appropriate implementation of infection control guidelines. Education and training of all Health care workers in blood bank about infection control procedures is recommended. Also, HBV Vaccination of all staff who are working in blood bank and exposed to infection should be mandatory. **Keywords:** Blood bank – Infection control – Vaccination.

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INTRODUCTION

Infection control refers to policies and procedures designed to provide a safe, sanitary, and comfortable environment for patients, health care workers and visitors in hospitals and health care facilities and minimize the risk of spreading infections among them.⁽¹⁾ The adoption and implementation of sound measures for the control and prevention of infection in blood banks is as important as in other clinical departments in the health care organizations. ⁽²⁾ Non adherence to infection control guidelines results in increased incidence of bacterial contamination of blood units which can have fatal consequences for the recipients of the transfusion. ⁽³⁾

Blood and body fluid exposures are the most common safety problems in health care workers.⁽⁴⁾ Health staffs working in blood banks and transfusion services are at risk of exposure to pathogenic organisms in blood in a number of ways. ⁽¹⁾ The major

concern after occupational exposure is the possible transmission of blood-borne pathogens. Transmission of more than 20 different pathogens by needlestick 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.⁽⁴⁾

The risk of HCV transmission has been found to vary widely between studies. The Center for disease control and prevention (CDC) review of all available data found that on average, the risk was 1.8% (including patients with negative and positive viraemia). While the risk of HIV transmission after needle stick injury with HIV-contaminated blood is thought to be 0.3%. ⁽⁵⁾ A study was conducted to explore the frequency of exposure to needle stick

injuries and hepatitis B vaccination among health care workers (HCW) in Egypt. The study revealed that 69.4% of interviewed health care workers reported at least one needle stick injury in their lifetime. HBV vaccination coverage was 38.1 % among doctors, 8.8 % among nurses and 5.4 % among laboratory technicians. ⁽⁶⁾

There is a decline in occupational HBV due largely to the widespread immunization of healthcare personnel. Although universal precautions also help in reducing blood exposures and HBV infections in healthcare personnel. ⁽⁷⁾ Hepatitis B is one of the diseases for which immunization of HCW is strongly recommended by CDC ⁽⁸⁾ .There is no clear policy that requires mandatory vaccination for health care workers in Egypt⁽⁶⁾.

Owing to the importance of adherence to infection control guidelines in blood bank and lack of data about degree of compliance of blood bank managers and personnel to these guidelines, this study

was conducted for assessment of this important issue. The study aimed for assessment of the infection control practices in Alexandria University Blood Bank (AUBB) in terms of structure required for standard infection control practices and adherence of physicians, nurses and technicians to infection control guidelines in relation to hand hygiene; wearing gloves; disposal of sharps; laboratory rules and safety precautions. Also, the study aimed to review of the blood bank registers to identify annual seroprevalence of viral hepatitis among blood donors in AUBB in the last 10 years and to identify types of donors.

MATERIAL AND METHODS

Study setting

The study was conducted at Alexandria University Blood Bank which is one of the two main governmental blood banks in Alexandria. It supplies blood components to all health care facilities in Alexandria and surrounding governorates. AUBB is a main blood bank in

which most of blood bank activities are present including blood donation, screening, component preparation, blood grouping and compatibility testing. There are no therapeutic transfusion services. It is a separate department inside Alexandria University Hospitals and is not shared by laboratory or other department. Data collection took place between January till March 2010.

Study design

Cross sectional descriptive study.

Sampling design and Sample size

A total of 64 blood bank staff are working in AUBB, they are 13 physicians, 31 technicians and 20 nurses. The sample included all the blood bank staff of the three categories who involved in the technical work during the period of the study with exclusion of those who were involved in managerial work. The sample size was 10 physicians, 27 technicians and 18 nurses. i.e. the total was 55 blood bank staff. Based on the average daily attendance of blood donors, each doctor was observed

while examining 30 patients. Each technician was observed while taking samples from 30 patients. Each nurse was observed while bleeding 30 patients. Each of the technicians working inside the laboratories was observed for 30 occasions. Observation schedule was planned according to the work schedule of the blood bank (the available staff in the shift). The observations were carried out in both morning shift (8 am – 2 pm) and afternoon shift (2 pm – 8 pm) equally. In AUBB there is no blood collection from donors in the night shift.

Data collection Techniques and Tools

The following techniques were used in the study: Observation, interview and retrospective record review.

I. Observation:

- 1) Assessment of the available resources for infection control practices. The researcher used checklist ⁽⁸⁾ to assess structure of donation area and laboratories of the blood bank. The

items were checked whether present or lacking.

- 2) Observation of physicians, nurses and technicians was done by using especially designed checklists. Observation was done to assess adherence of the three categories to infection control guidelines of blood bank in terms of hand hygiene, wearing gloves, disposal of sharps, laboratory rules and safety precautions. The checklists were designed on basis of infection control guidelines which was developed by collaborative efforts of the Egyptian Ministry of Health (MOH), Family Health International (FHI) and the United States Agency for International Development (USAID).⁽⁸⁾ The researchers modified the tool to be suitable to the study setting of the present research as it included some parameters which are not applicable in the setting under study.

II. Interview:

1. Interview with blood bank director by

using specially designed structured questionnaire⁽⁸⁾ to identify different blood bank activities in general and infection control activities in specific (Items of structure that could not be obtained by observation).

2. Interview with blood bank staff:

All the blood bank staff under study agreed to participate in the study. Interview was organized using specially designed structured questionnaire based on literature review.⁽⁸⁾ It included the following: history of training on infection control, awareness about likelihood of being infected with dangerous infections (HBS, HCV, HIV, History of hepatitis B (HBV) vaccination, source of vaccine for vaccinated individuals, previous exposure to needle stick injury in AUBB, reason of exposure to needle stick injury, intervention towards exposure to needle stick injury and reasons of non adherence to wearing gloves among non adherent physicians, technicians and nurses in AUBB.

III. Retrospective record review:

Review of the blood bank registers was done to identify annual seroprevalence of viral hepatitis among blood donors in AUBB in the last 10 years and to identify types of donors in the last 4 years. (Only records of last four years were available)

Pilot Study

Pilot study was carried out for the questionnaire and included 2 doctors, 4 technicians and 4 nurses. After the pilot study the questionnaire was reviewed and the needed changes were performed. The results of the pilot were included in the study.

Statistical Analysis

The data entry and analysis was done by using the Statistical Package for Social Science (SPSS) version 13. The data were presented in simple frequency tables. The adherence to guidelines was calculated as ratio of the frequency of correct action performed (actual performance) to the number of infection control procedures that

required to be performed correctly (expected performance).

Ethical considerations:

Anonymity and confidentiality of participants were ensured throughout the study. The purpose of the study was explained and oral consent from the participants was granted before participating in the study.

RESULTS

Table (1) represents AUBB structure required for standard infection control practices in the blood bank during the study period. Regarding the structure of donation area, this area is used for donation only with separate clean area for preparing bleeding process materials. The table enlightens the non availability of standard operating procedures manual (SOPs), written guidelines on safety and infection control in the blood bank safety , written donor selection criteria, blood donor questionnaire and educational materials, leaflets or posters. There is special register for recording donors. As regards structure

of laboratories required for standard infection control practices, there are no availability of safety and infection control guidelines or standard operating procedures (sops). There are availability of sink with running water and soap for hand washing.

In both donation area and laboratories, there are available materials for waste disposal as safety boxes for sharps which is appropriately labeled, Container with disinfectant for glassware, container for fluid waste and leak proof waste basket. In the blood bank, there are no availability of documented orientation program for new staff , documented training programs for staff, written guidelines for safety and infection control in the blood bank, written policy for needle stick or sharps injury post exposure procedures, records for documentation of such events (records of occupational exposures). There are availability of functioning hot air oven, incinerator, cool boxes for transporting

blood units and routine maintenance of equipment. From the table it is evident that waste from mobile sessions is returned to blood bank to be disposed with biohazardous waste. No cultures are done for blood units to detect bacterial contamination.

Table (2) demonstrate the distribution of blood bank staff according to history of training on infection control, awareness about likelihood of becoming infected with dangerous infections, previous exposure to needle stick injury and history of vaccination to B virus. Only 3 nurses constituting 16.7% of the total number of working nurses were trained on infection control procedures. While none of the physicians nor were technicians included in any training program. The percentage of trained staff among total number of working staff was 5.5 %. All the Blood bank staff who shared in the questionnaire (100%) acknowledged their awareness of the likelihood of becoming infected with

dangerous infections through their contact with blood. The total number of vaccinated staff is 29 (52.7 %). Seven out of ten physicians (70%) received the vaccine. On the other hand, only 6 nurses out of 18 (33.3%) and 16 technician out of 27 (59.3 %) received the vaccine. The vaccine was afforded by the hospital (AUBB) to 18 out of the total 29 vaccinated individuals (62.1 %) while the remaining 37.9 % obtained the vaccine from external sources. For all vaccinated nurses (100%) and 62.5 % of vaccinated technicians, the vaccine was afforded by the hospital. Whereas 28.2% of physicians were vaccinated in the hospital, the remaining 71.4 % got the vaccine from outside on their own. Regarding previous exposure to needle stick injury, there are no records for such incidents as we mentioned before so this data is extracted from the interview questionnaire with health care workers. The previously injured workers constitute 50.9 % of all questioned staff. Needle stick injury is a very common

incident among nurses. Seventeen nurses out of 18 nurses (94.4 %) reported that they were injured by sharps. The incidence was 30 % among physicians and 30.4 % among technicians. The main cause for injury among nurses (100 %) was during filling the sampling tubes after blood collection. For physicians and technicians, the incident occurred during lab procedures. All injured staff (100 %) stated that nothing was done to them after the injury as there is no policy or procedures for such events.

Table (3) demonstrates adherence of physicians and nurses to infection control guidelines throughout the study period. Regarding the adherence of physicians to infection control guidelines during examination of blood donors, the physicians washed their hands before starting the examination of 1.7% of donors but none of them (0 %) washed their hands between donors. Wearing gloves while examining donors was done in the

majority (80%) but all of them used the same glove for all donors.

As regards adherence of nurses to infection control guideline while bleeding donors, the table shows that in about 1.3 % of donors the nurses wash their hands before starting the work but none of them (0 %) wash hands between donors. In 90 % of observations they wore gloves during contact with donors but the rate of changing the gloves was 18 %. They change of the gloves occurred if it becomes soiled which is usually happens during filling of the sample tubes. Appropriate disinfection of skin before venipuncture (in circular direction from inside to outside several times) was seen only in 55 % of occasions. A new bag was used for each venipuncture. All the nurses (100 %) filled the sample tubes with needle bared. After sampling, the needles were appropriately disposed in hard leak proof container.

Concerning adherence of technicians to infection control guidelines when taking

blood samples from blood donors for hemoglobin test, in 66.6% of occasions, the technicians washed their hands before starting the work (at the beginning of the day) but none of them (0 %) washed his hands between donors. All the technicians who were included in the study wore gloves during work but they changed the gloves only if they soiled with blood or looks dirty. Rate of changing the gloves among technicians was 5.6 %.

Table (4) shows the adherence of technicians to infection control guidelines inside laboratories throughout the study period. They wore gloves during work in 79.8 % of observations while 87.4% of them did not wear gloves outside work place. In Serology lab and Blood component separation lab, the working surface is always cleaned with disinfectant before starting work and after finishing work. On the other hand, only in 33.3 % of observations, the technicians assigned in blood grouping/cross matching laboratory,

cleaned the working surface before starting laboratory procedures. Regarding cleaning working surface after the procedure, all of technicians instructed the housekeepers to clean at the end of duty. Mouth pipetting was not done in the three laboratories. Visible blood contaminated materials as blood soiled pieces of cotton were always seen (100 %) in blood grouping/cross matching laboratory but were not observed in serology lab or blood component separation lab. The technicians were adherent in 36.9 % of situations that needed adherence to infection control guidelines and rules which prohibit eating or drinking inside the laboratory. All technicians were keen to wash their hands before leaving the laboratory working area (100%).

Table (5) demonstrates the barriers of adherence to wearing the gloves among non adherent physicians, technicians and nurses in AUBB. Loss of sensation while working was the commonest reported

cause of non-adherence (75%); followed by allergy to gloves (56.3 %); presence of workload (37.5 %) and non availability of suitable size (37.5%).

Table (6) illustrates the distribution of blood donation types in AUBB during the last 4 years prior to our study. Family replacement donors constituted the mainstream (average within the last 4 years is 80.9 %). Directed donation was very few (0.02%). The percentage of voluntary non-remunerated donors was 12.9 % in 2006 and increased to 25.7 % in 2009.

Figure (1) represents the frequency of positive results to TTIs among blood donors in AUBB in the last 10 years. The average prevalence of HBS Ag positive cases among blood donors was 1.46 %. The average HCV positive is 4.62 %. HIV prevalence was 5 per 100,000. It is observed that the trend is decreasing from the year 2000 to the year 2009.

DISCUSSION

Standards of Egyptian accreditation

program necessitate the presence of approved policies and procedures on infection control in all hospital departments that should include: selection and uses of antiseptics and disinfectants; hand washing techniques; all cleaning activities; standard precautions; disposal of sharps and hazardous materials in addition to other infection control activities specific to each department. A formal orientation program for all employees must be present and infection control is an essential part of it ⁽⁹⁾. There is an infection control unit in Alexandria University Hospital including representatives from many departments like surgery, obstetric, nursing, laboratory, housekeeping and central supply but there is no representative from blood bank.

WHO recommends an integrated strategy for the provision of safe blood. One of its elements is collection of blood from voluntary non-remunerated blood donors (VNRBD) to minimize the risk of infections that can be transmitted through blood, the

phasing out of family/replacement donation and the elimination of paid donation ^(10,11,12). AUBB is on the road for achievement of this as the percentage of voluntary non-remunerated donors (VNRBD) increased from 13% in 2006 to 25.7% in 2009 and paid donors have been eliminated (Table 6). Most European countries have reached 100 % VNRBD. In Cambodia VNRBD levels remain stable at 25% of total with ongoing reliance on family replacement donation. In Indonesia, 82% are voluntary donors while in Pakistan only 15% are from VNRBD. In the Philippines overall rates of VNRBD have reached 55%. In June 2009, Melbourne, Australia, a global consultation held by WHO announced a declaration aiming to achieve 100% VNRBD by all countries by 2020 ⁽¹²⁾. In Egypt conversion to VNRBD may be achievable but will not happen in a vacuum. It requires a well organized and resourced blood system. Government support for the transition is essential. Culture and attitudes will also be

barriers to change. Pre-requisites include health authority commitment, a national program, community mobilization and support from the media, NGOs and international organizations. Lessons can be learned from countries which have successfully managed the transition.

There is no clear policy requiring mandatory vaccination of Hepatitis B Virus for HCWs in Egypt ⁽¹³⁾. Immunization of HCW against hepatitis B is strongly recommended by CDC, WHO as well as Egyptian infection control guidelines ^(13,14). Only 33.3% of nurses in AUBB were vaccinated. All of them got the vaccine from the facility (governmental) when it was given in a compulsory basis about 15 years ago. The vaccine is not afforded nowadays. All the non vaccinated nurses mentioned that they were not working in AUBB at that time and the price of the vaccine is relatively high, they cannot afford it on their own. So, they were not vaccinated. Higher percentage of technicians were vaccinated

compared to other categories (59.3 %) and this is due the fact that they were included in a vaccination program held by the hospital laboratory department about 6 years ago for all laboratory technicians in the hospital. As regards physicians, 71.4 % of them were vaccinated on their own because they recognize the importance of being vaccinated and no financial constrains present. Talaat et al., (2003) found HBV vaccination coverage 38.1 %, 8.8 %, and 5.4 % among doctors, nurses and laboratory technicians respectively.⁽⁶⁾ In the current study, vaccination coverage was 70 %, 33.3 % and 59.3 % among doctors, nurses and technicians respectively. AUBB must develop vaccination program to vaccinate all unvaccinated workers specially nurses because they are highly exposed to needle stick injuries according to the study (94.4 % of nurses were injured) (table 2).

There is no written policy for needle stick or sharps injury post exposure

procedures and no records of such events in AUBB in spite of the high incidence especially among nurses (table 2) and the mandatory requirement by Egyptian accreditation standards to develop this policy and inform the employee about it as it states: Education and training must be provided and documented for occupational health hazards and safety procedures. Over ninety percent of nurses were injured during filling the sampling tubes after blood collection because the needle is uncovered. Although all blood bags are supplied with a secure plastic cap which can be pulled securely to cover the needle. This was not done in AUBB because if the needle is covered it would be very difficult to fill the sample tubes and blood would pour outside. The plastic cap is designed to be used with vacutainer tubes which can be pushed inside it and no blood would gush while the needle is still inside and no chance to injure the nurse. This type of tubes is not available in AUBB due to its

higher cost than ordinary plastic tubes although it is widely used in laboratories in the hospital. It was observed that all the nurses and technicians disposed sharps and needles appropriately (100 %) as the puncture resistant required container which was always available. (table 3)

Appropriate hand hygiene practice is crucial to the safety of blood and blood products at all stages in the transfusion chain during which the donated blood units are handled. The microbial contamination of blood or blood products may occur at the time of blood collection or during the processing into blood products, labeling, storage and transportation, or during administration of blood at the patient bedside⁽²⁾. This can have fatal consequences for the recipients of the transfusion. Serious consequences of microbial contamination can be avoided by giving particular attention to the hand hygiene of the donor care staff at the time of blood collection and by thorough

cleansing of the venepuncture site on the donor arm. None of the physicians, nurses or technicians wash their hands between donors (tables 3). Education of staff about the importance and appropriate methods of hand hygiene should be stressed on.

Changing gloves in between donors is rarely done by most of blood bank workers (tables 3). Importance of this issue should be stressed on in addition to providing sufficient amount of gloves with different sizes to hold back non-availability as reason of nonadherence to this standard (table 5).

Most of the AUBB HCWs showed poor adherence to infection control standard guidelines (table 3). Lack of training was the noticeable cause in addition to absence of guidance from the supervisors and nonexistence of posters or any other form of education about infection control. Regarding laboratory technicians, they were adherent to measures which can be a form of general cleaning but safety rules

and regulations as regards infection control were ignored. The most obvious non adherence item was the usual eating and drinking inside the laboratory. Only on 36.9 % of occasions observed in all the three laboratories, no food or drink was seen (table 4). The consistent finding of visible blood contaminated materials in blood grouping and cross matching laboratory is the second most dreadful observation of non adherence to infection control measures.

An important quality control measure is to randomly select blood units, platelets concentrates and plasma to be cultured for detection bacterial contamination. This is needed for assessing the situation of infection control in blood bank, for benchmarking with other blood banks, evaluation of infection control interventions and early tracing of trends if the rate of contaminated units exceeds acceptable standard levels. ⁽¹⁵⁾ Unfortunately this is not performed in AUBB (table 1).

Blood screening activities for transfusion transmitted infections done in AUBB include hepatitis B virus, hepatitis C virus, HIV and syphilis. They are done for all donors. The sero-prevalence of hepatitis B and hepatitis C was monitored and compared to the findings of another study that was done in Al Mansoura on blood donors ⁽¹⁶⁾. The mean of HBV prevalence in AUBB blood donors was 1.46 % while it was 1.24 % in the mentioned study ($p = 0.0027$). The prevalence of HCV in AUBB blood donors was 4.62 % which is significantly lower than that of Al Mansoura study (11.63 %) ($p = 0.0089$). This may be due to the fact that their blood donors are from rural areas in which the frequency of hepatitis is higher than urban areas and these results reflect to some extent the total population prevalence.

CONCLUSION AND RECOMMENDATIONS

The AUCBB was found to be deficient of many resources required for proper implementation of infection control

practices. There were no policies or procedures in donation area as well as the laboratories. The majority of HCW in the blood bank including physicians, technicians and nurses were not trained on infection control procedures. Only 5.5 % were trained but this training was not documented. No educational materials or posters were seen in any area in the blood bank. As regards hand hygiene 50 % of the doctors, 39% of the nurses and 66.6 % of technicians wash their hands before starting work, but none of them wash hands between donors. On the other hand, the adherence to wearing gloves is good. There are no policy and procedures for occupational hazards exposure to blood and body fluids or to sharp injuries although there is high incidence of needle stick injuries specially among nurses (94.4%).

The vaccination coverage to HBV vaccine is poor especially among nurses. The seroprevalence of HBV and HCV among blood donors in AUBB is relatively

low compared to other Egyptian populations but the percent of VNRBD is remote from the recommended by WHO for the production of safe blood.

Development of policy and procedure manual for infection control in AUBB with supply of resources such as equipment and materials needed for appropriate implementation of infection control guidelines. Education and training of all health care workers (HCWs) in blood bank about infection control procedures with continuous observation of staff for the implementation of infection control

guidelines. is recommended. HBV Vaccination of all HCWs who are working in blood bank and exposed to infection should be mandatory. Evaluating the benefits and cost effectiveness of the purchase of vacutainer tubes to avoid the injury of nurse during sampling from blood bags is needed. Cooperation with non governmental organizations (NGOs), educational institutions, political parties, media and other allied social gathering to build strategies in order to raise the number of voluntary non-remunerated blood donors (VNRBD).

Table (1): Assessment of AUBB Structure Required for Standard Infection Control Practices in the Blood Bank During the Study Period.

Structure	Present (Available)	Lacking (Not available)
Donation area		
The area used for donation of blood only	√	
Educational materials, leaflets or posters		√
Guidelines or Standard Operating Procedures Manual		√
A separate clean area for preparing bleeding process materials	√	
Written guidelines on safety and infection control in the blood bank		√
Written donor selection criteria		√
Blood donor questionnaire		√
Register for recording of donor.	√	
Available materials for waste disposal: <ul style="list-style-type: none"> ▪ Safety box for sharps and appropriately labeled. ▪ Container with disinfectant for glassware ▪ Container for fluid waste ▪ Leak proof waste basket 	√ √ √ √	
Laboratories (Blood grouping & Cross-matching, component Preparation and serology)		
Safety and Infection Control guidelines		√
Standard operating procedures (SOPs)		√
Sink with running water	√	
Soap for hand washing	√	
Available materials for waste disposal : <ul style="list-style-type: none"> a- Safety box for sharps b- Container for fluid waste c- Waste basket for non sharps biohazards d- General waste basket 	√	
Miscellaneous items		
Documented orientation programs for new staff		√
Documented training programs for staff		√
Records of occupational exposures		√
Written policy for post-exposure procedures		√
Written guidelines on safety and infection control in the blood bank		√
waste from mobile sessions is returned to blood bank to be disposed with biohazardous waste	√	
Functioning hot air oven in the blood bank	√	
Functioning incinerator in the facility	√	
Cool boxes for transporting blood units	√	
Routine maintenance of equipment	√	
Units randomly cultured for bacterial contamination		√

Table (2): Distribution of Blood Bank Staff According to History of Training on Infection Control, Awareness About Likelihood of Becoming Infected With Dangerous Infections, Needle Stick Injury in AUBB (previous exposure, reason and intervention) and History of Vaccination to Hepatitis B Virus (HBV).

Items	Job Category							
	Physicians (n = 10)		Technicians (n= 27)		Nurses (n=18)		Total (n=55)	
	No	%	No	%	No	%	No	%
History of training on infection control (n=55)								
Trained	0	0	0	0	3	16.7	3	5.5
Not trained	10	100	27	100	15	83.3	52	94.5
Awareness about likelihood of being infected with dangerous infections (HBS, HCV, HIV) (n=55)								
Yes	10	100	27	100	18	100	55	100
History of hepatitis B (HBV) vaccination (n=55)								
Yes	7	70.0	16	59.3	6	33.3	29	52.7
No	3	30.0	11	40.7	12	66.7	26	47.3
Staff received HBV vaccine from AUBB (n=29)								
Yes	2	28.6	10	62.5	6	100	18	62.1
No	5	71.4	6	37.5	0	0	11	37.9
previous exposure to needle stick injury in AUBB (n=55)								
Yes	3	30.0	8	30.0	17	94.4	28	50.9
Reason of exposure to needle stick injury (n =28)								
-During lab procedures	3	100	3	100	-	-	-	-
-During filling the sampling tubes after blood collection	-	-	-	-	17	100	28	100
Intervention towards exposure to needle stick injury (n =28)								
No	3	100	3	100	17	100	28	100

Table 3: Adherence of Physicians and Nurses to Infection Control Guidelines in AUBB Throughout The Study Period

Infection control procedure	Frequency of correct action performed	%
Adherence of physicians to infection control guideline during examination of donors		
Washing hands before starting examination of donors (n= 300)	5	1.7
Washing hands between donors (n= 300)	0	0
Wearing gloves(n= 300)	240	80
Changing gloves between donor (n= 300)	0	0
Adherence of nurses to infection control guidelines while bleeding donors		
Washing hands before starting work(n= 540)	7	1.3
Washing hands between donors (n= 540)	0	0
Wearing gloves(n= 540)	485	90
Changing gloves between donor (n= 540)	97	18
The skin disinfection done appropriately before venipuncture (n=540)	298	55
Using a new bag for each venipuncture (n=540)	540	100
Filling sample tubes with the needle bared (n=540)	0	0
Covering venipuncture site with bandage after donation (n=540)	540	100
Sharps and needles appropriately disposed (n=540)	540	100
Adherence of technicians to infection control guideline as regards hemoglobin testing for donors		
Washing hands before starting * (n=810)	540	66.6
Washing hands between donors (n=810)	0	0
Wearing gloves (n=810)	810	100
Changing gloves between donors (n=810)	45	5.6
Reuse lancet for more than one donor (n= 810)	0	0

* They wash their hand at the beginning of the day.

Table (4): Adherence of Technicians to Infection Control Guidelines Inside Laboratories in AUBB During the Study Period

Infection control procedure	Serology lab (n = 180)		Blood component separation (n =180)		Blood grouping & cross matching (n= 450)		Total number of observations (n= 810)	
	Frequency of correct action performed	%	Frequency of correct action performed	%	Frequency of correct action performed	%	Frequency of correct action performed	%
Wearing gloves during work Yes	153	58	67	37.2	42.6	94.7	646	79.8
Wearing gloves outside work place No	174	96.7	180	100	444	98.7	708	87.4
Cleaning working surface before starting the procedure Done	180	100	180	100	150	33.3	420	51.9
Samples clearly labeled Done	180	100	180	100	120	26.7	390	48.1
Mouth pipetting Not done	180	100	810	100	450	100	810	100
Visible blood contaminated materials e.g. gauze, cotton Not seen	180	100	180	100	0	0	270	33.3
Food or drink seen inside laboratory Not done	48	26.7	87	43.3	140	31.1	266	36.9
Cleaning working surface after the procedure Done	180	100	180	100	450	100	810	100
Hand washing after the procedure Done	180	100	180	100	450	100	810	100

Table (5): Reasons of Non Adherence to Wearing Gloves Among Non adherent Physicians, Technicians and Nurses in AUBB*

Job category	Allergic to gloves		Loss of sensation during examination		Non availability of suitable size		workload	
	No	%	No	%	No	%	No	%
Physicians (n= 2)	1	50	2	100	0	0	1	50
Technicians (n=7)	6	85.7	5	71.4	2	28.6	2	28.6
Nurses (n=7)	2	28.6	5	71.4	4	57.1	3	42.9
Total (n=16)	9	56.3	12	75	6	37.5	6	37.5

* More than one reason was mentioned

Table (6): Types of Blood donors in Alexandria University Blood Bank in the last 4 years before the study period

Year	Types of Blood donors						Total	
	Voluntary non-remunerated		Family replacement		Directed			
	No.	%	No.	%	No.	%	No.	%
2006	7198	12.9	48426	87.1	0	0.000	55624	100
2007	8925	16.4	45607	83.6	8	0.015	54540	100
2008	10696	21.2	39777	78.8	17	0.034	50490	100
2009	14558	25.7	42083	74.3	19	0.034	56660	100
Total	41377	19.0	175893	80.9	44	0.020	217314	100

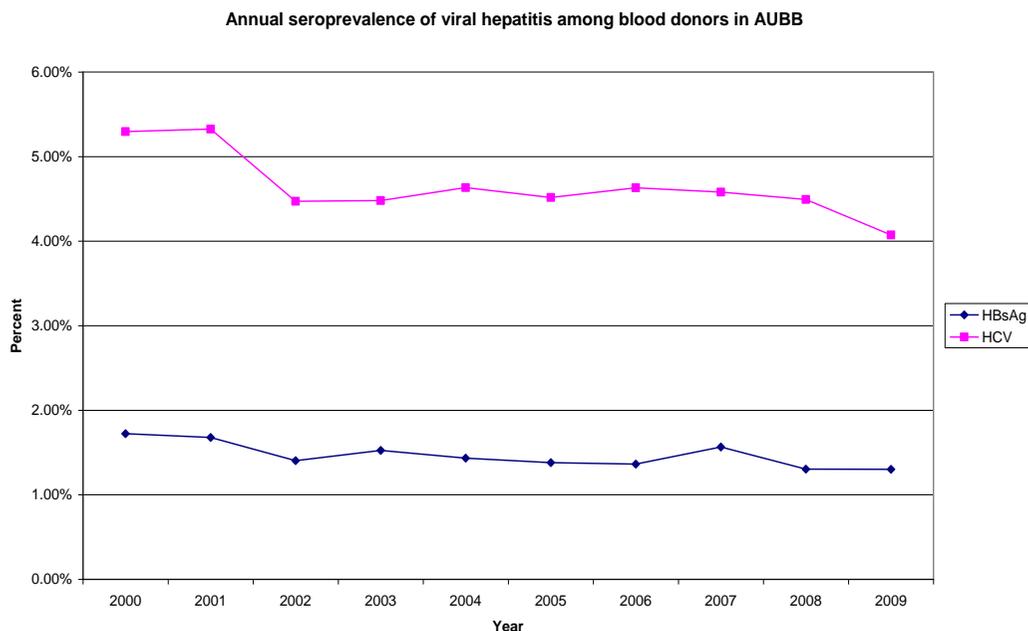


Figure (1) Annual Seroprevalence of Viral Hepatitis Among Blood Donors in AUBB in The Last 10 Years

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