BAU Journal - Health and Wellbeing

Volume 2 | Issue 1
ISSN: 2617-1635

Article 6

October 2019

KNOWLEDGE, ATTITUDE AND PRACTICE FOR HEALTHCARE WORKERS AND CLINICAL STUDENTS ABOUT INFECTION CONTROL MEASURES AWARENESS AT HOSPITALS

Souhad Safadi
Graduate Student, Department of Nursing, Faculty of Health Sciences, Beirut Arab University, mariamkbaysi@hotmail.com

Esin Kavuran
Assistant Professor in Nursing, Ataturk University, Erzurum, Turkey, esinkavuran@hotmail.com

Hanan Al Nuqiadan
Ministry of Health, Nursing Department, Kuwait, dr.hanan@yahoo.com

Ahmad Tassi
Assistant Professor, Faculty of Health Sciences, Beirut Arab University, Beirut, Lebanon, a.tassi@bau.edu.lb

Mirna Fawaz
Assistant Professor, Faculty of Health Sciences, Beirut Arab University, Beirut, Lebanon, mirna.fawaz@bau.edu.lb

KNOWLEDGE, ATTITUDE AND PRACTICE FOR HEALTHCARE WORKERS AND CLINICAL STUDENTS ABOUT INFECTION CONTROL MEASURES AWARENESS AT HOSPITALS

Abstract

Healthcare-associated infections are a major global public health concern. Health care workers are on the front line of protecting themselves and clients from infection, through preventing the transmission of nosocomial infections and that is through the implementation of infection control measures. Therefore, the purpose of this study is to investigate the knowledge, attitude and practice of infection prevention among healthcare workers at Lebanese hospital. A descriptive cross-sectional research design was implemented in the study, where the sample included 240 participants (80 nurses, 80 medical lab, and 80 clinical students). Participants were surveyed using pre-tested self-administered questionnaire. The results showed that knowledge between the three groups was good regarding standard precautions, but moderate regarding post exposure prophylaxis and vaccination. The results showed 41.7% of participants know the correct vaccines recommended, and medical labs were significantly higher than the other two groups, (p=0.00). Despite the good knowledge about standard precautions, the main reason for noncompliance was that they don't have time to wear PPE's while working and nurses were significantly higher than the other two groups, (p=0.00). The adherence to the use of PPE's was significantly related to if they have regular access to them in the facility, (p=0.00).Among those who had occupational exposure nurses were significantly higher in reporting the exposure, (p=0.001). In addition, 62.9% reported that PEP medications were available at their work place, while 52.5% experienced sometime unavailability of these medications. This study revealed a good knowledge and attitude of infection prevention among the majority of participants with relatively minimal practice rate.

Keywords

Infection control, Standard precautions, Nosocomial infections, Prevention

1. INTRODUCTION

Nosocomial infections or hospital acquired infections (HAIs) are new onset infections that develop during hospitalization or through the health care delivery process. Infections are also considered hospital acquired if their onset was after the discharge of patients from healthcare facilities. Infection-prevention and infection-control programs aim to reduce the risk of health care–associated infections in institutions that care for an increasingly vulnerable, elderly, and often immunosuppressed patient population. The goal is to make the hospital a safe place for patients and staff (Delaune & Ladner, 2010). Standard precautions proclaim that in principle, all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes might harbor communicable, disease causing microorganisms, and this term has been substituting the former used term "universal precaution" and proposes a new conception of precautions that is more comprehensive, and includes measures such as hand hygiene, use of appropriate personal protective equipment (PPE), use of aseptic technique to reduce patient exposure to microorganisms and management of sharps, blood spills, linen, and waste to maintain a safe environment (Abou El-Enein, El-Mahdy, 2011). Healthcare associated infections (HAIs) can be avoided and prevented through the adequate compliance of healthcare personnel from the various disciplines with the set of standard precautions which can safeguard the healthcare team, practice environment and of course the patients. Communicable diseases such as hepatitis and HIV are on an augmenting rate by the year, thus posing a high challenge to healthcare workers to practice in a high risk, stressful environment thus affecting the quality of patient care. The high prevalence of infectious diseases and multidrug resistant microorganisms, in addition to inadequate use of resources and inappropriate prescription of antibiotics which caused resistance increase the chances of acquiring HAIs (Shears, 2007). The WHO (World Health Organization) approximates that high risk injections and needle stick injuries lead to a minimum of 8-16 million HBV infections, 2.3-4.7 million HCV infections and 160,000 HIV/AIDS infection annually. The WHO adds that a minimum of 50% of the 12 billion injections dispensed annually in unindustrialized countries are risky inflicting major health hazards to patients, healthcare personnel, clinical students and the population. Sharp injuries have been related to the spread of more than 40 disease causing microorganisms such including hepatitis B virus (HBV), hepatitis C virus (HCV) and HIV (Eshetu, Legesse, 2007). It is noteworthy that standard precautions are adopted into practice in developed countries as program to safeguard healthcare workers from job-related hazards such as blood spills and consequential blood-borne diseases, however in developing countries studies note that there isn't that high compliance rate (Franklin, 2009). Even though there is substantial research on standard precautions yet domains on the knowledge and practice of infection prevention methodologies are not adequately examined in Lebanon. Thus, our study aimed to investigate the knowledge, attitude and practice of infection prevention among healthcare workers at Lebanese hospital. The results of this research will be disseminated among hospitals, decision makers in healthcare in Lebanon so that the appropriate measures and regulations can be put in place to achieve the Sustainable Developmental Goals.

2. METHODOLOGY

This research is a descriptive cross-sectional study involving Lebanese nurses, medical lab technologists, and clinical students practicing in various hospitals around Lebanon. The study was conducted over a period of 3 months from March 2019 till May 2019 after receiving the Institutional Review Board (IRB) approval at Beirut Arab University. A convenient sample of overall 240 healthcare personnel divided into three groups each of 80 nurses, 80 medical labs, and 80 clinical students was incorporated in the study. The inclusion criteria targeted adults who had training or working at a hospital and were in contact with blood and body fluids of patients. Responders were recruited by contacting them personally, by visiting the mentioned clinical settings and obtaining informed consent from the nurses willing to participate after explaining to them the purpose of the research study. The informed consent form contained details about the survey purpose, benefits, risks and confidentiality of participant data. Participation was voluntary and completely anonymous. Participants had the choice of opting out at any stage. Data was collected using a pre-tested self-administered questionnaire composed of 48 items. The questionnaire covers the demographic variables of the health care workers; assess their knowledge, attitude and practice of infection control measures including standard precautions, vaccination, and post exposure prophylaxis. The CDC standard precautions, vaccination, and PEP for infection control were used as a guideline for preparing the self-administered questionnaire. The developed tools were tested for their content

validity by four experts in the field of infection control and nursing. They were given instructions and response sheets and asked to rate the clarity, apparent internal consistency, and content validity of this tool. Each of the experts were rating each item of tool against 4 item scale from 1 to 4, where a rating 1 means not relevant, 2 is somewhat relevant, 3 means quite relevant but need some changes, while 4 is very relevant. The questionnaire was also tested for internal consistency (reliability) by Cronbach's Alpha test and a score of 0.73 was obtained. The overall results of validity and reliability of the newly developed tool for infection control measures revealed that it is valid and reliable to be employed. SPSS was used to analyze the data (IBM SPSS, Version 20).

3. RESULTS

3.1. Sample Characteristics

Two hundred and forty healthcare workers from the four approached facilities participated in this study. The results show that among 135 respondents 146 (60.8%) were females and 94 (39.2%) were males. The majority of the participants aged 21-31 years (52.1%) with experience of 0-5 years (61.7%). Concerning the professional categories, the three groups (Nurses, Medical lab, and Clinical students) were equally distributed in the study each of (n=80, 33.3%) (Table1).

Table1: Demographic characteristics of respondents

Variables	Frequency (N=240)	Percentage (100%)
Gender		
Male	94	39.2
Female	146	60.8
Age		
Less than20	52	21.7
21-30	125	52.1
31-40	43	17.9
More than 40	20	8.3
Professional status		
Nurse	80	33.3
Medical lab	80	33.3
Clinical student	80	33.3
Experience		
0-5	148	61.7
6-10	40	16.7
11-15	25	10.4
>15	27	11.3

3.2. Knowledge for healthcare workers about vaccination

Regarding the knowledge focused on basic concepts of vaccination required for healthcare workers before starting work at hospitals, the results of this study showed that only 41.7% of respondents knew the vaccines required where medical lab had significantly better knowledge than clinical students and nurses (55% medical lab, 29.3% medical students, and 25.6% nurses, p=0.00) (Table3), but the majority did not know the correct dose for each one. In addition, 45.4% of the participants chose the correct answer (0,1,6 month) for the time interval for hepatitis B vaccine, while 13.8% chose 0 and 1 months as a time interval without evidence of previous vaccination for MMR, and 40%answered one dose required every 10 years for Td/Tdap. Also 54.6% responded that the source of their information about the required vaccinations was from university study courses (Table 2).

Table2: Knowledge for healthcare workers about vaccination

Variables	Frequency(N=240)	Percentage (100%)
Do you know what are the vaccines needed for healthcare workers?		
Yes	193	80.4
No	47	19.6
If yes, what are these vaccines?		
-Hepatitis B/ Influenza/ Measles, Mumps, Rubella (MMR)/hepatitis A / Meningococcal	85	35.4
-Hepatitis B/ Influenza/ MMR/ Varicella/ tetanus, Diphtheria, Pertussis (Td/Tdap)/Meningococcal	100	41.7
-Hepatitis B/ Hepatitis A/ MMR/ Varicella/ Chicken pox/ Diphtheria/ Meningococcal	46	19.2
Have you taken Hep B vaccine?		
Yes	223	92.9
No	17	7.1
How many doses you got at what interval for Hepatitis B vaccine?		
0,1 month	21	8.8
0,2,6 month	93	38.8
0,1,6 month	109	45.4
0,2 month	17	7.1
[Measles, Mumps, Rubella, Varicella] dose time interval		
-0 and 1 months without evidence of previous vaccination	33	13.8
-0 and 1 months with evidence of previous vaccination	52	21.7
- 0 and 2 months without evidence of previous vaccination	83	34.6
- 0 and 2 months with evidence of previous vaccination	72	30.0
Tetanus, Diphtheria and Pertussis		
-one dose every 10 years	96	40.0
-one dose every 5 years	74	30.8
-two dose one month apart every 3 years	70	29.2
What is your source of information about healthcare worker vaccination?		
-resident training	31	12.9
- university study course	131	54.6
- job education in training hospital	32	13.3
- from medical book, journal, or social media	28	11.7
- don't know about vaccination	18	7.5

Table3: ANOVA significance Test

What are the recommended vaccines?					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.59	2	6.79	13.98	0.00
Within Groups	110.82	228	0.48		
Total	124.41	230			

3.3. Attitude For Healthcare Workers about Vaccination

The results of this study showed that most of the participants (58.8%) had incomplete vaccination, while 33.8% completed their vaccinations, and 5.7% had no vaccination. Also, the majority of respondents (64.6%) were not against the principle of vaccination, but from their own perspective they believed that the reasons for discontinuing the required vaccines vary between fear of the vaccine's adverse effects (26.3%), being too busy to take the vaccine (36.7%), the vaccination being too expensive (27.9%), lack of adequate knowledge about the vaccines (32.1%), and lack of knowledge about its benefits (25.0%) (Table4).

Table 4: Attitude for healthcare workers about vaccination

	Frequency (N=240)	Percentage (%)
Have you taken your vaccination mentioned above?		
Completed vaccination	81	33.8
Incomplete vaccination	141	58.8
No vaccination	18	5.7
Are you against some of the vaccines mentioned above?		
Yes	85	35.4
No	155	64.6
From your own perspective, what do you believe are the causes of healthcare worker discontinuing/ neglecting the required vaccines?		
Fear of its acute adverse effects	63	26.3
Doubts about its efficacy and safety	46	19.2
Too busy	88	36.7
Too expensive	67	27.9
Lack of adequate knowledge about vaccination	77	32.1
Lack of knowledge about its benefits	60	25.0
Belief that vaccine is not protective	22	9.2

3.4. Practice of Vaccine among Participants

Regarding the practice of vaccination, the findings of this study show that 61.3% of respondents were aware of policies toward vaccination in the facility they work in, and 60.8% of HCWs were asked to take the recommended vaccines (Table 5).

Table5: Practice of vaccines among participants

	Frequency (N=240)	**Percentage (100%)**
Are you aware of policies toward vaccination in your organization?		
Yes	147	61.3
No	93	38.8
Have you asked to take the recommended vaccine in the hospital you work/train in?		
Yes	146	60.8
No	94	39.2

3.5. Knowledge about Standard Precaution

Moreover, most of the respondents (86.3% of nurses, 95% of medical lab, and 82.5% of clinical students) could correctly define standard precautions; also they correctly identified the use of PPE's (96.3% of nurses, 91.3% clinical students, and 87.5% medical lab). The results show that the majority had correct knowledge about the components of standard precaution. Similarly, safe injection practices were correctly identified by (96.3%) of nurses, 95% of medical lab, and 87.5% of clinical students while identification of needle stick and sharp injury was done by 100% of medical lab, 95% nurses and 83.8% clinical students.

In addition, respiratory hygiene etiquette was reported by the three groups correctly (86.3% nurses, 77.5% medical lab, 80% clinical students). Almost the three groups had good knowledge about five moments of hand hygiene (Table 6).

Table 6: Knowledge about standard precaution

Variables	Nurses (N=80) (100.0%)	Medical lab (N=240) (100.0%)	Clinical students (N=240) (100.0%)
Standard precautions definition			
Agree			
Disagree	69 (86.3)	76 (95.0)	66 (82.5)
Not sure	5 (6.3)	0 (0.0)	2 (2.5)
	6 (7.5)	4 (5.0)	12 (15.0)
components of standard precautions:			
-Hand Hygiene			
-Use of PPE	79 (98.8)	79 (78.3)	77 (96.3)
-Safe injection practices	77 (96.3)	70 (87.5)	73 (91.3)
-Respiratory hygiene etiquette	77 (96.3)	76 (95.0)	70 (87.5)
-Cleaning and disinfection	69 (86.3)	62 (77.5)	64 (80.0)
- Needle stick and sharp injury	76 (95.0)	80(100)	71(88.8)
prevention	76 (95.0)	80 (100)	67(83.8)
Standard Precaution protects both healthcare workers and patient			
Agree			
Disagree	80 (100)	80 (100)	74 (92.5)
	0 (0.0)	0 (0.0)	6 (7.5)
Standard precaution reduce the spread of communicable disease			
Agree			
Disagree	74 (92.5)	79 (98.8)	75 (93.8)
	6 (7.5)	1 (1.3)	5 (6.3)
Indications for hand hygiene include:			
-Before touching a patient			
-Before exiting the patient's care area	79 (98.8)	79 (98.8)	79 (98.8)
-After contact with blood, body fluids or excreta	77 (96.3)	68 (85.0)	66 (82.5)
-Prior to performing any aseptic procedure	79 (98.8)	80 (100)	76 (95.0)
-After gloves removal	77 (96.3)	76 (95.0)	73 (91.3)
	73 (91.3)	78 (97.5)	68 (85.0)

Note: For components of SP and indication for HH the table contains the frequency and percentage for those who said "Yes".

3.6. Difference in standard precautions attitudes and practice

An ANOVA test was carried out to identifying the difference between the groups of participants regarding the most important reason for not always wearing both gloves and gowns while working was that they do not have time to wear them and it was significantly higher in nurses than medical lab and clinical students (57.1% nurses, 16.7 % clinical students, and 13.8% medical lab, p=0.003) (Table 7).

Table7: ANOVA significance Test

ANOVA

Most important reason for not always wearing both gloves and gowns while working (for those not wearing it)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23.579	2	11.789	5.898	.003
Within Groups	433.780	217	1.999		
Total	457.359	219			

A chi-square test was carried out to assess the relationship between the adherence to the use of PPE' and access to them in the facility, where (34.2%) of total participants do not have regular access to PPE's. The test showed that there was a significant relationship between the mentioned variables p=0.000 (Table 8). With respect to discarding both syringe and needle into safety box without

recapping, the respondents have proper practices specifically (88.8%) nurses, (77.5%) medical lab, and (82.5%) clinical students.

Table 8: Relation between adherence to use of PPE and the reason for non-compliance of healthcare workers

		Most important reason for not always wearing both gloves and gowns while working (for those not wearing it)					Total	Chi square test
		do not have regular access to PPE	do not have time to wear	can work safely without them	do not believe they are really protective	wearing them make it difficult for me to do my work		
PPE's always worn by healthcare workers	when working	48	42	9	10	21	130	Pearson Chi Square= 35.643 p=0.000
		36.9%	32.3%	6.9%	7.7%	16.2%	100.0%	
	gown only	2	5	3	1	3	14	
		14.3%	35.7%	21.4%	7.1%	21.4%	100.0%	
	gloves and gowns	22	9	18	11	18	78	
		28.2%	11.5%	23.1%	14.1%	23.1%	100.0%	
	gloves or gowns	10	7	0	1	0	18	
		55.6%	38.9%	0.0%	5.6%	0.0%	100.0%	
Total		82	63	30	23	42	240	
		34.2%	26.3%	12.5%	9.6%	17.5%	100.0%	

3.7. Prevalence of Occupational Exposure and Post Exposure Prophylaxis

Moreover, the study aimed at examining the prevalence of occupational exposure and post exposure prophylaxis among healthcare workers. The results of the study show that 51.2% of nurses, 38.8% of medical lab, and 45.0% of clinical students had a needle prick, body splash or was in contact with blood or body fluids, among those who reported the exposure were nurses scored (75%); a value which was significantly higher than medical lab (45.2 %) and clinical students (33.3%), p=0.001 (Table 10). Concerning the source of exposure, needle stick was the major type among nurses (37.5%) and medical lab (28.7%) but blood splash was among clinical students (22.5%). On the other hand knowledge about the sources of occupational injuries/ exposure was good for the three groups and they reported that they are needle stick injuries, blood, and body fluids (93.8% nurses, 92.5% medical lab, and 77.2% clinical students) (Table 9).

Table 9: Prevalence of occupational exposure

Variables	Nurse(N=80) (100.0%)	Medical lab(N=80) (100.0%)	Clinical students(N=80) (100.0%)
Exposed to occupational exposure			
Yes	41 (51.2)	31 (38.8)	36 (45.0)
No	39 (48.8)	49 (61.3)	44 (55.0)
Which type of accident/exposure did you experience?			
- needle stick injury	30 (37.5)	23 (28.7)	12 (15.0)
- blood splash	7 (8.8)	8 (10.0)	18 (22.5)
- mucous splash	4 (5.0)	0 (0.0)	6 (7.5)
- none	39 (48.8)	49 (61.3)	44 (55.0)
If yes, when was your last needle prick or body splash or in contact with blood or body fluids?			
-within 3 months	12 (29.3)	9 (29.0)	16 (44.4)
-within 6 months	9 (29.0)	4 (12.9)	11 (30.6)
-in the past one year	20 (44.4)	18 (58.1)	9 (25.0)
Did you report the accident?			
Yes	33 (75.0)	14 (45.2)	12 (33.3)
No	11 (25.0)	17 (54.8)	24 (6.7)

Continue Table 9

Have you ever heard about healthcare workers who sustained needle stick injuries /exposures at work place?			
Yes	59 (73.8)	40 (50.0)	16 (20.0)
No	21 (26.3)	40 (50.0)	64 (80.0)
What are the sources of occupational injuries/exposures?			
- Needle stick injuries, blood, and body fluids	75 (93.8)	74 (92.5)	61 (77.2)
- Vaginal secretions	3 (3.8)	3 (3.8)	4 (5.1)
- Blood transfusions	2 (2.5)	3 (3.8)	12 (15.2)
- Tears	0 (0.0)	0 (0.0)	2 (2.5)

Table 10: ANOVA significance Test

Did you report the accident?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.237	2	1.618	7.162	.001
Within Groups	23.726	105	.226		
Total	26.963	107			

4. DISCUSSION

This study reveals that the knowledge of recommended occupational vaccinations is insufficient in HCWs especially among nurses and clinical students. These results are in agreement with a couple of previous studies (Loulergue et al., 2009; Dinelli et al., 2009; La Torre et al., 2017) where similar results were found. In addition, most of the participants in this study said that the source of their information about vaccination ascribed to a university study course. This is inconsistent with the results of another study that was done among a population from southern Italy where it appeared that the participants acquired their information from their profession in the health sector and from friends/relatives/colleagues (Tabacchi et al., 2016).Consistent with other reports (Maltezou and Poland, 2016; Karageorgou et al., 2014; Vilar-Compte et al., 2018), in this study a large proportion of healthcare workers and even students that started their training in hospitals had not completely received the recommended vaccines. While most of HCWs and students are aware of the necessity of the vaccination in the workplace, only approximately half of them completed the vaccination course. These results were supported by several similar studies (Maltezou and Poland, 2016; Kisic-Tepavcevic et al., 2017). Regarding participants perception of the reasons for not taking or discontinuing the recommended vaccines, our results indicate that those reasons vary approximately equally between fear of vaccine adverse effects, being too busy to take the vaccine, the vaccine being too expensive, and lack of adequate knowledge about vaccination. Similarly other studies reported that the barriers that decreased the vaccine uptake among health care personnel have been consistently identified: gaps in knowledge about vaccine,, misconceptions about their own risk, vaccine effectiveness, vaccine safety and vaccine adverse events, lack of convenient access to vaccine, unawareness of the recommendations for immunization, fear of injections, and lack of leadership support (Maltezou and Poland, 2016;La Torre et al., 2017; Hollmeyer et al., 2009). On the other hand, a recent study done by Kouassi et al. (2017) showed that the cost of vaccine and lack of time was the determining factor .Although that most of the participants recognized have been vaccinated against hepatitis B, yet a significantly low percentage of vaccinated referred to have received a full course with 3 doses of correct interval time recommended. In comparison to other reports, our coverage is much higher than a study done in Mexico (Vilar-Compte et al., 2018).

According to the World Health Organization estimates, hepatitis B vaccination coverage shows remarkable discrepancy worldwide, with lowest rates in Africa ((Kisic-Tepavcevic et al., 2017; Prüss-Ustün et al., 2005), to much higher rates in western countries such as Germany (Wicker et al., 2013), and Greece (Papagiannis et al., 2016). Despite the standard precautions (SP) guidelines, knowledge and compliance vary among health workers and have been found to be inadequate in both developing and developed countries (Punia et al., 2014). The knowledge of SP in this study was high among the three groups as was also reported in other recent studies (Ndu and Arinze-Onyia, 2017; Johnson et al., 2019). In addition, consistent with other similar studies, the majority of the respondents in our study were able to define SP properly (Ndu and Arinze-Onyia, 2017;Amoran and Onwube, 2013).

Concerning the components or elements of SP implying in depth knowledge of SP, Ogoina et al (2015) found that among professional groups, the median knowledge scores different. However Ofili et al (2003) reported that health care workers were found to have insufficient knowledge of standard precaution. In this study, knowledge on five moments of hand hygiene was high among three groups. On the other hand, Ndu and Arinze-Onyia (2017) reported that knowledge on hand hygiene indications was low. Similarly Ogoina et al (2015) described that low percentage washed their hands after touching patients, after touching patients surrounding and after removing gloves. In this study, the main source of information about SP is formal training at hospital or university study course, which is consistent with Ndu and Arinze-Onyia (2017) who reported that SP being taught formally in university course for medical lab unlike other healthcare works since their main source information was formal training. Other studies have reported that the main source of information was material taught during the curriculum, and nursing students were found to have a better mean overall score compared to medical students (Tavolacci et al., 2008). The attitude to SP reported by the three study groups was significantly positive in this study, which is consistent with the findings ofNdu and Arinze-Onyia (2017) who reported the same results. Concerning the resources available for practice SP, the respondents reported lack of resources they do not have regular access to PPE's, this is similar to other studies in low income countries (Ogoina et al., 2015; Ndu and Arinze-Onyia, 2017). Moreover, respiratory hygiene is a big concern in infection transmission and spread. In this study a small number of respondents said that there were signs at entrances with instructions on cough etiquette, also they reported that no measures were put in place. Similarly,Ndu and Arinze-Onyia (2017) reported that there were inadequate signs in the hospitals encouraging SP. Concerning the practice of SP, there were a significant difference between nurses and both medical lab and clinical students. Nurses were less likely to use PPE's than the other two groups, and the reason for not always wear gloves and gowns while working was significantly related to lack of regular access to PPE's, this is in agreement with other studies (Ndu and Arinze-Onyia, 2017; Abdulraheem et al., 2012). In contrast, a study conducted in India showed that most of healthcare workers that there were a high use of gloves and gowns (Punia et al., 2014). Safe disposal of used needles and syringes was very good, and recapping is not practiced among healthcare workers this is against Ndu and Arinze-Onyia (2017) and Punia et al (2014) where safe disposal of used syringe was very poor, and recapping still being practiced. Among the participants in the study, approximately a high number experienced occupational exposure. Of these, nurses were significantly higher than the other two groups (medical lab and clinical students) who reported the exposure in the past one year. Needle stick was the major type of exposure among one third of nurses and medical lab, but blood splash was the main cause among clinical students. This is consistent with a study done in Tanzania among healthcare workers at public hospitals (Lahuerta et al., 2016) as well as with Kimaro et al (2018) who reported that the prevalence of occupational exposures was approximately high among healthcare workers, and the leading causes were blood splash followed by needle stick injuries. However, this prevalence of exposure is much higher compared to other findings from different settings, which showed a very low prevalence (Reda et al., 2010; Kumakech et al., 2011). Moreover, respondents were knowledgeable about criteria for offering PEP regimens, but general knowledge on HIV-PEP among healthcare workers was low, with approximately half of the participants having inadequate knowledge used for low and high-risk exposure. The observed high prevalence of occupational injuries and low knowledge of PEP put healthcare workers more at risk of acquiring infectious diseases due to occupational exposures. Similar findings on low knowledge on PEP have been reported in Nigeria (Agaba et al., 2012),Tanzania (Kimaro et al., 2018), and Nepal (Dhakal, 2012). Furthermore, Poor knowledge among participants was reported about the appropriate time to start HIV-PEP and the duration of therapy upon exposure. Similarly, another study showed differences in the percentage of knowledge and regimen should be followed for HIV-PEP after exposure was found to be explained by the lack of training on safety measures for post exposure (Dhakal, 2012). In contrast, other studies showed that high proportion of participants were knowledgeable on how to use HIV- PEP as well as the duration and the steps taken after exposure (Kimaro et al., 2018). Further, more than half of the participants reported the availability of PEP medication at their respective health facilities, but sometimes they experienced unavailability of these medications. Similarly Kimaro et al (2018) reported that almost three quarters of participants said PEP medication was available at the facility they work in. Contrary to these findings was reported in Nepal (Dhakal, 2012) and Ethiopia (Tebeje and Hailu, 2010).

5. CONCLUSIONS

– The study demonstrated that majority of health care workers and clinical students had adequate knowledge about components of standard precaution, post exposure prophylaxis (PEP) and nearly below half of them knew the correct vaccination recommendation required before start working at hospitals.

– In this study, we identified a major gap in immunizations. Despite being universally recommended for health care workers, correct hepatitis B vaccination in the recommended intervals was low. Other recommended vaccinations were also inappropriately acquired. In addition, few participants had completed their vaccines despite of policies available in the facilities. The reasons for not completing the recommended vaccinations was lack of knowledge about the vaccines, lack of knowledge about its benefits, cost, lack of free time to be vaccinated, and fear of its adverse effects.

– Generally, most have good knowledge of the definition of PEP and of HBV PEP, however have poor knowledge of the actions to be taken in case of HCV exposure and of the utilization of as well as of the start and end time of HIV PEP regimen following occupational exposures.

ACKNOWLEDGMENT

The researchers would like to thank the participants as well as the nursing administration at the respective hospitals at which the study was carried out.

REFERENCES

– Akl, E. A., El-Asmar, K., Maroun, N., Khater-Menassa, B., & Adibs, S. (2011). Financial characteristics and satisfaction of physicians practicing in Lebanon: a survey study. *The Lebanese medical journal*, *60*(3), 148-152.

– Bazargan, M., Makar, M., Bazargan-Hejazi, S., Ani, C., & Wolf, K. E. (2009). Preventive, lifestyle, and personal health behaviors among physicians. *Academic Psychiatry*, *33*(4), 289-295.

– Cooper, C. L., Rout, U., & Faragher, B. (1989). Mental health, job satisfaction, and job stress among general practitioners. *BMJ*, *298*(6670), 366-370.

– Cornuz, J., Ghali, W. A., Di Carlantonio, D., Pecoud, A., & Paccaud, F. (2000). Physicians' attitudes towards prevention: importance of intervention-specific barriers and physicians' health habits. *Family practice*, *17*(6), 535-540. (2)

– Deary, I. J., Blenkin, H., Agius, R. M., Endler, N. S., Zealley, H., & Wood, R. (1996). Models of job-related stress and personal achievement among consultant doctors. *British journal of Psychology*, *87*(1), 3-29.

– de Souza, L. C. L., Mendonça, V. R., Garcia, G. B., Brandão, E. C., & Barral- Netto, M. (2015). Medical specialty choice and related factors of Brazilian medical students and recent doctors. *PloS one*, *10*(7).

– DeZee, K. J., Byars, L. A., Magee, C. D., Rickards, G., Durning, S. J., & Maurer, D. (2013). Ratings of Specialties' Lifestyles by Fourth-Year US Medical Students with a Military Service Obligation. *Family medicine*, *45*(4), 240-6.

– Dorsey, E. R., Jarjoura, D., & Rutecki, G. W. (2005). The influence of controllable lifestyle and sex on the specialty choices of graduating US medical students, 1996–2003. *Academic Medicine*, *80*(9), 791-796.

– Dorsey, E. R., Jarjoura, D., & Rutecki, G. W. (2003). Influence of controllable lifestyle on recent trends in specialty choice by US medical students. *Jama*, *290*(9), 1173-1178.

– Fincher, R. M. E. (2004). The road less traveled—attracting students to primary care. *New England Journal of Medicine*, *351*(7), 630-632.

– Hauer, K. E., Durning, S. J., Kernan, W. N., Fagan, M. J., Mintz, M., O'Sullivan, P. S., ... & Reddy, S. (2008). Factors associated with medical students' career choices regarding internal medicine. *Jama*, *300*(10), 1154-1164.

– Marschall, J. G., & Karimuddin, A. A. (2003). Decline in popularity of general surgery as a career choice in North America: review of postgraduate residency training selection in Canada, 1996–2001. *World journal of surgery*, *27*(3), 249-252**.**

– Minor, S., Poenaru, D., & Park, J. (2003). A study of career choice patterns among Canadian medical students. *The American journal of surgery*, *186*(2), 182-188.

– Schwartz, R. W., Jarecky, R. K., Strodel, W. E., Haley, J. V., Young, B., & Griffen Jr, W. O. (1989). Controllable lifestyle: a new factor in career choice by medical students. *Academic Medicine*, *64*(10), 606-609.
– SPSS, I. (2011). Version 20. New York, NY, USA: IBM Incorporation.
– Ware, J. E., & Gandek, B. (1998). Overview of the SF-36 health survey and the international quality of life assessment (IQOLA) project. *Journal of clinical epidemiology*, *51*(11), 903-912.
– Wright, B., Scott, I., Woloschuk, W., & Brenneis, F. (2004). Career choice of new medical students at three Canadian universities: family medicine versus specialty medicine. *Canadian Medical Association Journal*, *170*(13), 1920- 1924.
– Wu, S., Zhu, W., Li, H., Wang, Z., & Wang, M. (2008). Relationship between job burnout and occupational stress among doctors in China. *Stress and Health*, *24*(2), 143-149.
– Xu, H., & Remick, D. G. (2016). Pathology: a satisfying medical profession. *Academic pathology*, *3*, 2374289516661559.
– Zarkovic, A., Child, S., & Naden, G. (2006). Career choices of New Zealand junior doctors. *The New Zealand Medical Journal (Online)*, *119*(1229).