Original Research Article

Knowledge, Attitudes and Practices of Nurses about Infection Control Measures in The Renal Dialysis Centre

Abstract

Over the world, Hospital-acquired infection (HAI) is one of the common health issues and difficulties faced by hospitals in all countries. This is descriptive cross-sectional conducted on Renal Dialysis El-Hawary Kidney Centre in Benghazi city, Libya in 2017. Since nurses are part of the healthcare team that perform an essential role in the control of hospital infection, this study is conducted to investigate the knowledge, attitudes and practice of nurses regarding infection control measures and precautions for hospital infection. The data collection instrument is composed of a self-structure questionnaire based on precautions suggested by the World Health Organization (WHO) and the United States Centers for Disease Control and Prevention (CDC). Data were fed into the SPSS software v.22 and were analyzed using descriptive and inferential statistics. The result found that 88 % of nurses reporting the higher level of exposure to the biohazards particularly, needle stick injury. However, most nurses do not have a good knowledge and practice about infection control even though having an average efficacy. As the outcomes show a low level of awareness among the nurses regarding hospital acquired infection, it is proposed to offer training sessions on the prevention and control of HAI in order to upsurge the awareness of nurses in the renal dialysis centre and hold practical courses for practicing these principles.

Keywords: Dialysis, knowledge, attitude, practice, standard precautions, infection control

Introduction

Patients who undergo dialysis treatment have an increased risk for getting an infection. Any healthcare setting has issues related to infectious diseases and the safety of both patients and staff, but the renal dialysis setting has its own concerns because the process of hemodialysis requires frequent use of catheters or insertion of needles to access the bloodstream. Hemodialysis patients can carry blood-borne pathogens, and consequently can increase a risk to the healthcare workers (HCWs) treating them and to the other patients being treated in the dialysis center. Hemodialysis patients may have weakened immune systems and be more susceptible to infection themselves, and everyone in the surrounding area is also at high risk. One of the most critical issues challenging

nurses of dialysis care is that of preventing infections. Because hemodialysis requires repeated exposure of the bloodstream for venous access, nurses must be diligent in keeping bacteria and viruses at bay. This is particularly important given that patients with kidney disease have lowered immune responses and are therefore more susceptible to infections. Bloodstream infections (BSIs)for instance are a leading cause of hospitalization in dialysis patients and one of the leading causes of mortality. According to the Centers for Disease Control and Prevention (CDC), an estimated 37,000 BSIs occur each year among dialysis patients with central lines, and as many as one in four of these patients may die as a result of their infection.[1,2] In addition, the estimated cost per hospitalization from a bloodstream infection among this population is $23,000.[2] Thus, preventing BSIs fulfills the triple aim, which is to improve population health, enhance patient experience of care, and reduce health care costs. The main emphasis in most of this research ideas to the importance of applying the Standard Precautions by the healthcare providers, together with special focus on disinfection policies and measures to avoid cross contamination.[2,3] This study was conducted in order to examine the nurses' knowledge and awareness of cross infection and to document their practice in relation to the application of the standard health precautions and CDC guidelines.

Methods

Study Design: a descriptive Cross-Sectional Survey was conducted among healthcare workers (Nurse staff) at Dialysis setting of the El-Hawwary Kidney Centre in Benghazi city, Libya.

Data Collection: Data were collected through using a designed questionnaire. For statistical analysis, the chi square test was used to measure the association among independent variables to evaluate the compliance of the nurses related safety procedures at the setting.

Questionnaire Design: The questionnaire included 24 multiple choice questions. The following data was provided:

- Socio-demographic data: age, gender, educational level and marital status, shift work and working years (Experience).

- General information on occupational risks and hazards: such as the severity of this job, previous work accident, type of accident type, reason of accident.

- Infection control measures and procedures: including hand washing, disinfection, sterilization, disposable methods, written policy, conducting training program, vaccinations, periodic medical examination program and etc.

Sample Population: The total population in the dialysis setting in the different shifts was 53 nurses, therefore, the questionnaires were distributed to all of them during a period of month from June to July 2017. Thus, the participation rate (Response Rate) was 96%.

Statical Analysis: The Statistical Package for Social Sciences (SPSS ver. 19) was used for data entry and analysis. Frequency distribution and cross tabulation were conducted to identify data entry error. Data were described using the mean and percentages**.**

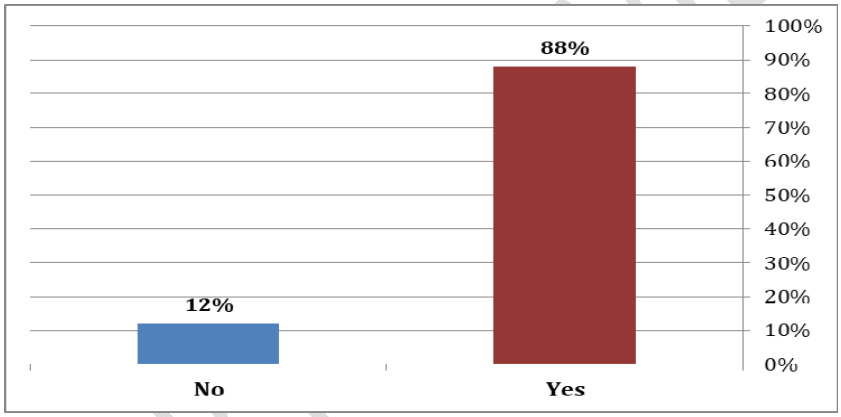
Ethical considerations: There were no ethical issues but application for ethical approval was made by agreement statement of the manager office of this dialysis setting, in order to collect the data. Researchers informed the participants that taking part in the study was completely voluntary and no questions about their identity were asked.

Results

Table (1): Demographic Characteristics of The Nurses in The Dialysis Setting

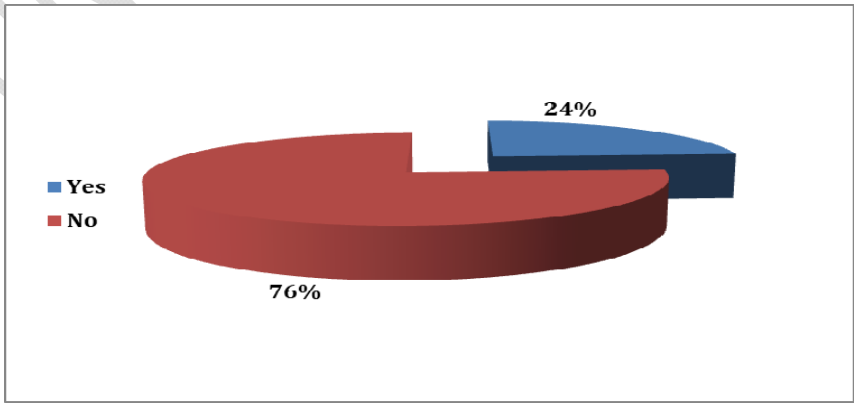
Characteristics		Frequency	Percent (%)
Gender	Male	12	24
	Female	39	76
Age Category	>20	2	4
	21-30	37	72
	31-40	10	20
	41-50	1	2
	51-60	1	2
Marital Status	Single	33	65
	Married	15	29
	Divorced	3	6
Work Hours	6 hours	43	84
	12 hours	8	16
	0-5	26	51

Working Years	**6-10**	9	18
	11-15	13	25
	16-20	2	4
	<26	1	2
Qualification	**Training Course**	6	12
	Diploma	39	76
	Bachelor	5	10
	Master	1	2



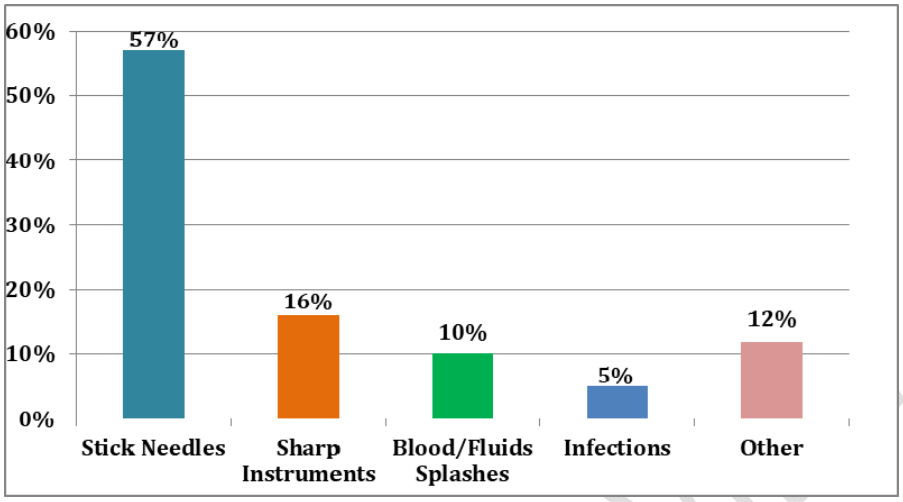
Graph (1): Biohazards Exposure at Work

Nurses at the renal dialysis centre reported their exposure to the biohazards by (88%), while (12%) thought that they were not exposed, as presented in graph (1).



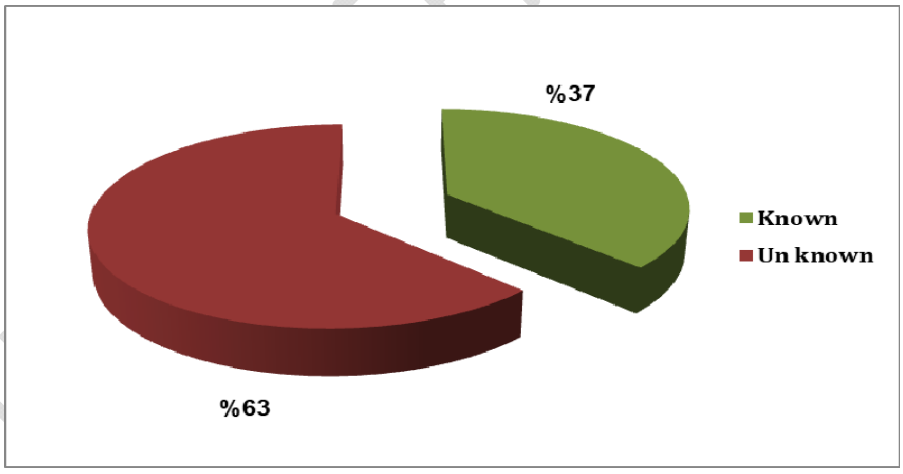
Graph (2): Accident Risk Exposure at Work

In addition, graph (2) shows that (24 %) of nurses at the renal dialysis centre were exposed to risk accidents during performing their duties.



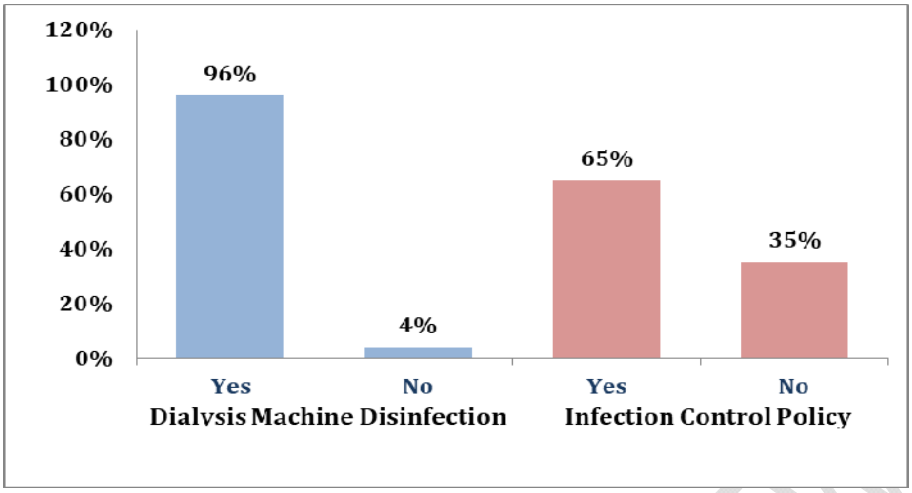
Graph (3): Knowledge Regarding The Causes of Work Accidents

The higher proportions of the main causes of work accidents among nurses were (57%) stick needles, (16%) sharp instruments, and (12%) other causes including slips and trips. Lower proportions involve (10%) blood and/or fluids splashes, (5%) infections such as influenza, as shown in graph (3).



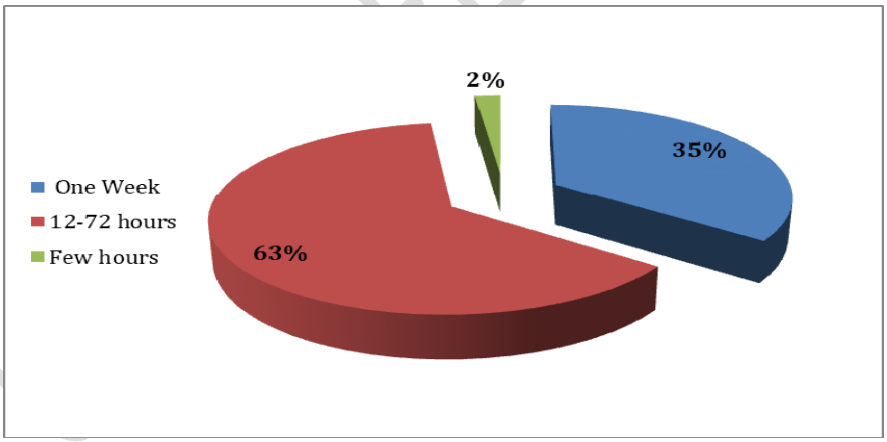
Graph (4)Awareness regarding Types of Renal Dialysis Machines

From graph (4), (63%) of the nurses reported that they were un known what are types of the dialysis machine, currently used in this centre. (Only 37%) (19 out of 51) were known about them.



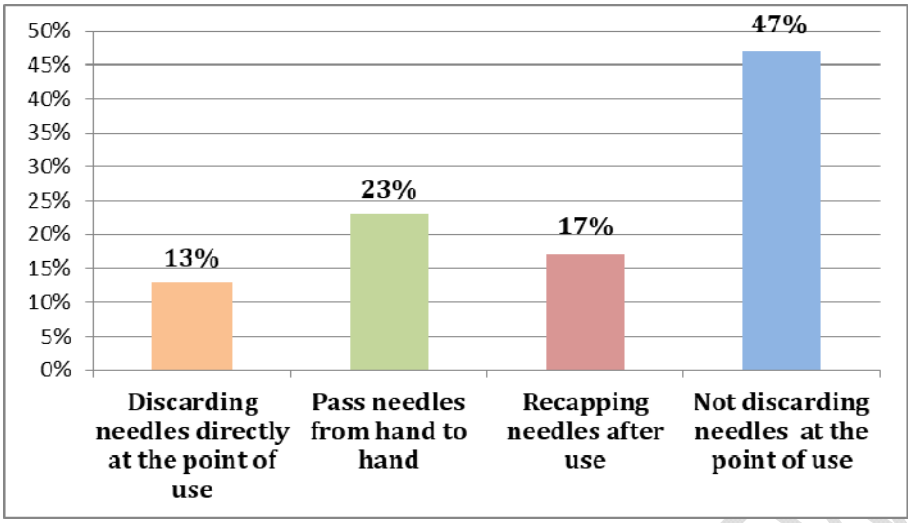
Graph (5): Disinfection of Machine and Infection Control Policy

Graph (5) presents the application of dialysis machine disinfection practice and provision of infection control policy at El-Hawwary Renal Dialysis Centre. (96%) of nurses stated that they applied disinfection for the dialysis machine between patients in particular heat disinfection. only (35%) of nurses confirmed that there was not infection control policy at this Centre, while the rest of them confirmed the opposite. They also stated that chemical disinfection applied only on machines which use on active positive serology patients.



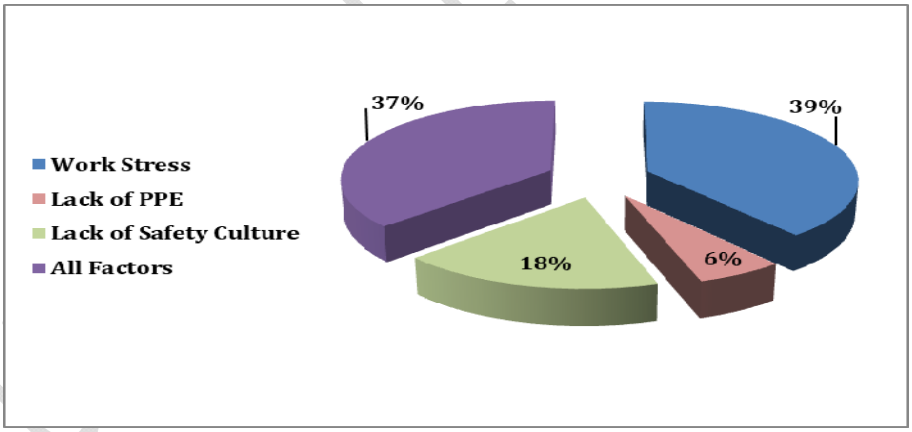
Graph (6) : The knowledge of the viability of hepatitis B virus on surfaces at room temperature

Graph (6) presents that more than half of the nurses (63%) had the knowledge of the viability of hepatitis B virus on surfaces at room temperature ranging from 12 hours to 72 hours. A shorter duration of viability was stated by (35%) of nurses for one week.



Graph (7): Practice of The Proper Handling of Needles

The report of nurses in the current study displayed in graph (7) that a proportion of them were not practiced the proper handling of needles in renal dialysis centre as (47%) of nurses reported not always discarding needle at the point of use. (23%) of nurses reported passing needles directly from hand to hand (17%) reported recapping needles after use.



Graph (8): Knowledge Regarding The Factors of Work Accidents

From graph (8), factors of work accidents in this study presented as (39%) work stress, (18%) lack of safety culture, (6%) lack of PPE and (37%) of nurses referred to all factors together.

Table (2): Association between Experience and Performing Duties

Working Years (Experience)	Immediate Dispose of any contaminated instruments/tools		Hand Hygiene Before and after Cross patients		Certain procedures with Patients (AIDs/Hepatitis)	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**
0-5	24	2	25	1	12	2
6-10	7	2	9	-	21	8
11-15	9	4	11	2	5	-
16-20	2	-	2	-	1	-
>26	1	-	1	-	2	-
Total	**43**	**8**	**48**	**3**	**41**	**10**

Table (2); determines the association between working years and different duties at work. It clearly found that the positive association increased among the nurses with (0-5) years and (6-10) years; and decrease gradually with the other categories.

Table (3); shows that all the nurses reported that they did not receiving on job training in infection control. Thus, more than half of them received training in infection control in dialysis unit (53%). The majority (88%) of nurses expressed a need for training in infection control in dialysis unit on regular basis. In addition, the majority of nurses reported the presence of infection control guidelines in dialysis unit (81%). The majority of nurses also stated an adequate supply of infection control equipment including gloves (96%), masks (88%) hand disinfectant (86%), Machine disinfectant (82%) and biohazard container/sharp box for each bed (80%). Lower proportions reported an adequate supply of Glasses (47%) and caps (45%) and gowns (39%). In the other hand, the knowledge of situations related to hand washing, (24%) stated hand washing after removal of gloves and (29%) of nurses stated hand washing before wearing of gloves. Lower proportion (18 %) stated hand washing after preparation of dialysis machine. In respect of the knowledge regarding needle stick, (76%) of nurses reported they trained and practice to avoid it during performing their duties. In respect of vaccination against Hepatitis B, (61%) of nurses reported they had it and (39%) did not vaccinated. However, (64%) of nurses mentioned that there was not periodic medical examination at work.

While (36%) mentioned that they conducted periodic examination by their selves, not as an obligation of work. Furthermore, (27%) of nurses had the knowledge that the patients on dialysis should be monitored monthly for the early detection of infection. (14%) of nurses had the knowledge that dialysis patients should be monitored every 3 months. The largest proportions (59%) of nurses had the knowledge of re-screening patients on dialysis patients every 6 months.

Table (3): The Knowledge, attitude of Nurses regarding Infection Control Program in Renal Dialysis Unit

Infection Control Program	**Frequency**		**Percentage%**	
	Yes	**No**	**Yes**	**No**
ICP training before conducting the job	-	51	-	100
ICP training after conducting the job	27	24	53	47
A need for more ICP on regular basis	45	6	88	12
Presence of IC Guidelines/Policy	42	9	82	18
Supply IC Equipment				
Mask	45	6	88	12
Gown	20	31	39	61
Gloves	49	2	96	4
Eyewear	5	46	10	90
Caps	23	28	45	55
Biohazard Container & Sharp box	41	10	80	20
Hand Disinfectant	44	7	86	14
Machine Disinfectant	42	9	82	18
Hand Washing				
Before wearing gloves	15	36	29	71
After wearing gloves	12	39	24	76
After preparation of dialysis machine	9	42	18	82
Training to avoid needle stick injuries	39	12	76	24

HBV Vaccination (Nurses)	31	20	61	39
Serology Monitoring/Rescreening (for –ve Dialysis Patients)				
Monthly Interval	14	37	27	73
3 Months Interval	7	44	14	86
6 Months Interval	30	21	59	41

DISSCUSSION

More than 90% of nurses in this study reported being always wearing gloves when attending to patients and drawing blood samples as well as the changing of gloves between patients. However, it has been observe that non-negligible proportions of nurses ranging between (24%), (29%) and (18%) were not always adherent to hand washing practices. The practice of hand hygiene before and after any contact with the patient and patient's environment and after removal of gloves fall in category I level of evidence in preventing infection in healthcare setting.[3,4] Although hand hygiene is the least expensive mean of preventing healthcare-related infections, the prevalence of sub-optimal practice has been, and is still high.[5] Failure to perform hand hygiene has serious consequences, including the negative effects on patients' health and their confidence in healthcare delivery. Nurses are well placed to support and express good hand hygiene techniques to inspiration culture change and hold hand-hygiene compliance at all levels in their healthcare organizations.

In this study also, the extent of nurses' use of personal protective equipment was unsatisfactory as (39%) reported always wearing gowns though performing their duties while (90%) of nurses were not always adherent to the use of eyewear. The evidence conducted by Bublitz[6] have presented that renal dialysis nurses are at significant risk of per mucosal (splash) contamination with increased likelihood of acquisition of major communicable diseases including HBV, HCV and HIV. For the prevention of the transmission of infections in hemodialysis units, the CDC recommends the wearing of gowns, face shields, eyewear or masks by health workers to protect themselves and prevent the soiling of clothing when performing procedures during which spraying or splashing of blood might occur.[7] Thus, Bublitz [6] emphasized that the availability of face shield and their appropriateness to healthcare workers is of significant importance for adherence to their use.

The CDC guidelines recommend that all patients and healthcare workers in renal dialysis unit should be vaccinated for HBV. Dialysis machine and related

peripherals could be a considerable source of viruses and bacteria transmission. These involve not only often touched surfaces, but also waste containers, blood tubing clipped to waste containers, and items placed machines such as dialyzer caps and medication ampoules.[8,9] Additionally, there is a significant probability that items used by patients or taken to patient's dialysis station could become contaminated with body fluids and serve as a considerable source of infection to other patients either directly or by contamination of the hands of personnel. In the current study awareness and practice of nurses of these recommendations was acceptable as the most of them informed that they continuously dispose in designated container used dialyzer line and dialyzer (91%) and bedside single use items (96%).

Most of nurses in this study agreed that healthcare workers in dialysis centre are at high risk of HBV and HCV infection and that protection with full dose of hepatitis B vaccine and following infection control guidelines is needed for their protection. Without a doubt, Performing infection control guideline is of very significant in view of the absence of hepatitis C vaccine. However, outcomes of this study displayed that only (61%) of the nurses were hepatitis B vaccinated. This indicates that the health care workers at dialysis centre were at poor to average level of knowledge, attitudes and practices regarding their safety.[9]

The report of nurses in this study regarding their compliance to the proper handling of needles in this centre was un acceptable. These practices can raise the risk of needle stick injury that is not infrequent in healthcare setting and may be responsible for the transmission of at least 20 different pathogens.[10,11] A study in Japan presented a 10% risk of transmission of HCV from a source patient with HCV PCR-positive blood following needle stick injury because of improper handling of needles.[12] These evidences suggest that occupational exposures will continue to occur in spite of improved methods of preventing exposure. Consequently measures to decrease risk taking behaviours in regards to these occupational exposures among nurses should be applied and regularly checked. This study also revealed that the common type of accident at work was needle sticks, and the reason of work accidents was work stress.

The findings of this study found Increasing positive knowledge and attitudes among the nurses with (0-5) years and (6-10) years rather than the other categories. This can result of up to date with information regarding hospital acquired infection due to recent graduation. Also it may be challenging to change safety culture and behaviours for workers with more years of experience and to change behaviour, it may take long period.

The incubation periods of acquiring the infection with HBV or HCV is very long, ranging from 45 to 160 days for HBV and from 14 days to 168 days for HCV.

Chronic HBV infection is usually asymptomatic and acute infection could be symptomatic in 10% of children and 30 to 50% of adults. Published studies recommends that HBV and HCV patients are capable to spread the infection even if no clear symptoms occur.[13] .Patients with chronic infection with mutations in the precore region of the HBV genome that prevent the expression of HBeAg but permit the expression of infectious virus has been defined. High titers of HBsAg have been detected in these patients despite the fact that they were HBeAg negative. [14] In the United States also, recent dialysis-associated outbreaks have occurred and HCV transmission most likely caused by inadequate infection control practices, mainly in situations when patients received dialysis immediately after an HCV-infected patient received dialysis. The CDC does not recommend using dedicated dialysis machines for patients with HCV, but recommends universal precautions and strict sterilization procedures for all dialysis machines.[15] Thus, it is clear that patients who are acutely infected may be hard to recognize. These patients could be a potential hazard of cross infection to healthcare workers and patients. Hence the CDC guidelines stated that all hemodialysis patients should be routinely tested on admission and on monthly basis afterwards. [5,14] Despite of this fact, (27%) of nurses correctly responded that hemodialysis patients should be tested for hepatitis B and C on monthly basis strongly agreed that testing patients on admission. This reflects the poor knowledge, practice and attitude of nurses regarding the cross infection in some ways.

CONCLUSION

According to the outcomes, most nurses do not have a good knowledge and practice about infection control even though having an average efficacy. Hence, it is essential that Libyan Ministry of Health and Medical Education do their best to inform the nurses and all the health care workers about the prevention of HAIs according to world standards and policies by way of academic courses, posters, and conferences. It is also essential to develop the knowledge of standard precautions, improve programs for HAI control, and hold training courses based on successful educational models. it has been detected that the nurses tend to be compliance with certain infection control practice than the others. Generally, the performance of nurses is acceptable but the intention is to reach best practice in all related areas. Training in infection control independently predicted better performance especially among those who received recent training. On job training in infection control should be frequent and emphasize on shaping nurses attitudes moreover to the delivery of comprehensive knowledge and standard practice.

Conflicts of interest

The author has no conflicts of interest to declare.

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