Assessment of Nurse's Knowledge and Practices about Personal Protective Equipment in Hemodialysis Unit in Basra Teaching Hospital

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Abstract

Objectives: to assess the nurses' knowledge and practices about personal protective equipment (PPE). **Methodology:** A descriptive cross-sectional design study has been carried out in Basrah teaching hospital, A purposive (non-probability) sample consist of (34) nurses who worked in the units of hemodialysis, the study started from 18th of October, 2019 to 12th of July, 2020. The instrument of the present study contains three parts, first part: It is concerned with the nurse's demographic data, second part: it is composed of (10) multiple choice questions (MCQs) related to the nurses knowledge, and third part: it consists of (14) items for nurses practice about personal protective equipment. The validity of the instrument had been achieved by 8 experts from different scientific branches. Statistical programs such as SPSS (Statistical Package for Social Science) v. 23 were used to analyze the data. **Result:** the findings revealed that majority of nurses had poor knowledge and practice about personal protective equipment and there has been a significant relationship between the nurse's knowledge about personal protective equipment and their level of education at a $p<0.05$ level. **Recommendation:** Provide training programs for the hemodialysis nurses on the promotion of higher standards of the hand hygiene and potential uses of the personal protective equipment during working in hemodialysis centers.

Keywords: *Assessment, nurses, knowledge, practices, personal protective equipment*

Introduction

Hemodialysis (HD) is one of numerous renal replacement therapies (RRTs) that have been utilized in treating the renal failure for the removal of the waste products and excess fluids and for the restoration of the electrolyte and chemical imbalances. Nowadays, the hemodialysis moves toward the innovative approaches, bio-materials and devices with absolute need for the solid evidences about each new technology or treatment [1].

In dialysis units, Infection is the first hospitalization cause and the second most widespread mortality cause amongst the Hemodialysis patients. The control of infections in the units of the dialysis is still the most significant one of the measures for maintaining healthy environment and for the prevention and avoidance of infection dissemination amongst the immuno-compromised patients [2].

Hemodialysis patients are under the exposure of a variety of the infection types, which include the infections to the bloodstream and the localized vascular access infections; blood-borne infections with the hepatitis C virus, hepatitis B virus (HBV), and/or human immunodeficiency virus (HIV); as well as the airborne infections. Infection sources include the contaminated equipment, water, infected patients and environmental surfaces. The contaminated health-care worker hands are amongst the most common transmission modes of the health-care-related infection cases [3].

About 19% of the HD patients die in 12 weeks after getting infected, 80,000 CRBSI take place in the ICUs of the US hospitals national wide, which causes about 28000 death cases every year [4].

In predialysis era, 60% of chronic renal failure patients who require being hospitalized have been infected and 39% have been died from infectious causes.

It has been presumed that debility that results from uremic state has resulted in the increase of infection risks, and uremia reversal would result in the reduction of infection risk times [1,3].

The obvious increase in the potentials for infection transmission in HD setting has resulted in creating and implementing certain strict measures for the prevention and control of the infection, as well as usual standard protection measures [6].

The patient-to-patient microorganisms' transmission through contaminated healthcare worker hands has been viewed as the most significant transmission route of the pathogens in the healthcare settings, which include the facilities of hemodialysis. Contact transmission may be prevented elements of Standard Precautions [4,7].

Standard Precaution elements include: a) hand hygiene, b) using personal protective equipment (PPE) like the gown, gloves, masks, eye protection (face shield or eye goggles), and c) handling items or equipment that include the surfaces in patient environment in such a way that prevents infectious agents' transmission [1,2].

The nurse is responsible for the prevention and control of the infection, and that responsibility is one of the integral elements of the safety program of the patients. Which is why, the nurses must be having ethical and professional responsibilities for ensuring that their skills and knowledge about the infection control are up-to-date and they always practice competently and safely [1,6].

Preventing health-care-related infections is responsibility of all of the health-care staff. Nurses have biggest part for the prevention of the nosocomial infection transmission amongst the patients and protecting the staff health. Moreover, nursing personnel can result in the reduction of the infection risk with proper hand hygiene and use of the personal protective barriers when changing the wound dressing and any invasive process for the patient care [8].

Material and Method

Design of the Study: A descriptive study has been conducted at hemodialysis units of Basrah Teaching Hospital for the assessment of the nurses' knowledge and practices about personal protective equipment (PPE) in basrah teaching hospital .The study started from 18th of October, 2019 to 12th of July, 2020.

Setting of the Study: The study was conducted in hemodialysis units of Basrah Teaching Hospital, and it is located in AL-Basra government.

Sample of this Study: A purposive (non-probability) sample consist of (34) nurses that have worked in HD units.

The instrument of this study has been conducted to reach the objective of the study and the questionnaire was derived from previous studies, they detail the following: first part: It is concerned with the nurse's demographic data which are gender, age, level of education, Years of work experience, Previous training in infection control, and get a regular test about infectious diseases. second part: it is composed of (10) multiple choice questions (MCQs) which are rated according to correct (1), not correct (0) score, related to the nurses knowledge.third part: it consists of (14) items for nurses practice about personal protective equipment which are rated according to choice always sometime never , scored as always(3), sometime(2), never(1).

The validity of the instrument had been achieved by 8 experts from different scientific branches from faculty on nursing university of basrah having at least 10 years of experience in their field of work .Minor changes have been performed on few items; such as change demographic data, and nurse's knowledge and practice about personal protective equipment.

Statistical Analyses: A statistical program such as SPSS v. 23 has been used for data analysis. There were two types of statistical data analysis which were used to obtain the results of the research study: Descriptive Data Analysis and Inferential Data Analysis.

Results

Table1: Study sample distribution by socio-demographic properties

Variables	Classification	Frequency	Percentage (%)
Gender	Male	23	67.60
	Female	11	32.40
	Total	34	100.0
Age group	20-29 year	19	55.9
	30-39 year	10	29.4
	40 year and above	5	14.7
	Total	34	100.0
Level of education	Nursing school	12	35.3
	Nursing institute	13	38.2
	Bachelors in nursing	9	26.5
	Total	34	100.0
Years of work experience	Less than 5 years	14	41.2
	5-10 years	15	44.1
	More than 10 years	5	14.7
	Total	34	100.0
Previous training in infection control	Yes	11	32.4
	No	23	67.6
	Total	34	100.0
Do you get a regular test about infectious diseases	Yes	9	26.5
	No	25	73.5
	Total	34	100.0

Table 1: represents that the high percent (**67.6%**) of the study sample are males, **55.9%** of them at age group (20-29) years, **38.2%** graduated from Nursing institute, **44.1%** years of work experience were arranged between (5-10 year), most of them (**67.6%**) don't have Formal training in infection control, and most of the (**73.5%**) don't get a regular test about infectious diseases.

Table 2: Assessment of the nurse's knowledge about Personal Protective Equipment

No.	Items of nurse's knowledge	Responses	Statistical parameters		Mean	Assess.
			F	%		
1	Infectious agents are	Incorrect	23	67.6	0.32	Fail
		Correct	11	32.4		
2	What is the most important vehicle of transmission of infectious agents in the hospital	Incorrect	9	26.5	0.73	Pass
		Correct	25	73.5		
3	What is the purpose of personal protective equipment	Incorrect	20	58.8	0.41	Fail
		Correct	14	41.2		
4	Personal protective equipment includes	Incorrect	12	35.3	0.64	Pass
		Correct	22	64.7		
5	Indication of hand hygiene	Incorrect	24	70.6	0.29	Fail
		Correct	10	29.4		
6	From a standpoint of the infection control, which is the optimal means for delivering drugs to the dialysis patients	Incorrect	21	61.8	0.38	Fail
		Correct	13	38.2		
7	The Personal Protective Equipment that should be worn when there may be a risk of splashing includes	Incorrect	15	44.1	0.55	Pass
		Correct	19	55.9		
8	Which one of the following statements is correct on using alcohol-based hand rubs	Incorrect	21	61.8	0.38	Fail
		Correct	13	38.2		
9	Which one of the following statements on using gowns is accurate	Incorrect	7	20.6	0.79	Pass
		Correct	27	79.4		
10	When should you wear gloves	Incorrect	26	76.5	0.23	Fail
		Correct	8	23.5		
	Total means				0.47	Fail

Table (2): this table shows the assessment of the nurse's knowledge about Personal Protective Equipment which indicate that sample responses are fail at all studied items except at the items number (2, 4, 7, and 9) their responses are pass. And the study sample responses are fail at a total means (0.47).

Table 3: means of scores of the nurse's practice about personal protective equipment

No.	Items of practice	Always	Some time	Never	M.S	Assess.
		F	F	F		
1	Wash and sterilize my hands before starting the sick	5	3	26	1.38	Poor
2	Wash and sterilize my hands before going to a different patient	0	3	31	1.09	Poor
3	Wash and sterilize my hands before wearing gloves	2	6	26	1.29	Poor
4	Wear gloves in the case of a direct contact with a patient	18	9	7	2.32	Good
5	Wash and sterilize my hands after taking the gloves off	6	8	20	1.59	Poor
6	I change my gloves before going to a different patient	4	6	24	1.41	Poor
7	I wear eye protection glasses in the case of a direct contact with a patient	3	3	28	1.26	Poor
8	I wear the medical face mask in the case of a direct contact with the patient	16	10	8	2.24	Good
9	I dispose needles used to place them in the container without covering them	12	9	13	1.97	Poor
10	Do you dispose of sharps material in the private container after its use	11	2	21	1.71	Poor
11	I wear the foot cover while entering the hemodialysis unit	6	6	22	1.53	Poor
12	In the event that you develop influenza, for example, do you take time off until the illness ends	7	6	21	1.59	Poor
13	Wear robe of work (gown) in the all-time drying hemodialysis procedure	2	3	29	1.21	Poor
14	Wearing the hair cap while entering the dialysis unit	20	8	6	2.41	Good
	Total				1.64	Poor

Poor practice =**Less than 2 ,** good practice= **more than 2.**

Table 3: this table shows that practice of the nurse about about Personal Protective Equipment was good at items (4,8,14) and have poor practice at the all remaining items and as a total level the nurse have poor level of practice at total means of score (1.64) .

Table 4: Relationship between the nurse's knowledge about personal protective equipment and their demographic variables .

Nurse's knowledge Variables	Pearson Chi-Square			
	Value (X2)	df	P-Value	Sig.
Gender	6.857	8	0.552	NS
Age group	25.310	16	0.065	NS
Level of education	28.403	16	0.028	S
Training course in infection control	11.698	8	0.165	NS

*Correlation is significant at the p<0.05 level.

Table4: presented that there has been a significant correlation between the nurse's knowledge about personal protective equipment and their level of education at a p<0.05 level. And there has not been correlation between the nurse's knowledge about personal protective equipment and their demographic variables as a gender, age group, and training course in infection control.

Discussion

The Socio-Demographic Characteristics of sample in the present study was (67.6%) of them were males, this result agreed with study stated that 66.7% of participants were males [10]. High percent of the study sample which is included in the present study was (55.9%) of them at age group (20-29 year) years, this result confirmed with study showed that 52.7 % at age (20-30) years [1]. Concerning to the educational levels, the present study was (38.2%) graduated from institute of nursing, this result agree with cross sectional study that present (51%) were from institute of nursing [2]. Years of work experience of the present sample in the present study is (38.2%) of them were arranged between 5-10 years, This finding agrees with the result of study that showed that Years of experience as a registered dialysis nurse was 6- 10 years and present (38.6%) from their study [5]. And according to the Previous training in infection control most of them (67.6%) don't have previous training , and this result is agreement with findings of study represent

(61.4%) not completion infection control course [5]. low percent of the sample don't get a regular test about infectious diseases which was of (73.5%), this findings of study was disagree with the results of study that show in their descriptive study that (72%) of study sample get a periodic analyzes against infectious diseases [9]. The researcher believes that the low percent are don't get a regular test about infectious diseases this may be due to neglect of nursing staff to do this test, or may be due to weak of routine procedure tests in hospital.

The result of this study shows that the assessment of the nurse's knowledge about personal protective equipment which indicate that sample responses are fail at all studied items except at the items number (2, 4, 7, and 9) which were (What is the most important vehicle of transmission of infectious agents in hospital, Personal protective equipment includes, The PPE that should be worn when there may be a risk of splashing includes, Which one of the following statements about the use of gowns is correct) their responses are pass. And the study sample responses are fail at a total means (0.47). this study is agree with result of study that evaluated one hundred and nine nurses in 3 dialyses units that are affiliated to Ministry of Health in Abha city, for the determination of the attitudes, practices and knowledge of the nurses who work in units of dialysis regarding the standard recommendation of the infection control that revealed that nurses' knowledge is deficient about standard recommendations of infection control [2]. And

disagree with another study that results have shown that (54.50%) of studied subjects got an adequate knowledge level in regards to HCV transmission prevention. The researchers believe this because of less of training education program to the nursing staff [1].

The present study shows that practice of the nurse about personal protective equipment was good at items (4, 8, 14) which were (Wear gloves in the case where there has been direct contact with patients, Wear the medical face masks in the case of a direct contact with a patient, Wearing the hair cap while entering the dialysis unit) and have poor practice at the all remaining items and as a total level the nurse have poor level of practice at total means of score (1.64), this result is similar to a study descriptive research has been conducted at the Baghdad teaching hospitals' hemodialysis units for evaluating the practices of the nursing staff over the treatment of the hemodialysis for the patients in units of the hemodialysis that have shown that there has been an insufficiency in nurses' practices which have to be applied to the patient during the treatment of the hemodialysis [10].

The finding of the present revealed that there has been a significant correlation between the nurse's knowledge about personal protective equipment and their level of education at a $p<0.05$ level. And there has not been any correlation between the nurse's knowledge about personal protective equipment and their demographic variables as a gender, age group, and training course in infection control, this finding is similar to result of study to assess the knowledge and practice of the nurses regarding the prevention of infection for the children which are under hemodialysis, and to evaluate the effects of an educational nursing program on nurses' knowledge and practice regarding the prevention of infection among children undergoing hemodialysis. This showed high significant relationship nurses' knowledge score and levels of improvement of their knowledge score after the education program and those with Bachelor of Nursing [11].

Conclusion

The nurse's knowledge about personal protective equipment was fail at a total means (0.47) and assessment of nurse practice about personal protective equipment has poor level of practice at total means of score (1.64).

And there has been a significant correlation between the nurse's knowledge about personal protective equipment and their level of education.

Recommendations

At the end of this research, the points below are recommended:

1. Provide training programs for the hemodialysis nurses on the promotion higher standards of hand hygiene and possible uses of the personal protective equipment throughout their working in hemodialysis centers.

2. Written booklets, videos and posters need be available in every one of the units in the hospital for acknowledging the nurses on the procedures of the infection control.

Ethical Considerations

Permission has been obtained from the College of Nursing/ university of Basra and Ministry of Health, Health Department of Basra, Training and Human Development Center to Basra teaching hospital, before conducting the study.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College Nursing and all experiments were carried out in accordance with approved guidelines.

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