Effectiveness of Education Program on Nursing Staff Knowledge toward Infection Control Measures at Hemodialysis Unit in Al-Dewaniya Teaching Hospital

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Abstract

Infection is the first reason of hospitalization and is considered the second highest death rate after cardiovascular disease among hemodialysis (HD) patients. Hemodialysis patients and staff are at risk for getting blood-borne infections such as hepatitis B (HBV), hepatitis C (HCV), and human immunodeficiency virus (HIV). Nursing staff compliance with infection control procedures will reduce transmission of infection, so standard precautions must be strictly adhered in the hemodialysis facility. A pre-experimental design (one group design: pre-test and post-test) was used. This study was conducted at hemodialysis unit on a non-probability (purposive) sample consisting of (26 nurses) working in Al-Diwaniya Teaching Hospital.The study finding shows, that all the study sample responses at the pre-test were fair knowledge with a statistical mean of scores (1.40). Other than the post-test, shows (100%) of the study sample have good knowledge at the mean of scores (1.85). Also, the results revealed a highly significant difference between the pre-test and post-test of the study sample after participated in the educational program at the (p-value=0.0001).The study recommended the necessity of updating nurses' knowledge by encouraging and motivating them to participate in special training programs and conferences on infection control measures, in addition to intensifying the work of the continuing nursing education unit to give educational courses focusing on infection control measures for the nursing staff in the hemodialysis units.

Keywords: Educational program, Nursing staffs' knowledge, Infection control measures, Hemodialysis Unit.

1. Introduction

Health-care-associated infections (HAIs) are one of the most frequent adverse events during caregiving and a significant public health problem that affects morbidity, death, and life quality. This infection was not present when the patient was admitted to the health care facility. Approximately to 7% of patients in developed and 10% in developing countries will acquire at least (1) of HAIs (WHO, 2016).

Infection is the first reason of hospitalization and is considered the second highest death rate after cardiovascular disease among hemodialysis (HD) patients. Hemodialysis patients and staff are at risk for getting blood-borne infections such as hepatitis B (HBV), hepatitis C (HCV), and human immunodeficiency virus (HIV). The risk of acquiring HBV remains in HD units despite a significant reduction in HBV vectors due to the wide use of the HBV vaccine. So Standard precautions must be strictly adhered in the hemodialysis facility, as well as the patient and the dialysis machine should be under supervision of nurses consistently in order to detect any possible complications. Hemodialysis nurses must be skilled because they considered important features of quality nursing care (Guzman-Cottrill et al. 2013).

Infection can be transmitted directly or indirectly by infected tools, equipment, and materials, as well as environmental surfaces and nursing staff's hands. Furthermore, HD patients' immune

systems are weakened, and they need repeated hospitalizations and surgery, which raises their risk of HAIs including central line bloodstream infection (Dixon, 2011).

Several infection control strategies, like proper hand washing and appropriate implementation of standard protocols through intrusive procedures, are simple and inexpensive, but they necessitate workers accountability and behavioural improvement, as well as enhanced employee education, documentation, and surveillance programs. The human factor plays an important role in improving or decreasing the risk of acquiring HAIs by using these precautions. Since a higher patient-to-nurse ratio raises the possibility of NI, competent nursing staff is needed (Fashafsheh et al. 2015).

Infections and their complications accounted for almost 11% of end-stage renal disease (ESRD) patients' annual mortality. Graft infection is a serious condition that can be hard to manage, and it is becoming a more common reason for hemodialysis patients to be admitted. The majority of studies show that graft infection rates range from 5% to 15% over the period of the patency. The risk of infection can be greater in the first year post access placement (Himmelfarb&Sayegh, 2010).

Health-care-associated infections are a serious problem all over the world, including in Iraq, because they result in a high number of deaths and illnesses among patients and nursing staff, as well as high health-care costs. Most of these problems can be avoided or minimized by using infection control measures and implementing easy, low-cost, and widely available techniques (Iraqi Ministry of Health [MOH], 2012).

Several epidemiological surveys have shown that nursing staff are implicated in the spread of NI. Literature shows that nurses' knowledge and practices are limited as a result, more research into the effect of nurses' knowledge and practices on infection control measures is necessary. In every healthcare setting, ensuring compliance with infection control policies is critical, so updating and improving infection control procedures should be a top priority (Fashafsheh et al., 2015).

2. Methodology

Design of the study:

A pre-experimental study (one group pretest-posttest) was conducted among the nurses of hemodialysis units, Al-Diwaniyah city, Iraq to evaluate nursing staff knowledge toward infection control measures, to determine the effectiveness of education program on nursing staff knowledge toward infection control measures, and to identify the association between nursing staff knowledge and demographic characteristics.

Ethical consideration:

Ethical approval has been granted from the Scientific Research Ethical Committee at the College of Nursing University of Baghdad prior to the initial conduct of the original study.

Sample and Setting of the study:

The study was conduct on nursing staff in hemodialysis unit in Al-Dewaniya Teaching Hospital, Iraq .A non- probability (purposive) sample consisting of (26) nurses who were working at Hemodialysis unit.

Instrument construction:

The questionnaire was developed by the researcher for the present study primarily to evaluate effectiveness of education program on nursing staff knowledge toward infection control measures at hemodialysis unit

1- First part: This section contains details about the sample's socio-demographic information, such as (age, gender, educational level, years of experience in hospital, years of experience in hemodialysis unit, and participation in educational courses related to infection control measures)

2- Second part: This section consist of (26) multiple-choice questions to evaluation of the

nursing staffs` knowledge toward infection control measures in hemodialysis unit.

Data collection:

The data is collected through a questionnaire that was included in the study, by meeting nursing staff in hemodialysis unit, after the participating nurses received the information and clarified the questionnaire to them. The response time took from 25 to 30 minutes, as the data collection process started from 10th to 24th January, 2021.

Statistical Data Analysis:

The statistical analysis of the data of the study is done by using Microsoft excel 2010 and SPSS version 20.

- Descriptive Statistical Tests (Frequency, Percentage, Mean of Score, Standard Deviation, and Persons' correlation).
- Inferential Statistical Tests (One way ANOVA, independent t-test and paired t-test).
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3. Discussion of the Results

Discussion of the nursing staffs' demographic characteristics of the study sample, as shown in (Table: 1):

Concerning nursing staffs' age, the result of the study uncovers that more than one third of participants (38.5%) were 40 years and more. The researcher explains the result of his research, hemodialysis unit need these age groups of nurses because they are more mature than other age group.

Regarding nursing staffs' gender, the study findings demonstrated that (69.2%) of the participants were males. This result is confirmed through a study done by (Athbi& Mohammed, 2012), who found that most participants (60%) were males.

Regarding years of experience in nursing and experience in hemodialysis units, the study found that half of the nursing staff has (1-3) years of experience. The study result comes along with the study of (Shlash et al., 2020), who found that (53.3%) of nurses had (1-3) years of experience in Hemodialysis unit.

With respect to the training sessions about infection control measures, the study findings indicate that the majority of the nursing staff (96.2) has no training courses in this field. A study carried out by (Fashafsheh et al., 2015) in Palestine State to assess the level of knowledge and practices of infection control among nurses in governmental Hospital of Palestine, showed that the majority of nurses have no training courses about infection control measures.

Concerning level of education, the study display that half of the participants graduated from the college of nursing. This result is confirmed by (Alice et al., 2013), they found that (66.2%) of participants were graduated from the college of nursing. A study conducted in Egypt by Morkeset. al., 2018, they reported that more than two-thirds of the nurses have diploma nursing institute.

Discussion of mean difference (paired t-test) and the overall evaluation of nursing staff knowledge at the pre-test and post-test, as shown in (Table: 2), and (Figure: 1):

The study findings manifested that the knowledge of nursing staff regarding infection control measures in the pre-test was fair knowledge as shown in figure 1 this means that nurses have had inadequate knowledge in concerning to infection control measures in HD units. The researcher explains the result of his research, most of the nursing staff had not been share to any training sessions about knowledge related to infection control measures. In the post-test trials, nursing staffs' knowledge has been improved after the application of the educational program.

These findings agree with a study conducted by (Athbi& Mohammed, 2012), Illustrated that the education program was effective in improving the knowledge of the participating nurses.

The researcher confirms these findings indicate the positive influence of the educational programs in enhancing nursing staffs' overall knowledge about infection control measures.

The study also finds that there was a highly statistically significant difference between the study sample overall responses in two periods of measurements (pre-test and post-test) at p-value (0.0001).These findings reflect that there is an enhancement in the knowledge of nursing staff at the post-test compared with pre-test scores as shown in table 2.

Discussion of the Relationship between Nursing Staffs' Knowledge with Demographic Characteristics as shown in (Table: 3):

Concerning the association between nursing staffs' age and their knowledge about infection control measures, the study showed that there was statistically significant difference between nursing staffs' age and their knowledge in post-test at p-value (0.016). These results show that the educational program was more effective for the category of young (25-29).

The result of this study comes along with (Mohamed &Wafa, 2011), carried out at Mansoura University hospital, the analysis of the results detected a positive statistically significant between post-program knowledge score and age of participants.

Regarding the educational level, the result of the study shows significant difference between the educational level and nursing staffs' knowledge in post-test at p-value (0.049).

The results were inconsistent with (Bayoumi& Mahmoud, 2017), who found no statistically significant association between the nurses' knowledge and personal data after implementing the program with regard to their educational level.

Concerning years of experience, the findings showed that no statistically significant, this result indicates that the knowledge of nursing staff about infection control is not affected with years of experience. But logically of these years of experience should play an important role in infection control measures, perhaps this result is due to that the nursing staff in hemodialysis unit (50%) are newly employed and have not received courses or programs about infection control measures or because their practices do not dependent on evidence-based practices or updated references.

Discussion the mean difference of the overall nurses' knowledge and practices according to their gender as shown in (Table: 4):

The result of the study indicates there are no differences in overall nursing staffs' knowledge according to their gender at p-value (0.762).

Also the result of the present study supported by study who conducted by (Rajih, 2020), to measure the effectiveness of the educational program on nursing staff knowledge about infection control measures, which did not find statistically significant differences between the knowledge of the nursing staff and the gender about infection control.

Conclusion

The study concludes that the educational program had a positive impact in the improvement of nursing staffs' knowledge concerning infection control measures at hemodialysis unit.

Recommendations

The study recommended the necessity of updating nurses' knowledge and practices by encouraging and motivating them to participate in special training programs and conferences on infection control measures, in addition to intensifying the work of the continuing nursing education unit to give educational courses focusing on infection control measures for the nursing staff in the hemodialysis units. Conducting future research programs with wide-range sample size to improve nursing staffs' knowledge regarding infection control measures in hemodialysis units.

Table (1): Distribution of the sample (26) nurses according to the demographic characteristics

Demographic data	Rating and intervals	Frequency	Percent
Age / years	20-24	9	34.6
	25-29	5	19.2
	30-34	2	7.7
	40 and more	10	38.5
	Total	26	100.0
Gender	Male	18	69.2
	Female	8	30.8
	Total	26	100.0
Educational Level	Secondary school	8	30.8
	Diploma	5	19.2
	Bachelors	13	50.0
	Total	26	100.0
Years of experience/Hospital	1-3	13	50.0
	4-6	3	11.5
	7-9	1	3.8
	10-12	3	11.5
	13+	6	23.1
	Total	26	100.0
Years of experience/HD	1-3	13	50.0
	4-6	3	11.5
	7-9	1	3.8
	10-12	3	11.5
	13+	6	23.1
	Total	26	100.0
Location of Session	No	25	96.2
	Yes	1	3.8
	Total	26	100.0

Table (2): Mean Difference (Paired T-Test) in the Nursing Staff Knowledge at the Pre-Test and Post-Test

Main Studied Domain	Pre-Test	Mean	Std. Deviation	T-Value	D.F.	P-Value
Overall Evaluation of Nursing Staff Knowledge	Pre-Test	1.40	0.10	21.195	25	.0001
	Post-Test	1.85	0.04			

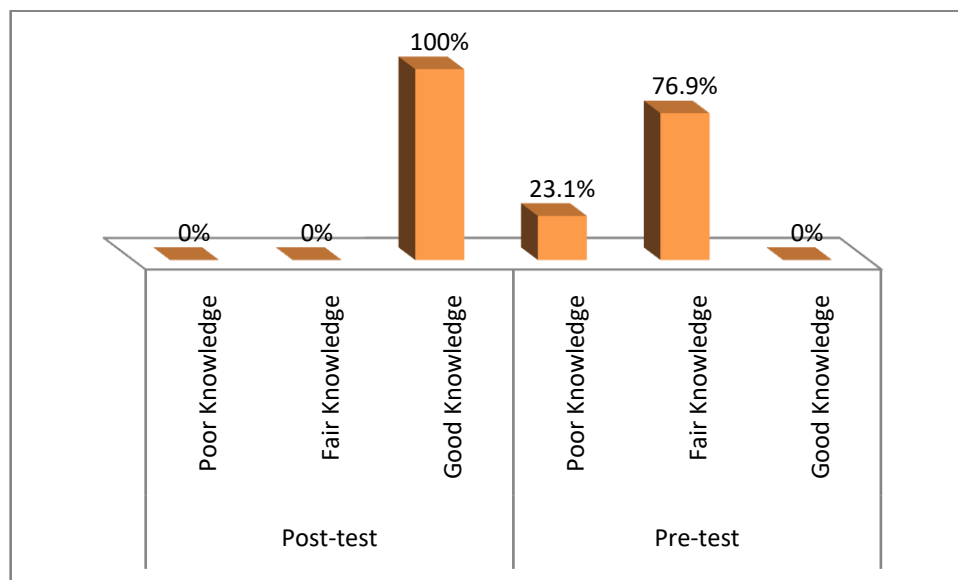Std. = standard Deviation, T= T. test, D.F.: Degrees of Freedom

Figure 1: Distribution of the study sample by their overall knowledge at the pre-test and post-test

Table (3): Analysis of Variance (ANOVA) of the Nursing Staff Knowledge at the Post-Test According to Demographic Data

Demographic Data	Rating and Intervals	N	Mean	Std. Deviation	95% Confidence Interval for Mean		F	p-value
					Lower Bound	Upper Bound		
Age / years	20-24	9	1.85	0.05	1.81	1.88	4.275	.016 S
	25-29	5	1.90	0.02	1.87	1.93		
	30-34	2	1.83	0.03	1.58	2.07		
	40 and more	10	1.84	0.02	1.82	1.86		
	Total	26	1.85	0.04	1.84	1.87		
Educational Level	Secondary school	8	1.83	0.03	1.80	1.85	3.442	.049 S
	Diploma	5	1.85	0.04	1.80	1.89		
	Bachelors	13	1.87	0.04	1.85	1.89		
	Total	26	1.85	0.04	1.84	1.87		
Years of Experience/Hospital	1-3	13	1.86	0.05	1.83	1.89	.483	.748 NS
	4-6	3	1.86	0.06	1.71	2.00		
	7-9	1	1.85	0.0	0.0	0.0		
	10-12	3	1.85	0.04	1.75	1.94		
	13+	6	1.83	0.02	1.81	1.85		
	Total	26	1.85	0.04	1.84	1.87		
Years of Experience/HD	1-3	13	1.86	0.05	1.83	1.89	.483	.748 NS
	4-6	3	1.86	0.06	1.71	2.00		
	7-9	1	1.85	0.0	0.0	0.0		
	10-12	3	1.85	0.04	1.75	1.94		
	13+	6	1.83	0.02	1.81	1.85		
	Total	26	1.85	0.04	1.84	1.87		

N= Number, Std. = standard Deviation, F=one way ANOVA calculated value

Table (4): Analysis of Variance (ANOVA) of the Nursing Staff Knowledge at the Post-Test

According to Demographic Data

Demographic data	Rating	N	Mean	Std. Deviation	t-value	d.f.	p-value
Gender	Male	18	1.85	0.04	.307	24	.762 NS
	Female	8	1.86	0.05			

N= Number, Std. = standard Deviation, T= T. test, D.F.: Degrees of Freedom

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