RESEARCH
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TRANSMISSION OF HEPATITIS VIRUS AMONG ADULT HEMODIALYSIS PATIENTS DUE TO NURSES' PRACTICES

Ali Sakran Muhaisen[1], Amean A Yasir[2]

[1]PhD Student, Community Health Nursing, College of Nursing, University of Babylon, zmanaljmali@gmail.com
[2]Prof. Dr., Community Health Nursing, College of Nursing, of Mustansiriyah University

Abstract
Background: Patients on hemodialysis frequently have immunocompromised immune systems, which means that their immune systems are weaker than those of healthy people. Consequently, the chance of developing viral hepatitis might rise with any violation of infection control procedures, such as improper hand hygiene or inadequate disinfection of dialysis equipment. The most prevalent infections among patients receiving hemodialysis are the hepatitis viruses (HCV and HBV). Patients on hemodialysis are more likely than the general population to contract the hepatitis virus (HBV) and (HCV). Even yet, in low-income nations, hemodialysis is still the preferred form of renal replacement therapy for patients with end-stage renal disease. Hepatitis B and C virus prevalence in hemodialysis patients differs throughout nations worldwide.
Objective: Assess the nursing practice regarding hemodialysis procedures, find out the relationship between the nursing practice regarding hemodialysis procedures and some of the nurses' demographic characteristics, and find out the relationship between the nursing practice regarding hemodialysis procedures and some of the nurses' working data.
Materials and Methods: observational study design conducted in hemodialysis centers, Iraq, Najaf, March 2023. Information was collected through an observational checklist to assess hepatitis virus transmission with nurses' practice among hemodialysis patients in hemodialysis centers.
Results: 50 nurses working in hemodialysis centers, (p-value > 0.05) of the level of the nursing practice towards their demographic data, but (p-value< 0.01) the level of nursing practice and the training courses and duration of the training course. The present study concluded that nurses' overall process with the hemodialysis nursing practice was fair. The level of nursing practice in hemodialysis centers does not significantly correlate with the demographics of nurses, but there is a statistically significant statistic between the level of nursing practice and training courses in infection control, as well as the period of the training.
KEYWORDS: Nursing practice, Hepatitis C and B virus, End stage renal disease, Infection control, Risk factors, Hemodialysis

INTRODUCTION

Over the past 30 years, there has been a significant global rise in the number of persons getting maintenance dialysis. Globally, it was estimated that over 2 million people were receiving dialysis in 2010, and estimates suggest that by 2030, this number will have doubled [1]. Numerous factors, including higher survival rates, lower death rates among dialysis patients, a rise in the prevalence of chronic kidney disease (CKD), broader acceptance criteria for kidney replacement therapy, and increased accessibility to maintenance dialysis in low- and middle-income nations, can be credited for this increase [2]. Noncompliance with infection control protocols is the main cause of viral hepatitis in hemodialysis patients [3]. Immunocompromised patients frequently have weakened immune systems compared to healthy persons receiving hemodialysis. Consequently, the chance of developing viral hepatitis might rise with any violation of infection control procedures, such as improper hand hygiene or inadequate disinfection of dialysis equipment [4]. The two most prevalent viruses among people receiving hemodialysis are the hepatitis B and hepatitis C viruses (HBV and HCV). Compared to the general population, hemodialysis patients are more likely to get the hepatitis B and C viruses [5]. Even yet, in low-income nations, hemodialysis is still the preferred form of renal replacement therapy for patients with end-stage renal disease. Hemodialysis patients' global prevalence of the hepatitis B and C viruses differs by nation [6]. Hemodialysis departments nowadays typically provide treatment that is designed to serve providers, mostly for particular illnesses, with an emphasis on dialysis care and the optimization of metabolic goals and dialysis, rather than on the principles of person-centered care (PCC) [7]. Patients who require maintenance hemodialysis are usually treated by many clinicians because they have complicated medical demands that are challenging to address [8]. Since contact with contaminated blood is the mode of transmission, it is imperative to adopt the appropriate safety measures when doing hemodialysis. This entails making sure practitioners are appropriately educated and certified in sterile practices, as well as utilizing disposable materials, including needles and tubing, for every patient [9]. Medical facilities should also routinely check that all furnishings and equipment are clean and hygienic [10]. Patients undergoing hemodialysis are more likely to have viral hepatitis because of things like immune suppression, shared equipment, drug use history, blood-

borne infections in the dialysis unit, and having blood transfusions [11]. Blood products must be thoroughly screened, infection control procedures must be followed, and the transmission of blood-borne infections must be stopped in order to lower the risk [12].

This study is important because it identifies risk factors for the spread of the hepatitis virus in dialysis units in the Najaf Governorate. It also aims to control pollution, improve nursing staff awareness regarding infection control, and stop the spread of hepatitis B and C among patients. One of the reasons for this investigation was the absence of hepatitis B and C standards for nurses working in these institutions.

Material and Methods:

Observational study design. Samples were taken from two main centers in Najaf Governorate, as they contain hemodialysis: Kidney Disease and Dialysis Center in Sadr Medical City: The center contains several departments, including the kidney transplantation department, the peritoneal dialysis department, and the hemodialysis department, which consists of three halls isolated from each other, which are negative, positive for hepatitis B, and positive for hepatitis C. The average number of nurses working on the hemodialysis machine is 50 nurses; Kidney Diseases and Dialysis Center at Al-Hakim General Hospital: Contains a peritoneal dialysis department and a hemodialysis department only, which consists of three halls isolated from each other, which are for negative patients, positive for hepatitis B, and positive for hepatitis C. The average number of nurses working on the hemodialysis machine is 50 nurses. The sampling was non-probability method (convenience). The sample was selected from the two previously mentioned centers: 50 nurses working on hemodialysis machines, 15 males and 35 females, sample represents about 50% of the target population. These differences between male and female nurses are proportional to the actual numbers present in the two centers since the health policy in the Center for Diseases and Dialysis requires nurses to have an actual full year, after which the nurse has the right to work on the hemodialysis machine. Therefore, in the questionnaire, the period of work in Hemodialysis starts from 1-5 years. The study tool is a observational checklist, through an extensive review of relevant literature; an instrument was developed and constructed for the current study (concerning nurses) consists of 2 parts:

Part I: Sociodemographic Data for nurses, which includes (age, sex, educational level, marital status, and nursing working data)

Part II: Nurses Practice (Observational Checklist) which includes three main branches

A. Pre-dialysis: 13

B. During dialysis: 14

C. Post-dialysis: 12

Ethical Approval: The objectives and the observational checklist were presented to the scientific committee-college for approval after the validity of the research's observational checklist was established. The committee-college then examined the study instrument and approved its conduct. a letter of authorization to start the trial on June 4, 2023. On June 18, 2023, formal clearance was received from the Najaf Governorate's Health Department.

Results

Table 1: Distribution of demographic characteristics for nurses working in hemodialysis centers.

Nurses Demographic data		f	%
Age	21 - 30 years	44	88.0
	31 - 40 years	5	10.0
	41 - 50 years	1	2.0
	Total	50	100.0
sex	male	15	30.0
	female	35	70.0
	Total	50	100.0
Educational level	Secondary nursing school	10	20.0
	Nursing institute	22	44.0
	B.Sc. in nursing	18	36.0
	Total	50	100.0
Marital status	Single	22	44.0
	Married	27	54.0
	Widow	1	2.0
	Total	50	100.0
Residency	Urban	46	92.0
	Rural	4	8.0
	Total	50	100.0

Frequency of sample (f); Percentage (%).

The table 1 displays some demographic characteristics, as the total number of nurses participating in the study was 50 nurses: age group 21-30 years (88%), percentage of females (70%), percentage of nurses who graduated from nursing institute (44%), while in marital status it was married people (54%), and the percentage residing in urban areas (92%).

Table 2: Distribution of some working data for nurses who work in hemodialysis centers.

Nurses Working data		f	%
Years of Employee	1 - 5 years	33	66.0
	6 - 10 years	13	26.0
	11 years and more	4	8.0
	Total	50	100.0
Training courses related to infection control	There is no	12	24.0
	1 – 3	37	74.0
	4 and more	1	2.0
	Total	50	100.0
Duration of courses	There is no	12	24.0
	less than 1 week	25	50.0
	1 - 2 weeks	13	26.0
	Total	50	100.0
Take the hepatitis B vaccine	There is no	9	18.0
	1 dose	4	8.0
	2 doses	12	24.0
	3 doses	24	48.0
	More than 3 doses	1	2.0
	Total	50	100.0

Frequency of sample (f); Percentage (%).

The table 2 presents some work-specific factors for nurses working in hemodialysis centers; Whereas the percentage of Years of Employee is (1-5) years is 66%, Training courses related to infection control was 74% for the category (1-3) courses, the percentage of Duration of courses was 50% for the category less than 1 week, and the percentage Take the hepatitis B vaccine was 48% for nurses who took two doses.

Table 3: Distribution of all nursing process level for nurses working in hemodialysis centers

No.	Items	MS	Assessment
1	Pre-dialysis	2.13	Fair
2	During dialysis	2.05	Fair
3	Post-dialysis	1.89	Fair
Overall Nursing Process Level in Hemodialysis		2.02	Fair

MS: Mean of Scores; MS (=<1.66) as (Poor); (1.67-2.33) as (Fair); and (≥ 2.34) as (Good).

The table 3 displays the Overall Nursing Process Level in Hemodialysis for nurses. The average scores were; pre-dialysis (2.13), during dialysis (2.05), and post-dialysis was (1.89), while Overall was (2.02).

Table 4: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their ages.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Age	21 - 30 years	3	25	16	44	1.111	4	0.893 N.S
	31 - 40 years	0	3	2	5			
	41 - 50 years	0	1	0	1			
Total		3	29	18	50			

MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); Sig. (significant); N.S (No significant).

The table above demonstrates at a significance level of 0.05, nurses at hemodialysis centers concerning preventive measures there is no relationship between the nursing process level of for viral hepatitis transmission and their age.

Table 5: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their sex.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Sex	Male	2	9	4	15	2.454	2	0.293 N.S
	Female	1	20	14	35			
Total		3	29	18	50			

MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); Sig. (significant); N.S (No significant).

The table above demonstrates at a significance level of 0.05, nurses at hemodialysis centers concerning preventive measures there is no relationship between the nursing process level of for viral hepatitis transmission and their sex.

Table 6: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their educational level.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Educational level	Secondary nursing school	1	6	3	10	0.523	4	0.971 N.S
	Nursing institute	1	13	8	22			
	B.Sc. in nursing	1	10	7	18			
Total		3	29	18	50			

MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); N.S (No significant).

The table above demonstrates at a significance level of 0.05, nurses at hemodialysis centers concerning preventive measures there is no relationship between the nursing process level of for viral hepatitis transmission and their educational level.

Table 7: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their residency.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Residency	Urban	2	27	17	46	2.810	2	0.245 N.S
	Rural	1	2	1	4			
Total		3	29	18	50			

MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); Sig. (significant); N.S (No significant).

The table above demonstrates at a significance level of 0.05, nurses at hemodialysis centers concerning preventive measures there is no relationship between the nursing process level of for viral hepatitis transmission and their residency.

Table 8: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their marital status.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Marital status	Single	1	12	9	22	1.144	4	0.887 N.S
	Married	2	16	9	27			
	Widow	0	1	0	1			
Total		3	29	18	50			

MS: Mean of Scores; MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); Sig. (significant).

The table above demonstrates at a significance level of 0.05, there is no relationship between the nursing process level of nurses at hemodialysis centers concerning preventive measures for viral hepatitis transmission and their marital status.

Table 9: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their years of work.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Years of Work	1 - 5 years	3	19	11	33	2.356	4	0.671 N.S
	6 - 10 years	0	7	6	13			
	11 years and more	0	3	1	4			
Total		3	29	18	50			

MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); Sig. (significant); N.S (No significant).

The table above demonstrates at a significance level of 0.05, there is no relationship between the nursing process level of nurses at hemodialysis centers concerning preventive measures for viral hepatitis transmission and their years of work.

Table 10: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their training courses related in infection control precautions.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Training courses related in infection control precautions	There is no	3	9	0	12	17.008	4	0.002 H.S
	1 - 3	0	19	18	37			
	4 and more	0	1	0	1			
Total		3	29	18	50			

MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); Sig. (significant); H.S (High significant).

The table above demonstrates at a significance level of 0.01, there is high relationship (High significant) between the nursing process level of nurses at hemodialysis centers concerning preventive measures for viral hepatitis transmission and their training courses related in infection control precautions.

Table 11: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their duration of training courses.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Duration of courses	There is no	3	9	0	12	28.312	4	0.001 H.S
	less than 1 week	0	18	7	25			
	1 - 2 weeks	0	2	11	13			
Total		3	29	18	50			

MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); Sig. (significant); H.S (High significant).

The table above demonstrates at a significance level of 0.01, there is high relationship (High significant) between the nursing process level of nurses at hemodialysis centers concerning preventive measures for viral hepatitis transmission and their duration of training courses.

Table 12: The relationship between nurses' level of the nursing process in hemodialysis centers concerning preventive measures for viral hepatitis transmission and their taking the hepatitis B vaccine.

Variable	Interval	Nursing Process Level			Total	Pearson Chi-Square		
		Poor	Fair	Good		Value	df	Sig.
Take the hepatitis B vaccine	There is no	1	7	1	9	7.073	8	0.529 N.S
	1 dose	0	3	1	4			

	2 doses	**0**	**5**	**7**	**12**			
	3 doses	**2**	**13**	**9**	**24**			
	More than 3 doses	**0**	**1**	**0**	**1**			

MS (=<1.66) as Poor; (1.67-2.33) as Fair; (≥ 2.34) as Good; df (Degree of freedom); Sig. (significant); N.S (No significant).

The table above demonstrates at a significance level of 0.05, there is no relationship between the nursing process level of nurses at hemodialysis centers concerning preventive measures for viral hepatitis transmission and their taking the hepatitis B vaccine.

Discussion

The table 1 shows some of the demographic characteristics of the nurses participating in the study sample, as the sample consisted of 50 nurses working in hemodialysis centers, the majority of whom were in the age group 21-30 years old, and females were more than males, nearly half of the sample's educational level can be verified by their nursing institution certificates. More than half of the sample was married, and the majority were urban in terms of residence place.

The table number 2 shows some work data for nurses working in dialysis centers, as the majority of the sample had 1-5 years of work in the field of nursing, the majority of them had training courses 1-3, the duration of the training course was a week or less, and about half of the sample received Hepatitis B vaccine for three doses.

The table 3 presents the general level of the nursing process in dialysis for nurses. The mean score was; pre, during, and post-hemodialysis, the level of nursing was "fair". Whereas a study conducted by Shlash and others in the Iraqi city of Hilla in 2020 is consistent with the current study, the level of nursing practice in hemodialysis centers was (sometime), meaning it is fair [13]

The tables (4, 5, 6, 7, and 8) show the relationships between the level of nurses' practice regarding preventive measures against the transmission of viral hepatitis and some demographic data for workers in dialysis centers, as all tables show that there is no statistically significant relationship between the level of the process nursing assessment of nurses in dialysis centers regarding preventive measures against viral hepatitis transmission towards their demographic data,

The tables (9, 10, 11, and 12) show the relationships between the level of nurses' practice with regard to preventive measures against the transmission of viral hepatitis and some work data for nurses working in dialysis centers. Tables (9 and 12) show that there is no statistically significant relationship between The level of the nursing process for nurses in dialysis centers with regard to preventive measures against the transmission of viral hepatitis towards their years of work, as well as vaccination of the viral hepatitis B vaccine. Tables (10 and 11) show that there is a highly significant statistical relationship between the level of nursing practice and the training courses, as well as the duration of the training course. There is a study in the Iraqi city of Hilla conducted by Abdulhassan & Ali 2020 it is consistent with the current study, as it confirmed a relationship between training courses and duration of training with nursing practice [14].

Conclusions

The present study concluded that nurses' overall process with the hemodialysis nursing practice was fair. The level of nursing practice in hemodialysis centers does not significantly correlate with the demographics of nurses, but there is a statistically significant statistic between the level of nursing practice and training courses in infection control, as well as the period of the training. Consequently, task-based solutions using bedside procedures should be used in an efficient program for all nurses and healthcare personnel employed in hemodialysis centers. Encouraging and inspiring nurses to follow infection control measures in order to protect their own safety as well as the safety of others may strengthen regulations pertaining to infection control procedures via ongoing monitoring.

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Conflicts of interest

There are no conflicts of interest

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