Original Article

Prevention and Precautions of Hepatitis B and C among Hemodialysis Units

Abdulkareem Salman Khudhair

ABSTRACT

Objective: To evaluate nurses' awareness of hepatitis B and C prevention strategies and precautions at dialysis units in southern Iraqi cities.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the dialysis centers in Iraq's southern cities from 15th October 2021 to 30th December 2021.

Methods: Out of four units, 96 nurses were selected as a sample. A developed questionnaire with 42 items divided into five domains was utilized to gather the data, and in-person interviews were employed as the method of interaction. Thirteen experts evaluated the instrument's validity, and the Cronbach's test was used to assess the study tool's reliability.

Results: The nurses' understanding of dialysis units varied significantly across four southern cities.

Conclusion: Hemodialysis units should employ nurses with the highest educational attainment. Additionally, all nurses should be able to view specific information regarding The walls of the hemodialysis unit are marked with basic precautions and preventative measures for viral hepatitis B and C.

Key Words: Prevention, Precautions, Hemodialysis, Hepatitis

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INTRODUCTION

For individuals with end-stage kidney disease, the most popular type of renal therapeutic alternative therapy is hemodialysis (HD). Patients undergoing HD may be more susceptible to infection, particularly from blood-borne viruses (BBVs).[1]

The primary causes of morbidity and mortality among hemodialysis patients are viral hepatitis B and C infections. These diseases also present care issues in renal dialysis units because patients with chronic kidney failure are unable to adequately eliminate these infectious agents. Hemodialysis centers in southern Iraqi cities were the site of a descriptive cross-sectional investigation. The most common condition that leads to HD treatment is viral hepatitis, including B and C.[2]

Hemodialysis patients are more likely than the general population to develop viral hepatitis B and C. Because of the implementation of prophylactic measures, including as vaccines, serologic screening, and post-exposure treatment, the number of transmissions linked to hemodialysis has significantly decreased.

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The first reports of viral hepatitis spreading in hemodialysis date back to the 1960s and continue to this day.[3]

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Healthcare professionals have reported contaminated syringes and needles, as well as the little amounts of blood accidentally being inseminated during surgery, are the two ways that HBV and HCV are spread. They must take the right precautions to prevent illness. However, rigorous adherence to accepted microbiological procedures and methods, HBV can be avoided by avoiding pre-vaccine exposure and by regularly taking the proper precautions to shield skin and mucous membranes while handling blood and other bodily fluids for all patients in medical facilities.[5]

Blood transfusions, the length of dialysis, intravenous medication use, and a history of kidney transplantation are risk factors for HBV and HCV in dialysis patients.[6]

Hemodialysis requires careful patient care, and a professional nurse is essential in this regard. In addition to providing care that supports management, preventing complications, and giving health advice, they also plan and execute treatments to manage and prevent injuries. The capacity of the nursing specialist to diagnose the patient's symptoms and organize their care based on professional judgment.[7]

To improve the patient's quality of life, the nursing staff frequently provides emotional support to dialysis patients. They do this by looking at the significance that an individual places on their life experiences and trying to determine what the patient expects from the care they receive.[8]

Monitoring, supporting, assessing, and teaching the patient are all crucial tasks performed by the nurse in the dialysis unit. Due to the numerous potential complications, such as clotting of the dialyzer or dialysis tubes, during dialysis, the patient and the dialyzer must be closely watched for air blockage, hypotension, spasms, vomiting, blood leakage, contamination, problems with access tubes, and insufficient or excessive fluid removal.[9]

The requirements of renal failure patients and their relatives throughout their lives are the focus of the specialized nursing field of hemodialysis. The nurse providing this specialist care must exhibit up-to-date specialty knowledge and practice in addition to promoting competent, safe, and ethical care. A vital aspect of nursing practice, patient education enhances people's health and equips them with the information and abilities needed to manage chronic conditions like renal disease. Bringing about long-lasting behavioral changes is the primary objective of patient education by equipping patients with the skills, knowledge, and practices necessary to make independent decisions and take charge of their own care in order to improve their own results.[10]

For nurses, infection prevention measures and protection against needle sticks and severe injuries are crucial. Post-exposure prevention, immunization, and blood-borne transmission education must be put into practice. To fully understand the risk of this potentially dangerous virus to nurses, more research is necessary.[11] Routine monitoring of the patient, dialyzer, and dialysate bath is necessary due to a number of issues, such as blood leakage, cramps, vomiting, hypotension, air embolism, circuit clotting, excessive or insufficient ultrafiltration, contamination, and problems with access and maintaining the vascular access method and providing nursing care to patients are crucial.[12]

METHODS

This descriptive cross-sectional study was carried out at In the four southern Iraqi cities in hemodialysis units at Al-Hussein Hospital, Emam-Hussein Hospital, Al-Sader Hospital, and Basrah Hospital, educational institutions from 15th October 2021 to 30th December 2021 vide letter No. 9352/QM/Approval/KJD863 dated January 1, 2021. A total of 96 nurses, both male and female, who work at dialysis units across the four provinces were included in the non-probability (purposive) sample. Data was gathered using a standardized questionnaire and in-person interviewing methods. There were two primary sections of the questionnaire. Sociodemographic data, part one, while nursing knowledge is covered in part two. It was broken down into five domains and includes 42 items.

The Cronbach's Alpha coefficient test was used to specify the study tool's reliability, and a panel of experts evaluated the instrument's validity to determine its stability and dependability. The following criteria have been used to grade and assess the items on the study questionnaire: 1 = No, 2 = uncertainty and 3 = acceptance. The data was analyzed through SPSS-22. The Chi-square, One-way analysis of variance, and Post-Hoc multiple comparison (Scheffe) test) test were used and P value <0.05 considered as significant.

RESULTS

Majority of them (36.5%) hailing from Thi-Qar city. The highest percentage was 66.7% for men aged 26 to 30. The bulk of participants (51.0%) are graduates of the institute, followed by those with 1–5 years of experience (41.7%) and those attending the training session (59.37%) [Table 1]. The average score for each of the five study domains, with general precaution receiving the greatest score (2.55), and dialysis machine equipment receiving the lowest score (1.83) [Table 2].

Table No. 1: The distribution and sociodemographic traits of the research sample (N = 96)

Item	No.	%
Province Centre		
Basra	28	29.2
Maysan	22	22.9
Thi-Qar	35	36.5
Muthanna	11	11.5
Gender		
Male	64	66.7
Female	32	33.3
Age (years)		
21-25	22	22.9
26-30	31	32.3
31-35	14	14.6
36-40	15	15.6
41 & more	14	14.6
Level of education		
Secondary students	27	28.1
Institute students	49	51.0
University students	20	20.8
Years of experience		
1–5	40	41.7
6–10	31	32.3
11–15	25	26.0
Training session		
Yes	57	59.37
No	39	40.63

Table No. 2: Mean of scores for the domains

Domains	Score				Mean score	Assessment
	Basra	Maysan	Thi-Qar	Muthanna		
Universal precautions	2.40	2.52	2.60	2.68	2.55	Good
Dialysis machine equipment	1.48	1.64	2.01	2.19	1.83	Moderate
Patients surveillance	1.71	2.16	2.31	2.36	2.135	Moderate
Separation of patients	1.76	1.86	2.1	2.19	1.98	Moderate
Immunizations & medications	1.81	2.24	2.32	2.47	2.21	Moderate
Total	1.834	2.082	2.266	2.38	2.14	Moderate
	Moderate	Moderate	Moderate	Good	Moderate	

Table No. 3: Nurses' Knowledge about Protection and Precautions of Hepatitis B and C

City	Number	Mean of Score	Standard deviation	F	P- value	Significant
Basra city	28	1.834	0.21477	11.687	0.001	Significant
Maysan city	22	2.082	0.21802			
Thi-Qar city	35	2.266	0.37399			
Muthanna city	11	2.38	0.45135			

Table No. 4: Multiple comparisons

Province	Hemdialysis unit	Mean Differences	P-value	Significance
Maysan	Basra	0.27307*	0.030	Significant
Thi-Qar	Basra	0.42759*	0.001	Significant
	Maysan city	0.15451	0.356	Non-significant
Muthanna	Basra city	0.49060*	0.001	Significant
	Maysan city	0.21752	0.322	Non-significant
	Thi-Qar city	0.06303	0.953	Non-significant

With a p-value of 0.001, this table demonstrates that nurses' knowledge in hemodialysis units across four cities varies significantly (Table 3). Basrah differs significantly from the other cities, according to the table above, which displays the results of the Post Hoc multiple comparison (Scheffe) test between southern city hemodialysis centers (Table 4).

DISCUSSION

The study involved 96 nurses in all who took part in the research. The largest proportion of the sample (36.5%) consisted of people aged 26 to 30 who lived in Thi-Qar city. Of them, men made up the largest percentage (66.7%). This conclusion was corroborated by Mohammed et al[13], who observed in their study, and Al-Fatlawy[14], who found that most dialysis unit nurses were men. This result is comparable to that of Dawood et al[15], who found that men predominated among dialysis unit nurses, with a 56.7% rate. A similar conclusion was reached by the study by Athhi and Mohammad[16], which also showed that a significant portion (60%) of the participants were men.

More than half of the patients (51.0%) received their degree from a nursing school (Table 1). This can be the result of the relatively limited number of nursing college graduates in these provinces. Most of the study samples were nursing institute graduates, according to numerous earlier investigations that supported these findings.[17] With a percentage of 41.7%, the current study's findings showed that most nurses have one to five years of experience. These findings also accord with the study by Al-Hchaim and Hamza[18], which discovered that most study samples had between one and five years of experience.

According to the study, 59.37% of participants are registered in training sessions. This affects nursing expertise since training programs are required to enhance skills and knowledge and keep nurses up to date. The substantial association between nurses' knowledge and prior training sessions, confirm this conclusion.[19]

Nurses in hemodialysis units across four provinces had a modest mean score of 2.14 for their knowledge of five domains pertaining to precautions and prevention strategies against viral hepatitis B and C (Table 2). The mean of score for hemodialysis units in Basra, Maysan, Thi-Qar, and Muthanna provinces were displayed in the table as follows: 1.834, 2.082, 2.266, and 2.38 correspondingly.

Froio et al[20] demonstrated that the most efficient way to stop the transmission of blood-borne viruses is to strictly enforce universal infection control procedures. Garthwaite et al[21] found that in order to successfully prevent the spread of blood or blood-contaminated

material from patient to patient, either directly or indirectly contaminated surfaces or equipment, protocols for infection control must include sanitary measures.

There is no proof that using specialized dialysis equipment is beneficial for individuals with HCV infection.[22] The internal routes of contemporary single-pass dialysis devices have not been demonstrated to be capable of transmitting HCV. While the virus cannot penetrate the intact dialyzer membrane, another study[23] demonstrates that for the virion to spread. It needs to pass through a second patient's dialyzer membrane after moving from the drain tube to the new dialysate circuit. Even in the event of a blood leak, HCV would need to back-filter across the dialyzer membrane to enter the patient's blood compartment after passing through the new dialysate used for a later patient.

According to Zuñiga et al[24], as long as strict protocols for washing and disinfection are followed between patients, HCV patients do not require specialized equipment. Healthcare professionals should avoid dialyzing patients without an HBV infection concurrently when administering hemodialysis to Hepatitis B-infected patients. The patients must wear personal protective equipment and make sure that every patient is thoroughly decontaminated before moving on to the next, if this is not possible.

Chaves et al[25] reported that patient's total risk is elevated or if they personally go through an event that raises their risk, their need for surveillance should be strengthened. Furthermore, according to his research, HBsAg testing should only be done once a year for patients receiving regular hemodialysis in hospitals who are not susceptible to hepatitis B. But with time, antibody titers may decline, leaving some people vulnerable.

Dialyzing HBV-infected patients in a different area of the dialysis unit from the "clean" area has been shown to reduce the risk of HBV transmission.[26] Dialyzing HCV patients in a different location is not necessary, and infection control and general safety measures are taken.[27]

The staff members who interact clinically Patients who have received an HBV vaccination should demonstrate that they are immune and virus-free.[28] Occupational health must clear personnel with an active HBV infection before they can conduct clinical responsibilities and subject to ongoing monitoring. Usually, they aren't given a clinical position in a dialysis facility.

High doses, frequent doses, or both should be utilized in the initial HBV immunization regimen.[29] The legal method (deltoid muscle) is used to administer the immunizations, However, if enough knowledge is acquired, the intradermal approach might work better.

The drug vials should be thrown away after one usage and should not be used again.[30] A single medicine vial is split into multiple dosages and distributed from a central location if it is utilized to treat numerous patients. It is not recommended to puncture single-use intravenous medicine vials more than once since once a needle has entered a vial marked for single-use, the product's sterility cannot be verified.

There are substantial differences in nurses' expertise in hemodialysis units throughout the cities, with a statistically significant (f) value of 11.687 and a probability value of 0.001. The high mean of score of 2.38 out of 3 degrees for Muthanna were in the largest city (Table 3}. The difference between the nurses' knowledge in the hemodialysis unit in Basrah city and the other dialysis units in the other city, where the probability value originated, is the reason for the statistically significant differences in nurses' knowledge among hemodialysis units (Table 4}. Maysan and Thi-Qar (0.356), Maysan and Muthanna (0.323), and Thi-Qar and Muthanna (0.952) all had probability values more than 0.05, despite the fact that the differences between the hemodialysis units in other cities were not statistically significant.

Recommendations: In hemodialysis units, the most highly qualified nurses ought to be allocated. Patients with renal failure receiving hemodialysis therapy should get an instruction handbook on hepatitis B and C prevention and precautions. Basic precautions and preventative measures for hepatitis B and C should be highlighted in special recommendations that are displayed on the hemodialysis unit's walls for all nurses to view. The healthcare director should put continuing education programs into place to raise nurses' knowledge of viral hepatitis B and C in hemodialysis units.

CONCLUSION

Most of the study nurses were employed at the Basra province's hemodialysis facility(29.2%), were male (66.7), were between the ages of 21 and 25, had graduated from nursing school (51.0%), had one to five years of experience, and were participating in training sessions (59.7%).The study's findings showed that nurses' knowledge of hepatitis B and C precautions and preventive measures was low in the Basra city hemodialysis unit (mean score of 1.834), moderate in Maysan city (mean score of 2.082), moderate in Dhi-Qar city (mean score of 2.266), and good in Muthanna (mean score of 2.38).With a probability value of (.001), the results show that nurses' expertise varies considerably in hemodialysis facilities in four southern Iraqi cities.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Abdulkareem Salman Khudhair
Drafting or Revising Critically:	Abdulkareem Salman Khudhair
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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