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Evaluation of Adherence to Hepatitis B and C Prevention Guidelines among Hemodialysis Personnel in Teaching Hospitals of South Khorasan in 2024: a Cross Sectional Study

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Abstract

Hepatitis poses a serious health risk in hemodialysis units due to the invasive nature of procedures and frequent blood exposure. The disease can cause considerable challenges in infection control and patient safety. This study aimed to assess the adherence to hepatitis prevention protocols and their association with demographic variables among hemodialysis staff in teaching hospitals of South Khorasan. This descriptive-analytical cross-sectional study was conducted on 160 personnel working in hemodialysis units of South Khorasan teaching hospitals. Participants were selected through systematic random sampling. Data were collected using a researcher-developed, validated, and reliable questionnaire. The collected data were analyzed using SPSS 22, descriptive statistics indicators, and non-parametric tests (Mann-Whitney and Kruskal-Wallis) with a significance level of less than 0.05. The findings indicated a high mean score of adherence to hepatitis prevention protocols among personnel (118.06 ± 14.48). No statistically significant differences were observed based on age, gender, or education level. However, adherence levels were significantly associated with job experience and organizational role. The study concluded that the hemodialysis unit staff demonstrated a high level of adherence to hepatitis prevention protocols. This could be attributed to the implementation of strict infection control policies in these departments. Additionally, personnel working in specialized units like hemodialysis may have greater experience and competency compared to staff in general departments.

Keywords: Hepatitis, Risk factors, Hemodialysis

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Introduction

Viral hepatitis is a major global public health problem that causes significant morbidity and mortality. Patients with chronic kidney disease (CKD), particularly those undergoing regular hemodialysis or kidney transplantation, are at increased risk of liver injury due to impaired immunity and repeated exposure to blood products and dialysis equipment (1). Chronic liver disease is therefore a significant contributor to morbidity and mortality in this population (2). Hepatitis B (HBV) and C (HCV) are highly contagious viral infections, primarily transmitted through blood transfusions and high-risk sexual contact (2,3). These viruses are the most common infections among patients with kidney disease (3). Globally, the prevalence of HCV varies widely, from 0.6% in Canada to 1.5% in Japan and 6% in Africa (4). Strict infection control measures in developed countries have minimized transmission, but in developing countries, prevalence remains high due to inadequate adherence to standard precautions, lack of vaccination, and limited financial and medical resources (5,6). A meta-analysis by Khalisi et al. (2023) reported an overall HBV prevalence of 7.32% among hemodialysis patients, with regional variations ranging from 4.32% in North America to 9.73% in South America (7).

Patients with end-stage renal disease (ESRD) are particularly susceptible to HBV and HCV infections because of their reduced immune response, anemia, prolonged vascular access, repeated blood transfusions, and exposure to contaminated dialysis equipment (8–11). Other contributing factors include iatrogenic transmission, dialysis duration, and dialysis modality, which together increase morbidity, mortality, and negatively affect patient survival (12).

Hemodialysis staff, especially nurses, play a critical role in preventing viral transmission. They are responsible for implementing infection control protocols, guiding the healthcare team, and minimizing complications related to viral infections, thereby supporting patient recovery (13). However, studies show gaps in knowledge and practice among dialysis nurses. Ahmad et al. (2024) found that fewer than half of nurses had adequate knowledge regarding HBV and HCV prevention, and more than half did not perform satisfactorily in patient care practices (14).

In Iran, there is limited evidence on the level of adherence to hepatitis prevention guidelines among dialysis personnel, and little is known about how demographic factors influence adherence to hepatitis prevention protocols. Therefore, this study aims to assess the level of adherence of dialysis staff to hepatitis prevention protocols and explore its relationship with demographic characteristics.

Methods

This descriptive-analytical cross-sectional study was conducted on 160 personnel working in hemodialysis units of educational hospitals in South Khorasan Province, Iran. After approval by the Research Committee and obtaining ethical clearance from the Ethics Committee of Birjand University of Medical Sciences (ethics code: IR.BUMS.REC.1403.426), permission was secured from the hospital administration to access the dialysis departments. All participants were informed about the study objectives, and written informed consent was obtained before data collection. The study population included all personnel working in dialysis units in South Khorasan. Inclusion criteria were: having more than six months of work experience in a dialysis unit and willingness to participate. Individuals who were unwilling to continue participation were excluded. Based on consultation with a statistical expert and using a similar study and the following formula with %80 power, 5% error, the required sample size was estimated to be 180; however, data from 160 participants were ultimately analyzed.

$$n = \frac{z^2_{1-\frac{\alpha}{2}} s^2}{d^2}$$

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Two of them had emergency conditions, eight did not complete the questionnaire, and five were unwilling to continue the study. Sampling was conducted using a simple random and systematic method, and continued until the desired sample size was reached. Data were collected using two questionnaires. The first questionnaire gathered demographic data, including age, gender, work experience, job type, and education level. The second was a researcher-designed questionnaire assessing adherence to hepatitis prevention practices. This tool consisted of 35 items scored on a 4-point Likert scale (from 1 to 4), with a total possible score ranging from 35 to 145. Content validity was assessed through review by 10 faculty members, and internal consistency was confirmed with a Cronbach's alpha coefficient of 0.78. Data analysis was performed using SPSS version 22. The Kolmogorov-Smirnov test was used to assess the normality of data distribution. Since the data were not normally distributed, non-parametric tests, including Mann-Whitney and Kruskal-Wallis, were used to analyze group differences.

Results

A total of 160 participants participated in this study, of which 100 (62.5%) were women. Half of the participants (80) were between 30and 35 years of age. 90(56.2%) were married. 110 (68.8%) had a bachelor's degree. Most of the participants (43.8%) had between 4 and 10 years of work experience, and 110 of the participants were nurses (Table 1). The mean of the variable of adherence to hepatitis prevention protocols by dialysis unit personnel was 118.06±14.48, which, considering the maximum value of this variable, which was 140, indicates that the level of adherence was good. The level of adherence to hepatitis prevention protocols by dialysis unit personnel was higher among women than men, but based on the Mann-Whitney test, the difference observed was not statistically significant (P=0.222). The rate of adherence by dialysis ward personnel was higher in the age group under 30 years than in other age groups, but the observed difference was not statistically significant (P=0.322). The rate of adherence by dialysis ward personnel was higher in people with 4-10 years of work experience than in other groups, but the observed difference was not statistically significant (P=0.385). The rate of adherence was higher in people with a master's degree than in other groups, but the observed difference was not statistically significant (P=0.325). The adherence rate by dialysis ward personnel was higher among head nurses than in other groups, but the observed difference was not statistically significant (P=0.892).

Table 1. Demographic information of the participants (N=160)

Variable name		N(%)
Age	<30	50(31.3)
	30-35	80(50)
	>35	30(18.8)
Gender	Male	60(37.5)
	Female	90(62.5)
Marital Status	Single	70(43.8)
	Married	90(56.2)
Education Level	Diploma	30(18.8)
	Bachelor's degree	110(68.8)
	Master's degree	20(12.5)
Work Experience	6 months to 3 years	60(37.5)
	4-10 years	70(43.8)
	11-20 years	20(12.5)
	21-30 years old	10(6.3)

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Organizational Position	Assistant	30(18.8)
	Nurse	110(68.8)
	Head nurse	20(12.5)

Table 2. Determining adherence to hepatitis prevention protocols by dialysis department personnel according to gender, age, work experience, education, and organizational position

Variable		Mean± Standard deviation	P-value
Age	<30	125.40±13.3	0.322
	0-35	115.25±16.88	
	>35	113.33±4.50	
Gender	Male	111.5 ±18.19	0.222
	Female	122±10.95	
Marital Status	Single	118.50±18.53	0.385
	Married	122.57±9.79	
	Diploma	101±11.31	
Education Level	Bachelor's degree	124±14.7	0.325
	Master's degree	114.72±15.21	
	6 months to 3 years	127.50±4.94	
Organizational Position	Assistant	102.5±14.7	0.032
	Nurse	111.35±11.35	
	Head nurse	122.75±12.5	
Work Experience	4-10 years	118±4.58	0.012
	11-20 years	117.18±17.31	
	21-30 years old	123±7.07	

Discussion

This study was conducted to determine the level of adherence to hepatitis prevention protocols and its relationship with demographic variables of hemodialysis department personnel in South Khorasan teaching hospitals. The study showed that dialysis personnel had good adherence (84%). This aligns with previous studies reporting moderate to high infection control performance among healthcare workers (16,17). Adherence was slightly higher among women, younger staff, and those with more work experience or higher positions. Similar studies, however, found no clear link between demographics and infection control (17,18). This suggests that workplace context and responsibilities may influence adherence more than personal characteristics. Education and training consistently improve adherence. Studies, including Sirafian et al. (2013), show that structured and continuous training enhances hand hygiene, aseptic technique, and equipment disinfection (19). Our findings support this conclusion, highlighting that targeted education and practical training can reduce the risk of hepatitis transmission in hemodialysis wards. Collectively, these findings suggest that despite international recommendations, adherence to hepatitis B and C prevention guidelines among hemodialysis staff remains suboptimal across many contexts. Variations in compliance appear

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to be influenced by differences in resource availability, training, and monitoring mechanisms. To strengthen adherence further, dialysis units should implement continuous, structured training programs, monitor adherence to infection control practices, and emphasize practical skills such as hand hygiene, aseptic procedures, and patient preparation. These measures provide a logical and evidence-based approach to improving safety in hemodialysis settings

Limitations

This study was conducted only in the teaching hospitals of South Khorasan; therefore, the generalization of the findings to other regions or countries should be done with caution. Also, the data were collected through self-reported questionnaires, which may be subject to response bias or inaccurate reporting.

Conclusion

Based on the results of this study, the level of adherence with risk factors that cause hepatitis by hemodialysis ward personnel in relation to patients in these departments is at a high level. One of the reasons for this is the existence of strict infection control rules for personnel in these departments. On the other hand, the personnel working in these departments, which are part of special departments, are more efficient and competent than other personnel in ordinary departments. However, the effect of differences in education on the level of adherence to hepatitis prevention protocols indicates the importance of training personnel in these cases, which should be implemented by ward head nurses and health care providers.

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Conflict of interest

The authors affirm that there is no conflict of interest associated with the publication of this paper.

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