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Viral Hepatitis B&C in Elderly Hemodialysis Unit: Nurses' Related Preventive Practices

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Abstract ***Background:*** Hepatitis B virus and hepatitis C virus infections are important causes of morbidity and mortality of hemodialysis patients. Hepatitis B and C virus in our hemodialysis patients is still high. These data emphasize the need for stricter adherence to infection control, barrier precaution and preventive behaviors with all patients. ***Aim:*** The aim of this study was to assess nurses' practices regarding preventive measures for viral hepatitis B & C in hemodialysis dialysis unit. ***Design:*** A descriptive exploratory design was utilized in the current study. ***Setting:*** The study was carried out in two hemodialysis units at Beni-Suef University Hospital and Elwasta General Hospital in Beni-Suef Governorate. ***Subjects:*** A convenient sample of 76 hemodialysis nurses. ***Results*:** The mean of age is 23.45±2.71 years, 71.1% of them are female, 52.6% of the dialysis nurses have technical institute, and 48.7% of the dialysis nurses have 2-5 years of experience in nursing field. About 89.5% & 55.3% of the dialysis nurses were competent regarding preventive practices related to viral hepatitis in dialysis unit and practices toward the environment, respectively, 71.1% & 52.6% of them were incompetent regarding general preventive practices related to dialysis unit and practices toward machine & equipment, respectively. Moreover, 63.2% of them were incompetent regarding toward safe waste management. Furthermore, 52.6% of the dialysis nurses were incompetent regarding practices towards viral hepatitis B & C for the elderly patients in the dialysis units. ***Conclusion:*** There is highly statistically significant relation between dialysis nurses' practice and their education level, attended training program for new dialysis nurses, training program for improving nursing skills, and participate in scientific conferences for dialysis and kidney disease during the last 5 years. Moreover, there is statistically significant relation with their age, years of experience in nursing field, years of experience in dialysis unit and the opportunity to view the courses and medical journals. ***Recommendations:*** Increase availability of supplies and equipment, especially which concerned With infection control as personal protective equipment, alcohol rub in a dispenser inside the dialysis rooms and close from the point of care".

Keywords: *viral hepatitis b&c, elderly, hemodialysis nurses' practices*

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1. Introduction

Geriatric care faces similar challenges with just 7,128 geriatricians, one for every 2,546 older. By 2030, it is estimated that this number will increase to only 7,750, one for every 4,254 older, far short of the predicted need for 36,000 geriatricians. Other professions such as social work have similar shortages. These issues are critical not only in the United States but across the globe [1-8]. "If these issues remain unresolved, the cumulative impact for our aging population and our overall health care system will be significant. Projected consequences include, but are not limited to extremely high nurse-patient ratios; proliferation of high-tech, low-touch care systems; and a decline in public trust for nursing [9-17].

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are important causes of morbidity and mortality of hemodialysis (HD) patients. HBV and HCV prevalence in our HD patients is still high. These data emphasize the need for stricter adherence to infection control, barrier precaution and preventive behaviors with all patients. In patients on maintenance HD, the risk of hepatitis is still a serious problem despite the availability of serological tests and vaccines for hepatitis B virus infection and universal precaution standards and infection control measures. Available data suggest that HCV has become the most common cause of acute hepatitis in dialysis patients and dialysis staff members, following the implementation of infection control measures for HBV [18].

An estimated 150,000 new HCV infections occur each year in Egypt and HCV morbidity and mortality are predicted to double in the coming 20 years. The HCV epidemic in Egypt is thought to have originated with unsafe injections administered for a mass ant-schistosomiasis campaign conducted in that country during representing the world's largest iatrogenic transmission of blood-borne pathogens to date. Currently, contact with infected blood through medical procedures (including unsafe injection practices) is considered the primary mode of HCV transmission in Egypt. In urban areas, illicit drug use also contributes to the epidemic [19].

2. Aim of the Study

The aim of this study was to assess nurses' practices regarding preventive measures for viral hepatitis B & C in hemodialysis dialysis unit

2.1. Research Questions

What about hemodialysis nursing staffs' practices regarding preventive measures for viral hepatitis B & C in hemodialysis dialysis unit?

3. Subjects and Methods

3.1. Subjects & Setting

The investigation was carried out in two hemodialysis units at Elwasta General Hospital and Beni-Suef University Hospital in the governorate of Beni-Suef. All of the 76 hemodialysis nurses who provided direct patient care, of which 22 were men and 54 were women, agreed to take part in the study.

3.2. Tools of Data Collection

The researcher created an interview questionnaire after examining the national and international literature reviews that were relevant to the topic of the investigation. Nursing knowledge is evaluated by a self-administered questionnaire.

Part I: Questionnaire about background traits:

This section was created by the researcher to gather information about the background information of nurses, including their experience in dialysis units, participation in training programmes to advance their nursing skills, access to courses and medical journals, and participation in conferences for dialysis and kidney disease over the previous five years.

Part II: Nurses' practices toward viral hepatitis:

A pattern of preventative procedures for viral infection in dialysis units is covered in Part III of the article, which is about nurses' practices towards viral hepatitis for patients who attended in those facilities.

❖ **Scoring system:**

Nursing practice received a total score of 59 grades, with "done" receiving one point and "not done" receiving zero. A percentage score was created by adding up these scores. It was divided into two groups: Competent practices if score ≥ 80% and Incompetent practices if score from <80%.

3.2.1. Validity and Reliability of Tool

i. Content Validity:

- Tool validity analysis was performed to determine the extent to which the employed tools capture the intended metric. Five community health nursing experts from the nursing department at Beni-Suef University served on a panel to review the instruments' content and face validity. Each expert was tasked with reviewing the instrument to determine its clarity, content coverage, and suitability for achieving the current study's goal.Each expert was asked to examine the instrument for contentcoverage, clarity, and whether the included items are suitable to achieve the aim of the current study.
- To assess the content validity of the tools, a panel of five community health nursing specialists from the nursing faculty revised the tools for clarity, relevance, comprehensiveness, understanding, and applicability and made the required modifications.

ii Reliability: In the present study, reliability was tested using Cronbach's Alpha coefficients:

- The nurses' practices towards viral hepatitis B and C for the elderly patients in dialysis units were 0.841.

3.3. Field Work

This phase began with the preliminary phase, which focused on a review of the recent and historical, national and international, related literature regarding the study's issues using textbooks, papers, journals, and websites. After assessing and creating the data collection tools, this review was helpful to the investigator. After that, the investigator used his or her skills to evaluate the tools' accuracy, relevance, and correctness. To gather information about nurses' understanding of the prevention of viral hepatitis transmission in HD units, the nurses who accepted to participate in the study were given the Self-administered Questionnaire. Each nurse had to wait for a few minutes during each of the working shifts while the researcher clarified any ambiguous inquiries.

The practise assessment checklist for nursing practise to stop HCV transmission in HD units was then filled out using the participant observational checklist. To accomplish this goal, the researcher personally observed each prospective nurse three times while she provided patient care; she had to be present during all HD shifts.

A pilot study was conducted on 10% of the entire study sample (8 nurses) in order to check the tools' applicability, effectiveness, and clarity as well as the fieldwork's viability and to look for any potential challenges that the researcher might encounter. To include the pilot sample among the study subjects, modifications were made. The primary study sample was made up of the pilot sample.

The study needs five months to collect its data. Beginning in January 2022, data collecting for the project was completed by the end of May 2022. At Elwasta

General Hospital and Beni-Suef University Hospital, the investigator visited the HD unit. Nurses work three days a week from 9 am to 12 pm; each hospital has a weak day. The researcher first gave the nurses an explanation of the study's objectives and assured them that any information gathered would be kept private and utilised exclusively for that purpose. Nurses in the HD unit at Beni-Suef University Hospital and Elwasta General Hospital were questioned by the investigator.

3.4. Ethical Considerations

The scientific research ethical committee of the Faculty of Nursing at Beni-Suef University gave its clearance before the study was carried out. The researcher visited with the director of Elwasta General Hospital, affiliated with Beni-Suef University, to explain the purpose of the study and obtain their agreement. In order to get their consent to participate in the study and to explain the goals of the study to them, the investigator also met with nurses. They were told that the data collected was anonymous and confidential and would only be used for scientific study. The nurses were given the freedom to leave the research whenever they wanted.

A main permit was given by the hospital authorities as well as the research ethics committee at the faculty of nursing for ethical considerations. Each eligible individual was also told of the study's purpose and significance during the initial interview. The researcher made particular to underline that participation in the study is completely optional and that anonymity and confidentiality were ensured by data coding. Each person who accepted to take part in the study provided a written consent form.

3.5. Administrative Design

The dean of the nursing faculty at Beni-Suef University sent an official letter requesting authorization to conduct the study and forwarded it to the hospital affiliated with the university, Elwasta General Hospital, asking for their consent to do so. In order to obtain their cooperation and consent for data collection, this letter included the purpose of the study and a photocopy of the data collection equipment.

3.6. Statistical Design

Statistical Package for Social Science (SPSS) version 25 and the Microsoft Excel programme were used to conduct the data analysis. For categorical data, frequencies and percentages were used, while arithmetic means (X) and standard deviations (SD) were used for quantitative data. Descriptive statistics were used to present the data. The chi square test (X2), P-value to determine whether two variables are related, and Pearson correlation test (R-test) to determine whether the research variables are correlated were used to compare qualitative variables. The following results were given different levels of significance. Degrees of significance of results were considered as follows: (1) P-value > 0.05 Not significant (NS), (2) P-value ≤ 0.05 Significant (S), (3) P-value ≤ 0.01 Highly Significant (HS).

4. Results

Table 1. Frequency distribution of the dialysis nurses according to their socio-demographic characteristics (n=76)

Socio-demographic characteristics	No.	%
Age (year)		
20-	39	51.3
25-	18	23.7
30-	12	15.8
35-	7	9.2
Mean SD 23.45 ± 2.71		
Gender		
Male	22	28.9
Female	54	71.1
Qualification level		
Diploma	20	26.3
Institute	40	52.6
Bachelors	16	21.1
Years of experience in nursing field		
2-	37	48.7
5-	15	19.7
8-	15	19.7
10-	9	11.9
Years of experience in dialysis unit		
2-	44	57.9
5-	16	21.0
8-	10	13.2
10-	6	7.9
Attending program for new dialysis nurses		
Yes	51	67.1
No	25	32.9
Attending training programs for improving nursing skills		
Yes	53	69.7
No	23	30.3
If yes, how many training programs did you attend? (n=53)		
One	18	34.0
Two	29	54.7
Three	4	7.5
More than three	2	3.8
Opportunity to view the courses and medical journals		
Yes	18	23.7
No	56	76.3
Participate in scientific conferences for dialysis and kidney disease during the last 5 years		
Yes	12	15.8
No	64	84.2
Participate in educational lectures before		
Yes	70	92.1
No	6	7.9

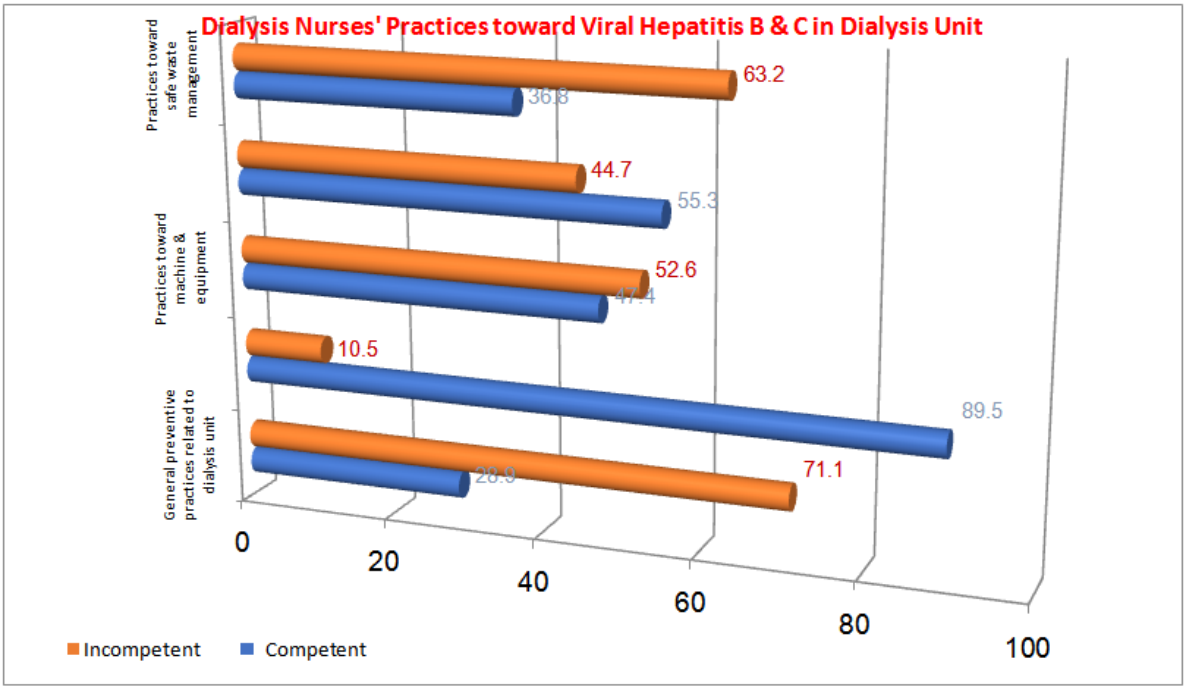

Figure 1. Frequency distribution of the dialysis nurses according to their practices towards viral hepatitis B & C for the elderly patients in the dialysis units (n=76).

Table 2. Relationship between socio-demographic characteristics of the dialysis nurses and their total practices towards viral hepatitis B & C for the elderly patients in the dialysis units (n=76)

Socio-demographic characteristics		Levels of total practices				X2	P-Value
		Competent (n=36)		Incompetent (n=40)			
		No.	%	No.	%		
Age (years)	20-	14	38.9	25	62.5	10.91	0.049*
	25-	10	27.8	8	20.0		
	30-	7	19.4	5	12.5		
	35-	5	13.9	2	5.0		
Gender	Male	14	38.9	8	20.0	3.227	0.120
	Female	22	61.1	32	80.0		
Education level	Diploma	2	5.6	18	45.0	20.07	0.000**
	Technical	18	50.0	22	55.0		
	Bachelor	16	44.4	0	0		
Years of experience in nursing field	2 - 5	9	25.0	28	70.0	14.37	0.015*
	5 - 7	10	27.8	5	12.5		
	8 - 10	10	27.8	5	12.5		
	> 10	7	19.4	2	5.0		
Years of experience in dialysis unit	2 - 5	13	36.1	31	77.5	14.88	0.011*
	5 - 7	12	33.3	4	10.0		
	8 - 10	7	19.5	3	7.5		
	> 10	4	11.1	2	5.0		
Training program for new dialysis nurses	Yes	36	100.0	15	37.5	19.63	0.000**
	No	0	0.0	25	62.5		
Training program for improving nursing skills	Yes	36	100.0	17	42.5	21.36	0.000**
	No	0	0.0	23	57.5		
Opportunity to view the courses and medical journals	Yes	18	50.0	0	0.0	13.04	0.013*
	No	18	50	40	100		
Participate in dialysis/kidney conferences at the last 5 years.	Yes	12	33.3	0	0.0	15.27	0.001**
	No	24	66.7	40	100		
Participate in educational lectures before.	Yes	18	50.0	0	0.0	16.13	0.000**
	No	18	50	40	100		

No significant at $p > 0.05$. *Significant at $p < 0.05$. **highly significant at $p < 0.01$.

Table 1: Presents frequency distribution of the dialysis nurses according to their socio-demographic characteristics. It shows the mean of age is 23.45±2.71 years, 71.1% of them are female, 52.6% of the dialysis nurses have technical institute. Also, 48.7% of the dialysis nurses have 2-5 years of experience in nursing field. 76.1% of them attend program for new dialysis nurses, 84.2% of the dialysis nurses attend training programs for improving nursing skills, and 54.7% of them attend two programs.

Table 2 & Figure 1: Presents frequency distribution of the dialysis nurses according to their total practices towards viral hepatitis B & C for the elderly patients in the dialysis unit. It shows that, 89.5% & 55.3% of the dialysis nurses were competent regarding preventive practices related to viral hepatitis in dialysis unit and practices toward the environment, respectively. Also, 71.1% & 52.6% of them were incompetent regarding general preventive practices related to dialysis unit and practices toward machine & equipment, respectively. Moreover, 63.2% of them were incompetent regarding toward safe waste management. Furthermore, 52.6% of the dialysis nurses were incompetent regarding practices towards viral hepatitis B & C for the elderly patients in the dialysis units.

Table 2: Presents relationship between socio-demographic characteristics of the dialysis nurses and their total practices towards viral hepatitis B & C for the elderly patients in the dialysis units It displays that, there is highly statistically significant relation between dialysis nurses' practice and their education level, attended training program for new dialysis nurses, training program for improving nursing skills, and participate in scientific conferences for dialysis and kidney disease during the last 5 years at (P= < 0.01). Also, there is statistically significant relation with their age, years of experience in nursing field, years of experience in dialysis unit and the opportunity to view the courses and medical journals at (P= < 0.05). While, there is no statistically significant relation with their gender at (P= > 0.05).

5. Discussion

Elderly is a natural process, which starts with intrauterine life, continues until death and is caused by irreversible degeneration of cells and systems. Elderly is not a pathological process and it consists of physiological, psychological, sociological and chronological changes [20]. At the biological level, ageing results from the impact of the accumulation of a wide variety of molecular and cellular damage over time. This leads to a gradual decrease in physical and mental capacity, a growing risk of disease and ultimately death. These changes are neither linear nor consistent, and they are only loosely associated with a person's age in years. The diversity seen in older age is not random. Beyond biological changes, ageing is often associated with other life transitions such as retirement, relocation to more appropriate housing and the death of friends and partners [21].

Within dialysis units, this is of paramount importance. Nursing staff must take adequate precautions and implement appropriate practices that will substantially reduce the risk of workplace transmission of blood borne infection to patients and staff within this high-risk environment. Various evidence-based guidance have been published for the prevention of healthcare-associated infections (HAI) in all HD settings in order to globalize and share the evidence, as CDC recommendations, APIC guide to the elimination of infections in HD [22].

The systematic review of molecular virology papers revealed transmission of HCV via internal fluid pathways of the dialysis machines in a minority of reports only. So; disinfection of the internal pathways of the dialysis machine between patient uses is not required. Dialysis machines are engineered so that the pathways segregate blood and dialysate. The exception is if a blood leak event occurs. In the event of a blood leak outside of the blood pathway, the CDC recommends internal disinfection before the dialysis machine is used on a successive patient [23].

The finding of the present study also, showed highly statistically significant relation between dialysis nurses' practice and their education level, attended training program for new dialysis nurses, training program for improving nursing skills, and participate in scientific conferences for dialysis and kidney disease during the last 5 years at (P= < 0.01). Also, there is statistically significant relation with their age, years of experience in nursing field, years of experience in dialysis unit and the opportunity to view the courses and medical journals at (P= < 0.05). While, there is no statistically significant relation with their gender at (P= > 0.05). The finding disagreed with kale & shind (2020) as his results revealed that there were no significant relation found between nurses' practice and their gender, level of education, and years of experience in hemodialysis units, while significant relationship was found between nurses' practice and their marital [24].

Centers for Disease Control and Prevention clarified another difference regarding that topic between HD-center precautions and standard precautions. It stated that standard precautions do not restrict use of supplies, instruments, and medications to a single patient; while HD-center precautions specify that none of these items be shared among any patients. It added that; if HCV-negative patients are routinely screened for seroconversion, the absence of new infections can provide evidence of adherence to the procedures in units with high prevalence. However; Screening results are not a substitute for regular assessment of the implementation of hygienic precautions, especially in units with few or no infected patients [25-30].

Conclusion

There is statistically significant relation between dialysis nurses' knowledge and their years of experience in dialysis unit, attendance training program for new dialysis nurses, and their opportunity to viewing the courses and medical journals ($p<0.05$).

Recommendation

Modification of the ongoing training program regarding infection control to be more applied to hemodialysis units.

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