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Research Article

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

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Abstract:

Background: Nurses are in a unique position and frequently asked to provide care for hemodialysis patients. Nurses as members of the healthcare team lead the rest of the team in practicing prevention strategies to protect the patient from infection. Utilizing the skills and knowledge of nursing practice, nurse can facilitate patient recovery while minimizing complications related to infections.
Aim: The aim of this study was to assess hemodialysis nurses' general practices regarding elderly viral hepatitis C and B.
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, of whom 22 were men and 54 women, and who provided direct patient care, consented to take part in the study.
Results: 57.9% of the dialysis nurses have 2-5 years of experience in dialysis unit, 72.4% of the dialysis nurses don't participate in scientific conferences for dialysis and kidney disease during the last 5 years, 92.1%% and 93.4% of the dialysis nurses place all disposable syringes and needles, scalpel blades, and other sharp items in puncture- resistant containers and wear the special uniform mandatory for all workers of the unit, respectively. While, (67.1% and 71.1%) of them don't commit to well-groomed uniforms while maintaining personal hygiene and not using external accessories and don't use the one hand method, respectively.
Conclusion: Most of dialysis nurses had incompetent practices regarding general preventive practices related to dialysis unit. There is highly statistically significant relation between dialysis nurses' practice and their education level, nurses' experience, attending training programs for improving nursing skills, participation in scientific conferences, and their knowledge about infection control standards for dialysis patients and their total practices towards viral hepatitis B & C for elderly patients in dialysis units.
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; hemodialysis; nursing practices

Introduction

The prevalence rates of chronic kidney disease (CKD) worldwide are high and have increased in the last few years to about 13–15%, with an increased prevalence of diabetes and hypertension. The number of patients with CKD who would ultimately require renal replacement therapy is increasing at an alarming rate worldwide. The number of patients with end stage renal disease (ESRD) has increased by about 9% per year in the USA and by 4% per year in Japan. In Egypt, the prevalence of dialysis patients is presumed to be increasing and the main causes of ESRD in Egypt, other than diabetic nephropathy, include hypertensive kidney disease, chronic glomerulonephritis (GN), unknown etiology, chronic pyelonephritis, schistosomal obstructive uropathy, and schistosomal nephropathy [1].

In Egypt, the estimated annual incidence of ESRD is around 74 per million and the total prevalence of patients on dialysis is 264 per million. The prevalence of ESRD continues to increase in most countries: it is higher than 2000 per million populations (pmp) in Japan, about 500 pmp in the USA, and about 800 pmp in the European Union. In developing countries, less than 100 pmp in sub-Saharan Africa and India to about 400 pmp in Latin America. The incidence of CKD is at least three to four times more frequent in Africa than in developed countries, but the prevalence

of ESRD is relatively lower, which reflects the lack of medical care facilities Patients in end-stage renal disease (ESRD) undergoing chronic dialysis are at a high risk of exposure to hepatitis C virus (HCV) and hepatitis B virus (HBV) [2].

According to the Community and Hospital Infection Control Association (2021) infection prevention and control must be made up of evidence-based knowledge, and up-to-date skills and implementation practices. Nurses can play a key role in modeling and promoting knowledge regarding evidence-based practices to prevent occurrence of infections and minimize its complications, especially in hemodialysis (HD) units. Nurses are in a unique position and frequently asked to provide care for HD patients. Nurses as members of the healthcare team lead the rest of the team in practicing prevention strategies to protect the patient from infection. Utilizing the skills and knowledge of nursing practice, nurse can facilitate patient recovery while minimizing complications related to infections [3].

Hand hygiene. Maximal barrier precautions (both for the patient and the inserter) when placing a central line, Skin antisepsis, Optimal catheter site selection, Assessment of line necessity with prompt removal of unnecessary line, Use maximal sterile barrier precautions (i.e., mask, cap, gown, sterile gloves, and sterile full body drape). Choose the best insertion site to minimize infections and noninfectious complications based on individual patient characteristics. Avoid femoral site in obese adult patients. Prepare clean skin site with a antiseptic solution prior to catheter insertion and dressing changes [4].

For patients with sensitivities or suspected contraindications (i.e., allergy, hypersensitivity) povidone-iodine can be used as an alternative. Apply using a back-and-forth friction scrub for at least 30 seconds, according to manufacturers' instructions. Place a sterile gauze dressing or a sterile, transparent, semipermeable dressing over the insertion site. For patients 18 years of age or older patient, use a chlorhexidine impregnated dressing with cleared label that specifies a clinical indication for reducing for short-term non-tunneled catheters infection unless the facility is demonstrating success at preventing with baseline prevention practices [5-10].

2. Aim of the Study

The aim of this study was to assess hemodialysis nurses' general practices regarding elderly viral hepatitis C and B.

1.1. *Research Questions*:

a. What is the level of dialysis nurses according to their total general practices towards viral hepatitis B & C for the elderly patients in the dialysis units?
b. Is there a relationship between dialysis nurses' education and their total practices towards viral hepatitis B & C for elderly patients in dialysis units?
c. Is there relationship between dialysis nurses' experience in dialysis and their total practices towards viral hepatitis B & C for elderly patients in dialysis units?
d. Is there relationship between dialysis nurses' attending training programs for improving nursing skills and their total practices towards viral hepatitis B & C for elderly patients in dialysis units?
e. Is there relationship between dialysis nurses' participation in scientific conferences and their total practices towards viral hepatitis B & C for elderly patients in dialysis units?
f. Is there relationship between dialysis nurses' knowledge about infection control standards for dialysis patients and their total practices towards viral hepatitis B & C for elderly patients in dialysis units?

3. Setting and Subjects

The goal of the study was achieved through a descriptive exploratory study. The investigation was carried out in two hemodialysis units at Elwasta General Hospital and Beni-Suef University Hospital in the governorate of Beni-Suef. The study included 76 hemodialysis nurses, a suitable sample of all hemodialysis nurses.

4. Tools of data collection:

After reviewing national and international related literature that connected to the study issue, the researcher prepared the interview questionnaire. There were two primary components to it:

Part I: personal characteristics questionnaire sheet:

The researcher created this section to gather information about the personal and professional characteristics of nurses, including their educational background, length of nursing career, attendance at new dialysis nurse training programmes, and participation in dialysis and kidney disease-related scientific conferences over the previous five years.

Part II: checklist:

Designed to assess nurses' general practices toward viral hepatitis for the patient who attended in dialysis units that includes; using personal protective equipment, washing hands, well-groomed uniforms, places disposable syringes & needles, …… etc

❖ **Scoring system:**

The total score of nurses' practice was evaluated as "Done" was taken one score and "not done" was taken zero score. These scores were summed up and were converted into a percentage score. It was classified into 2 categories: Competent practices if score ≥ 80% and Incompetent practices if score from <80%.

4.1. Validity and reliability

Tool validity was done to identify the degree to which the used tools measure what was supposed to be measured. Content and face validity of the tools were tested through subjecting the tools to a panel of five community health nursing expert form faculty of nursing in Beni-suef University members. Each expert was asked to examine the instrument for content coverage, clarity, and whether the included items are suitable to achieve the aim of the current study. Nurses' practice towards viral hepatitis B & C for the elderly patients in the dialysis units was 0.841

4.2. Field Work

This phase started with a review of current and past, national and international related literature concerning the subjects of the study, using textbooks, articles, journals, and websites. The nurses who agreed to participate in the study were received the Self-administered Questionnaire to collect personal data. It took about minutes for each nurse separately in all shifts of working during which the researcher was clarifying any obscure questions. Then participant observational checklist was utilized to fill out practice assessment checklist regarding nursing general practice to prevent hepatitis B&C transmission in hemodialysis (HD) units. Each potential nurse was observed directly by the researcher for three times during giving care to patients; this required attending for all HD shifts to achieve this objective.

Pilot study was carried out on 10% of the total study sample (8 nurses) to evaluate the applicability, efficiency, clarity of tools, assessment of feasibility of fieldwork, beside to detect any possible obstacles that might face the investigator and interfere with data collection.

Data collections of the study take five months. Data collection of the study was started at the beginning of January 2022, and completed by the end

of May 2022. The investigator attended in HD unit at Beni-Suef university hospital, and Elwasta general hospital, Three days per week from 9am to12pm for nurses; Each hospital one day every weak.

4.3. Ethical & Administrative Considerations:

Prior study conduction, ethical approval was obtained from the scientific research ethical committee of the Faculty of Nursing, Beni-Suef University. The researcher met director of Beni-Suef University hospital, Elwasta General Hospital to clarify the aim of the study and take their approval. The investigator also met nurses to explain the purpose of the study and obtain their approval to participate in the study. They were reassured about the anonymity and confidentiality of the collected data, which was used only for the purpose of the scientific research. The nurses' right to withdraw from the study at any time was assured.

An official letter requesting permission to conduct the study was directed from the dean of the Faculty of Nursing Beni-Suef University to Beni-Suef University hospital, Elwasta General Hospital to obtain their approval to carry out this study. This letter included the aim the study and photocopy from data collection tools in order to get their permission and help for collection of data.

4.3. Statistical Design:

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X^2). Degrees of significance of results were considered as follows: P-value > 0.05 Not significant (NS), P-value ≤ 0.05 Significant (S), and P-value ≤ 0.01 Highly Significant (HS).

5. Results

Figure (1): presents frequency distribution of the dialysis nurses according to their general characteristics. It shows that 52.6% of the nurses have technical institute. Also, (57.9%) of the dialysis nurses have 2-5 years of experience in dialysis unit, 72.4% of the dialysis nurses don't participate in scientific conferences for dialysis and kidney disease during the last 5 years.

Table (1): displays frequency distribution of the dialysis nurses according to general preventive practices related to dialysis unit. It shows that, (92.1%% and 93.4%) of the dialysis nurses place all disposable syringes and needles, scalpel blades, and other sharp items in puncture- resistant containers and wear the special uniform mandatory for all workers of the unit, respectively. While, (67.1% and 71.1%) of them don't commit to well-groomed uniforms while maintaining personal hygiene and not using external accessories and don't use the one hand method, respectively.

Figure (2): presents frequency distribution of the dialysis nurses according to their total general practices towards viral hepatitis B & C for the elderly patients in the dialysis units. It shows that, 71.1% of dialysis nurses were incompetent regarding general preventive practices related to dialysis unit.

Figure (3): Presents relationship between dialysis nurses' education and their total practices towards viral hepatitis B & C for elderly patients in dialysis units. It displays that, there is highly statistically significant relation between dialysis nurses' practice and their education level, (P=0.000).

Figure (4): Presents relationship between dialysis nurses' experience in dialysis and their total practices towards viral hepatitis B & C for elderly patients in dialysis units. It displays that, there is statistically significant relation with their years of experience in dialysis unit (P<0.05).

Figure (5): Presents relationship between dialysis nurses' attending training programs for improving nursing skills and their total practices towards viral hepatitis B & C for elderly patients in dialysis units. It displays that, there is highly statistically significant relation between dialysis nurses' practice and their attended training program for improving nursing skills, (P=0.000).

Figure (6): Presents relationship between dialysis nurses' participation in scientific conferences and their total practices towards viral hepatitis B & C for elderly patients in dialysis units. It displays that, there is highly statistically significant relation between dialysis nurses' practice and their participation in scientific conferences for dialysis and kidney disease during the last 5 years at (P=0.000).

Figure (7): Presents relationship between dialysis nurses' knowledge about infection control standards for dialysis patients and their total practices towards viral hepatitis B & C for elderly patients in dialysis units. It displays that, there is highly statistically significant relation between dialysis nurses' practice and their knowledge about infection control standards for dialysis patients (P=0.000).

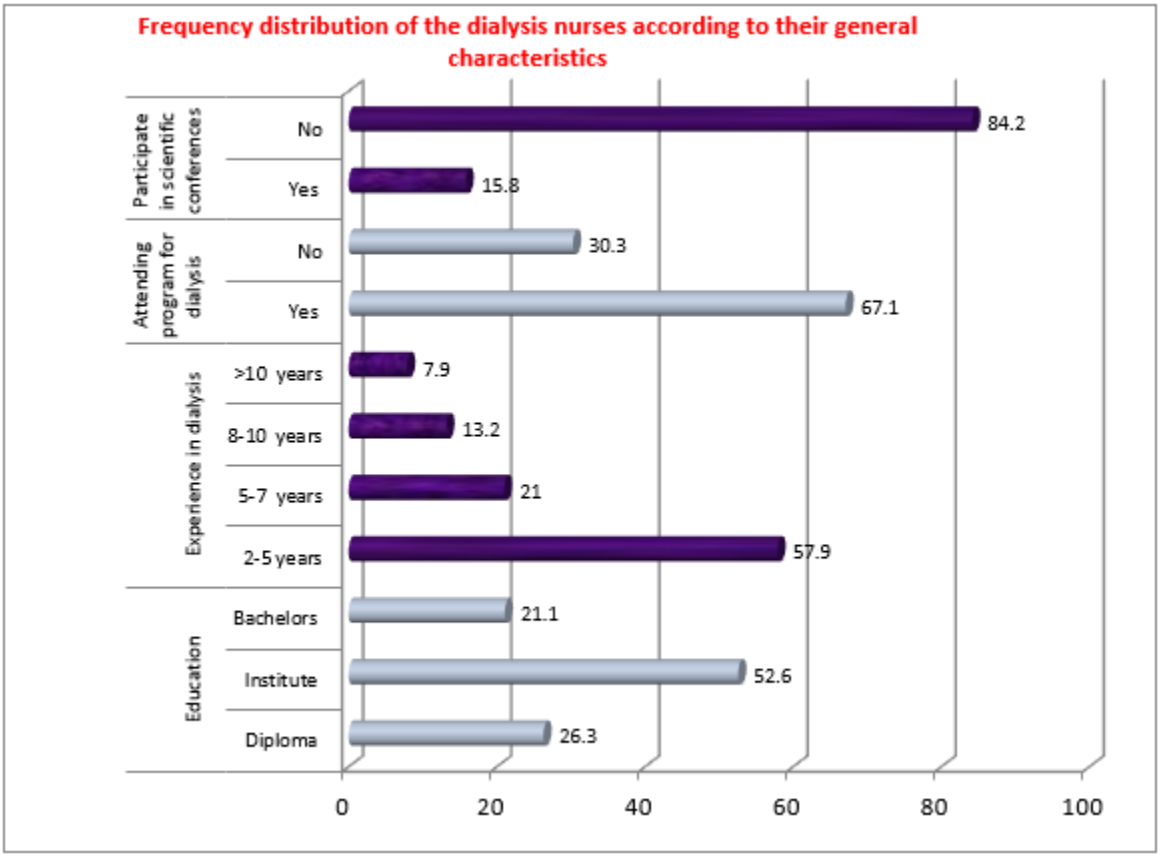

Figure 1: Frequency distribution of the dialysis nurses according to their general characteristics

Items	Done		Not done	
	No.	%	No.	%
Using personal protective equipment; gloves, gown, or plastic apron, overshoes and masks always when dealing with any patients in the dialysis unit.	34	44.7	42	55.3
Washing hands before and after any procedure in the dialysis unit.	30	39.5	46	60.5
Nursing is committed to well-groomed uniforms while maintaining personal hygiene and not using external accessories.	25	32.9	**51**	**67.1**
The nurse places all disposable syringes and needles, scalpel blades, and other sharp items in puncture-resistant containers.	**70**	**92.1**	6	7.9
The nurse does not cover needles after use.	42	55.3	34	44.7
If a needle is covered, the nurse uses the one hand method.	22	28.9	**54**	**71.1**
The nurse does not purposely bend or break needles by hand	60	78.9	16	21.1
The nurse does not remove needles from syringes (she disposes needles with syringe as one unit)	68	89.5	8	10.5
The nurse ensures that traffic flow into the unit is restricted.	34	44.7	42	55.3
The nurse does not touch any furniture or telephones with gloves.	37	48.7	39	51.3
The nurse wears the special uniform mandatory for all workers of the unit.	**71**	**93.4**	5	6.6
The nurse sends clothes and uniforms in special bags to be cleaned after work.	55	72.4	21	27.6

The nurse wears a coat over her uniform when leaving the unit.	33	43.4	43	56.6
The nurse obtained a serum hepatitis assessment (or vaccine) HBV before beginning work in the unit.	52	68.4	24	31.6
The nurse does not eat food or during inside the unit.	25	32.9	51	67.1

Table 1: Frequency distribution of the dialysis nurses according to general preventive practices related to dialysis unit (n=76).

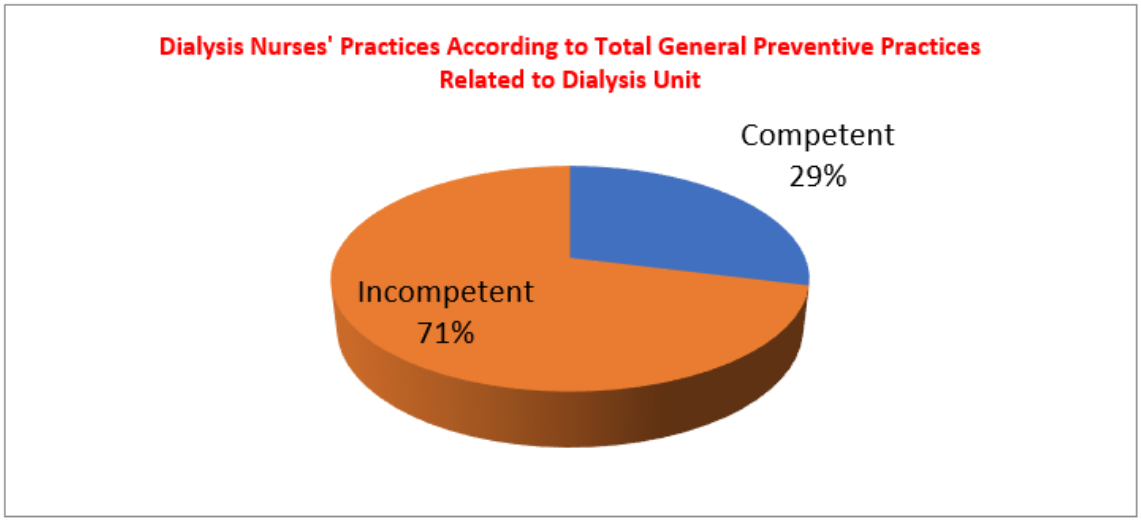

Figure 2: Dialysis Nurses' Practices According to Total General Preventive Practices Related to Dialysis Unit

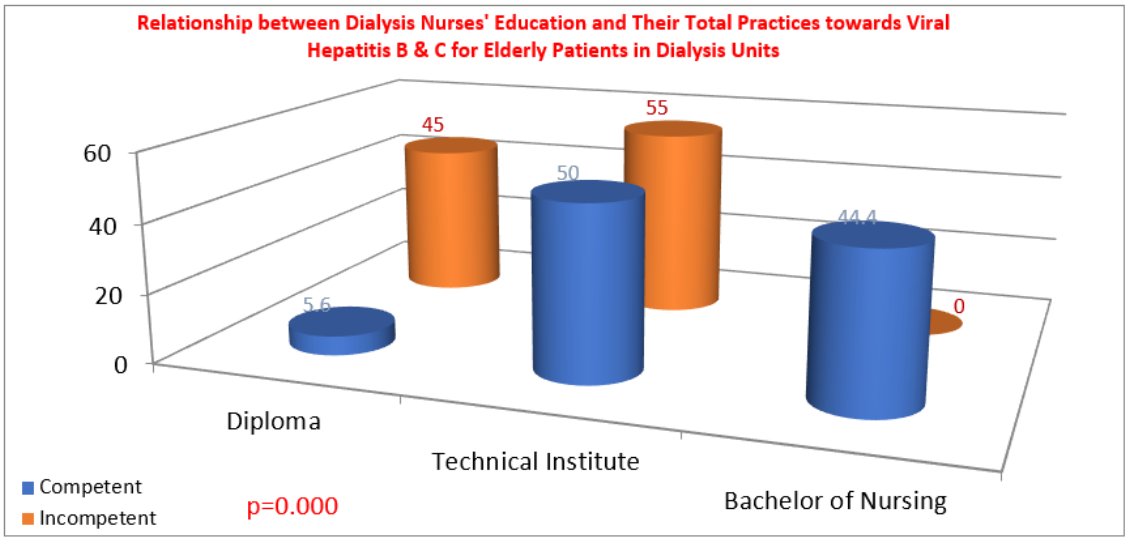

Figure 3: Relationship between Dialysis Nurses' Education and Their Total Practices towards Viral Hepatitis B & C for Elderly Patients in Dialysis Units

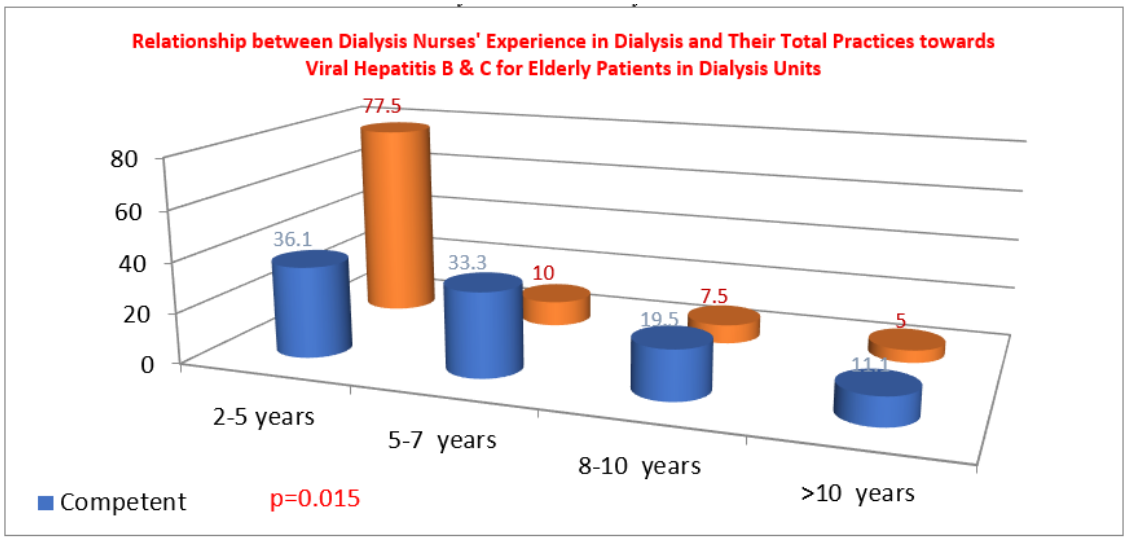

Figure 4: Relationship between Dialysis Nurses' Experience in Dialysis and Their Total Practices towards Viral Hepatitis B & C for Elderly Patients in Dialysis Units

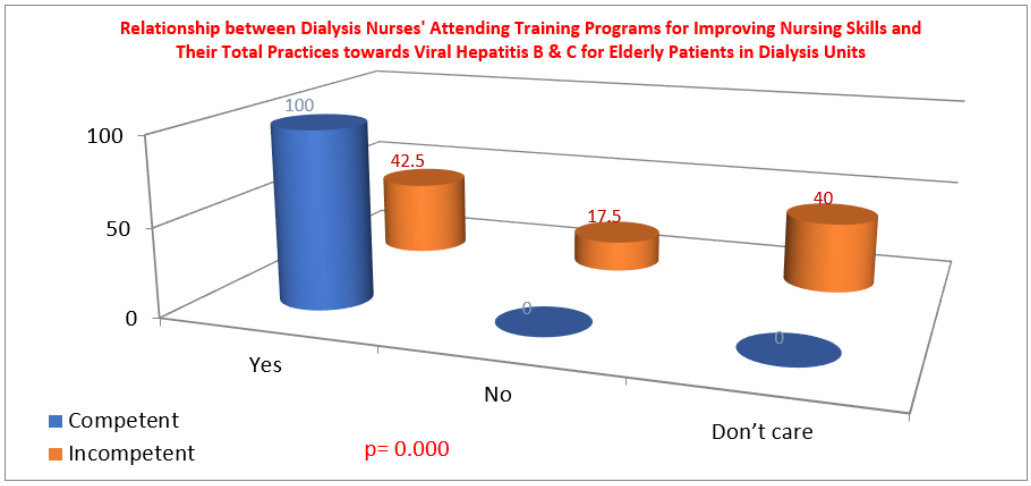

Figure 5: Relationship between Dialysis Nurses' Attending Training Programs for Improving Nursing Skills and Their Total Practices towards Viral Hepatitis B & C for Elderly Patients in Dialysis Units

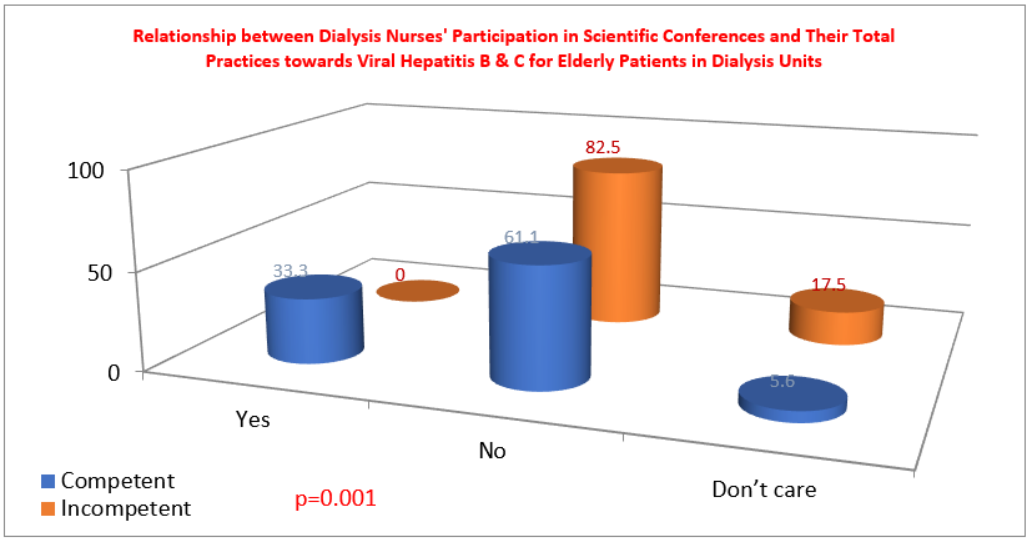

Figure 6: Relationship between Dialysis Nurses' Participation in Scientific Conferences and Their Total Practices towards Viral Hepatitis B & C for Elderly Patients in Dialysis Units

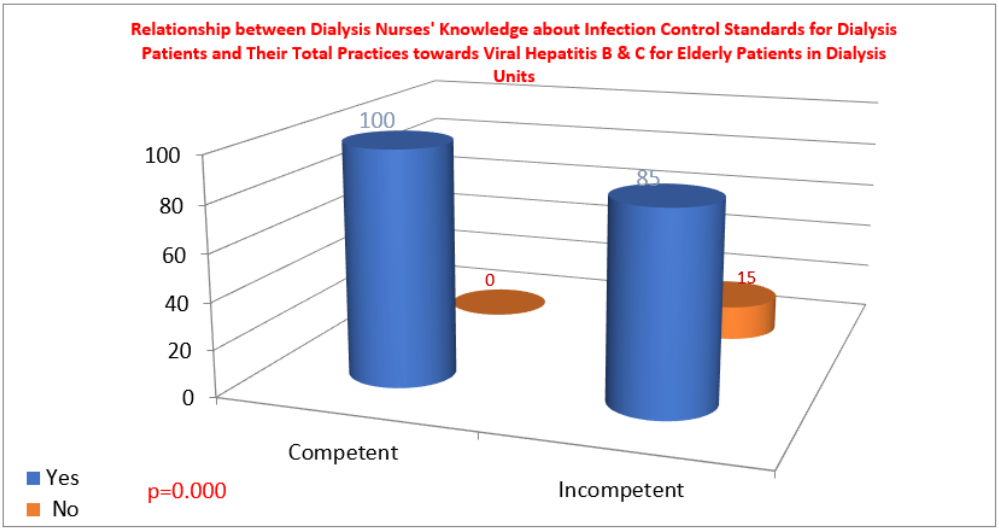

Figure 7: Relationship between Dialysis Nurses' Knowledge about Infection Control Standards for Dialysis Patients and Their Total Practices towards Viral Hepatitis B & C for Elderly Patients in Dialysis Units

6. Discussion

Advanced chronic kidney disease (CKD) progresses at a relatively slower rate in the elderly. The elderly population also experiences high rates of non-CKD related mortality. In fact, the risk of ESRD did not surpass the risk of death in those 65–84 years. Viral hepatitis is the most common cause of chronic liver disease in hemodialysis (HD) patients. The natural history of viral hepatitis B& C virus in HD patients remains unclear because the course of viral hepatitis infection typically extends over decades, although HD patients have higher morbidity and mortality rates compared with those without renal disease, limiting long-term follow-up [11-15].

The role of the professional nurse in preventing health care associated infections is significant. Nursing-sensitive indicators are actions and interventions performed by the nurse when providing patient care within the scope of nursing practice. These interventions are integral to the processes of nursing care and are often performed in collaboration with other members of a multidisciplinary health care team. Some of the most basic strategies resulting in positive patient outcomes include: the practice and promotion of hand hygiene, consistent use of aseptic technique, cleaning and disinfection practices, use of standard precautions, patient assessment and additional precautions, patient education, use of safety devices and removal of unnecessary invasive devices [16-20].

The results of the current study show that, (92.1%% and 93.4%) of the dialysis nurses place all disposable syringes and needles, scalpel blades, and other sharp items in puncture- resistant containers and wear the special uniform mandatory for all workers of the unit, respectively. While, (67.1% and 71.1%) of them don't commit to well-groomed uniforms while maintaining personal hygiene and not using external accessories and don't use the one hand method, respectively.

The results of the current study finding that answered the research question "What is nursing staffs' level of practice regarding preventive measures of viral hepatitis transmission in hemodialysis unit (HDU)?" It revealed that majority of the dialysis nurses place all disposable syringes and needles, scalpel blades, and other sharp items in puncture- resistant containers and wear the special uniform mandatory for all workers of the unit, respectively. While, less than three quarters of them don't commit to well-groomed uniforms while maintaining personal hygiene and not using external accessories and don't use the one hand method, respectively.

The study findings were consistent with **Boatman & Markley (2022)** study entitled "evaluation of nurses' practices throughout hemodialysis treatment for patients in hemodialysis unit at teaching hospitals" which revealed that there was a deficit in the nurses' practice that should be applied to the patient throughout hemodialysis treatment [21]. It was also agreed with the study by **Jenkins & Wilkie (2022)** at 14 HDUs in Saudi Arabia, which revealed that neither infection prevention and control competencies nor compliance with dialysis standards and guidelines were satisfying [22].

As regard hygienic precautions, results showed that minority of dialysis nurses only observed to wash hands before and after contact with patient respectively despite the percent of the majority and less than three quarters of studied subjects that knew that they should always wash their hands after and before using gloves respectively. The researcher interpreted the poor compliance to hand hygiene may be attributed to lack of continuous and efficient in-service training and absence of supervision. Barriers of good compliance also includes unavailability of alcohol rub in the dialysis rooms, increased workload, lack of motivation, weak sense of self-efficacy, absence of leader in their units who takes the lead in education and the promotion of hand hygiene.

On the same vein, **El-Enein & El Mahdy (2019)** study which was done among nurses in the dialysis unit of a University Hospital in Alexandria, Egypt, revealed that less than half of nurses (47.1%) correctly knew that they had to wash their hands before and after caring for a patient. This is may be as a result of absence of continuous education as revealed by the researchers that none of the nurses received any training program about infection control [23].

On the other hand; a study done by **Young & Siddiqui (2019)** observed patient care across hemodialysis facilities enrolled in the National Opportunity to Improve Infection Control in ESRD (end-stage renal

disease) (NOTICE) project in order to evaluate adherence to evidence-based practices aimed at prevention of infection and include thirty-four hemodialysis facilities [24]. Results regarding overall adherence to hand hygiene practice was (72%) and compliance to hand hygiene before and after procedures was high **Mosby's (2020)** In accordance with the study results, study showed that none of the nurses (0%) washed hands before and after the different activities that required hand washing or the use of plastic aprons or face protection among nurses in the dialysis unit in a University Hospital in Alexandria despite that (47.1%) correctly knew that they had to wash their hands before and after caring for a patient in [25]. On the other hand; a study done by **Neugarten (2020)** observed patient care across hemodialysis facilities enrolled in the National Opportunity to Improve Infection Control in ESRD (end-stage renal disease) (NOTICE) project in order to evaluate adherence to evidence-based practices aimed at prevention of infection and include thirty-four hemodialysis facilities [26]. Results regarding overall adherence to hand hygiene practice was (72%) and compliance to hand hygiene before and after procedures was high.

Many infection control measures, such as appropriate hand hygiene, consistent use of aseptic technique, cleaning and disinfection practices are simple and of low-cost, but require staff accountability and behavioral change, in addition to improving staff education, reporting and surveillance systems Nurses must be skilled in renal nursing, maintain a high standard of clinical practice, have excellent communication skills, and develop their individual leadership and management abilities. Nurses should be involved in multiprofessional discussions where decisions are made about changes in patient treatment. In addition, nurses require the clinical skills and competencies to manage renal patients in different stages of their illness and on particular RRT modalities [27-30].

Erasing HCV& HBV from hospital environment is essential for preventing its spread to patients. As an enveloped virus, HCV is fragile outside the human body and sensitive to most of the antiseptics and disinfectants, including hydro-alcoholic solutions used for hand disinfection. However, in plasma, it can survive in room temperature for at least 16 hours (on equipment, clothing, and so on); it is why hypochlorite solution should be used as surface disinfectant for blood contaminated spills [31].

Regarding the relationship between socio-demographic characteristics of the dialysis nurses and their total knowledge about viral hepatitis B & C for elderly patients in the dialysis units, the results of the current study revealed a statistically significant relation between dialysis nurses' knowledge and their years of experience in dialysis unit ($p<0.05$). It is expected as one's knowledge will increase day by day as his experience and knowledge enhanced by exposure to situations every day as well as attending training programs and opportunity to viewing the courses and medical journals.

7. Conclusion

Most of dialysis nurses had incompetent practices regarding general preventive practices related to dialysis unit. There is highly statistically significant relation between dialysis nurses' practice and their education level, nurses' experience, attending training programs for improving nursing skills, participation in scientific conferences, and their knowledge about infection control standards for dialysis patients and their total practices towards viral hepatitis B & C for elderly patients in dialysis units.

8. Recommendation

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.

9. References

1. Jardine M, Zuo L, Gray N. (2021) hemodialysis hours on quality of life and clinical outcomes: the ACTIVE dialysis multinational trial. Paper presented at: ASN Annual Meeting.
2. Manns B, Johnson JA, Taub K, Mortis G, Ghali WA, et al. (2021). Quality of life in patients treated with hemodialysis or peritoneal dialysis: What are the important determinants? *Clin Nephrol* 60(5): 341-351.
3. Lawson, A. A study of the natural history of hepatitis C infection within a geographically determined population (Trent HCV study) (Doctoral dissertation, University of Nottingham).
4. MacLachlan, J, Cowie, B (2021), Hepatitis B Mapping Project: Estimates of chronic hepatitis B prevalence, diagnosis, monitoring and treatment by Primary Health Network National Report, Darlinghurst, NSW, *Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine*.
5. Specialist Panel on Chronic Hepatitis, (2020) B.i.t. M.E., A review of chronic hepatitis B epidemiology and management issues in selected countries in the Middle East. *J Viral Hepat*., 19(1): p. 9-22.
6. Ki, McAlister, VC (2020). "Clinical kidney transplantation: a 50th anniversary review of the first reported series". *American Journal of Surgery*. 190 (3): 485-488.
7. Hassan H., Mohammed S., Mohammed A., Ghanem S. (2024). Study Nurses' Knowledge about Fall Prevention among Elderly Women. *Journal of Orthopaedic Science and Research*, 5(1): 1-13.
8. Ghanem S., Mohammed A., Mohammed S., Hassan H. (2024). Relationship between Nurses' Practices Regarding Fall Prevention among Elderly Women and their personal Characteristics. *Journal of Orthopaedic Science and Research*, 5(1):1-7.
9. Hassan H., Ghanem S., Mohammed A., Mohammed S. (2024). Nurses' Knowledge and Practices about Fall Prevention among Elderly Women: Impact of Socio-demographic Characteristics. *Journal of Women Health Care and Issues*, 7(1):1-7.
10. Mohamed S., Omran A., Ramadan E., Hassan H. (2024). Effect of Kegal and Breathing Exercise adherence on Obstetrical History of Elderly Women with Urinary Incontinence. *Journal of Women Health Care and Issues*, 7(2): 1-8.
11. Hassan H., Ghanem S., Mohammed S., Mohammed A. (2024). Study Nurses' Practices Regarding Fall Prevention among Elderly Women. *Clinics in Nursing*, 3(1): 1-11.
12. Joukar, F., Mansour-Ghanaei, F., Soati, F., & Meskinkhoda, P. (2020) Knowledge levels and attitudes of health care professionals toward patients with hepatitis C &B infection. *World journal of gastroenterology*: WJG, 18(18), 2238.
13. Hassan H., Mohamed A., Saleh A., Mohamed M. (2023). Viral Hepatitis B&C in Hemodialysis Units: Preventive Practices toward Machine, Equipment, Environment and Waste Management. *Psychology and Mental Health Care*; 5(6): 1-9.
14. Mohamed M., Saleh A., Mohamed A., Hassan H. (2023). Hemodialysis Nursing Staffs' General Knowledge Regarding Elderly and Dialysis. *Psychology and Mental Health Care*, 7(5): 1-8.
15. Saleh A., Mohamed A., Mohamed M., Hassan H. (2023). Nurses' Knowledge regarding Preventive Measures for Viral Hepatitis B&C in Dialysis Unit. *American Journal of Epidemiology and Infectious Disease*, 11(1): 18-24.

16. Mohamed A., Mohamed M., Saleh A., Hassan H. (2023). Viral Hepatitis B&C in Elderly Hemodialysis Unit: Nurses' Related Preventive Practices. *World Journal of Preventive Medicine*, 11 (1): 10-15
17. Benson, S., & Powers, J. (2020). Your role in infection prevention. Nursing made incredibly easy, 9(3), 36-41.
18. Hassan H., Mohamed M., Saleh A., Mohamed A. (2023). Beni-Suef Elderly Hemodialysis Units: Nurses' knowledge and Preventive Measures Practices. *American Journal of Public Health Research*, 11(4): 67-73.
19. Ghanim S., Mohamed S., Mohamed A., Hassan H. (2024). Nurses' Knowledge and Practice for Reducing Falls among Older Adult Women. *Nile journal for geriatric and gerontology*, 7(1): 104-126.
20. Saleh A., Mohamed M., Mohamed A., Hassan H. (2023). Viral Hepatitis B&C in Elderly Hemodialysis Unit: Nurses' Related Knowledge. *Psychology and Mental Health Care*, 7(6): 1-8.
21. Mohamed M., Saleh A., Mohamed A., Hassan H. (2023). Viral Hepatitis B&C in Dialysis Units: Nurses' Preventive Practices. *World Journal of Preventive Medicine*, 11(1): 10-15.
22. Boatman, J. D., Stevens, M. P., & Markley, J. D. (2022). Infection Control in the Outpatient Setting. In Infection Prevention (pp. 47-71). *Springer*, Cham.
23. Jenkins, S., Shrestha, B., & Wilkie, M. (2022). Complications of Peritoneal Dialysis. In Primer on Nephrology (pp. 1425-1442). *Springer*, Cham.
24. El-Enein, N. Y. A., & El Mahdy, H. M. (2019). Standard precautions: a KAP study among nurses in the dialysis unit in a University Hospital in Alexandria, Egypt. *The Journal of the Egyptian Public Health Association*, 86(1 and 2), 3-10.
25. Young, J. D., Abdel-Massih, R., Herchline, T., McCurdy, L., Moyer, K. J., et. al., (2019). Infectious Diseases Society of America position statement on telehealth and telemedicine as applied to the practice of infectious diseases. *Clinical Infectious Diseases*, 68(9), 1437-1443.
26. Mosby's Dictionary of Medicine, (2020) Nursing, & Health Professions. 7th ed. St. Louis, MO; Mosby: 2020 /20.
27. Nies, M, Mc Neugarten J, Golestaneh L (2020). Gender and the prevalence and progression of renal disease. *Adv Chronic Kidney Dis* 20(5): 390-395.
28. Bouallègue, O., Naija, W., Said, H., Nouria, A., Jaidane, N., (2021). P233: Incidence of ICU acquired nosocomial infections in University Hospital of Sahloul (Sousse-Tunisia). *Antimicrobial Resistance and Infection Control*, 2(1), 1-1.
29. Ahmed M., Hassan H., Mohamed A., Saleh A. (2025). Knowledge and Practice of Nurses toward Preventive Measures of Elderly Patients with Viral Hepatitis B and C in the Dialysis Unit. *Nile journal for geriatric and gerontology*, 7(1): 70-92.
30. Hassan H., Saleh A., Mohamed A., Mohamed M. (2023). Hemodialysis Nursing Staffs' Knowledge Regarding Practices toward Viral Hepatitis B & C in Dialysis Unit. American Journal of Nursing Research, 11(3):110-117. DOI: 10.12691/ajnr-11-3-2
31. Hassan H., Saleh A., Mohamed A., Mohamed M. (2024). Viral Hepatitis C and B: Hemodialysis Nursing Staffs' Knowledge. American Journal of Epidemiology and Infectious Disease, 12(1)
32. Pozzetto, B., Memmi, M., Garraud, O., Roblin, X., & Berthelot, P. (2021). Health care associated hepatitis Virual infection. World journal of gastroenterology WJG, 20(46), 17265.

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