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ORIGINAL RESEARCH

Assessment of Nurse's Knowledge towards Infection Control in Hemodialysis Units

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ABSTRACT

Background: Hemodialysis is very important management model for patients with end-stage renal disease; and involve several invasive procedures, including (vascular access cannulation, connecting and disconnecting dialysis machines, managing catheters and administering intravenous medications). All of these actions increase risk of infection. The nurses should be application of aseptic techniques and consistent use of protective equipment, such as gloves, to protection both patients and healthcare providers. Nurses are dominant to preventing the spread of infections. Nurses requiring not only practical skills but also comprehensive knowledge of infection control measures. Their expertise and caution are crucial in maintaining patient safety and reduction the complications such as infection, the importance of continuous training and adherence to best practices in hemodialysis units.

Objectives: To assess nurses' knowledge concerning Infection control in Hemodialysis Units and to find out the relationship between nurse's knowledge and their demographic data.

Methodology: The study utilized a descriptive cross-sectional design conducted from October 18, 2023, to April 20, 2024, at the Hemodialysis Unit of Al-Sadder Medical City in Al-Najaf. A non-probability convenience sample of 62 nurses was included, focusing on those with at least six months of work experience in the unit. The research tool, developed and validated by the researcher, consisted of two parts: demographic characteristics (e.g., age, gender, education, and training) and 25 items assessing knowledge of infection control strategies and practices. The questionnaire was translated into Arabic and validated through expert review and a pilot study, yielding a Cronbach's alpha of 0.87. Data collection occurred from February 5 to February 20, 2023, using semi-structured, self-reported questionnaires, with strict adherence to ethical guidelines, including informed consent and confidentiality. Knowledge levels were classified as poor or good based on a scoring system, providing a robust framework for evaluating nurses' infection control knowledge.

Results: The majority of nurses (77.4%) demonstrated poor knowledge concerning infection control, with a mean score of 1.42, below the acceptable threshold of 1.5. Only 22.6% showed good knowledge, indicating a significant gap in infection control understanding.

Conclusion: The study findings point to critical areas requiring intervention to improve nurses' knowledge about the infection control in hemodialysis units. Also, a significant association between level of education and their knowledge highlights the importance of providing nurses with opportunities for formal education and advanced training.

Recommendations: Nurse in hemodialysis units must take the opportunity for continuing their education to maintain knowledge and skills

Keywords: Assessment; Nurse's Knowledge; Infection Control; Hemodialysis Units.

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INTRODUCTION

An infection is considered nosocomial if becomes obvious 48 hours or more after hospital admissions or within thirty days of discharge from the hospital. The best clinical care in the world will be worthless if patients pick up other infections from the hospital Infections, arising in hospitals, are termed as hospital associated infections. Such infections also called as 'Nosocomial Infections' and sometimes 'Hospital Acquired Infections'. As more health care is now provided in ambulant patients, it is also termed as 'Healthcare Associated infections' (Silva, 2018).

The infection is second leading cause of death in hemodialysis unit the sepsis indicted for long hospital sitting to patient the, the nurse in (HD) is paly main role in infection control. the venous catheter or vascular access is the first causes of infections but have found other causes of infection in hemodialysis unit include the blood contamination from environmental sources. Nosocomial transmission multidrug-resistant organism is far more possible in dialysis' patients than the general patients. Clostridium difficile and hepatitis B virus, hepatitis C virus, and/or human immunodeficiency virus; and airborne infections are both more prevalent in hemodialysis facilities than other care settings, and transmission between patients is a significant risk. the hand hygiene and stander precaution are the very importance in hemodialysis unit to break the chin of infection and decrease of transmission (Ebrahim et al., 2023).

In hemodialysis unit most of procedure is invasive that need for more a septic technique example for this procedure insertion of cannulation, connect and disconnect of machine, needle of intra veins medication and hemodialysis catheterization all of this procedure needs from nurse wearing gloves to protect them self and patient from infection, the nurse should be more knowledge and skills to manage and prevent of infection transmission (Ebrahim et al., 2023). The staff in hemodialysis high risk to sharp injures hazards such as body fluid, blood -borne pathogens, e.g., HBV, HCV and HIV, may occur during inject of patient or cover of needle or exposure to harmful chemical the health and safety department in the hospital should be ensure all staff is knowledge and understand how to protect them self and patient from this infection transmission. Many infection control procedures, such as suitable hand hygiene and correct application of basic precautions during invasive procedures are simple and low-cost, but require staff accountability and behavioral change, in addition to improving staff education, reporting and surveillance systems.

To apply these protections, the human component plays an important role in increasing or decreasing the probabilities of communicable HCAI. Thus, acceptable nursing staff is necessary because a higher patient-to nurse ratio increasing the risk of nosocomial infection (Muhaibes; YASSIN et al., 2018). To protect the patient in the hemodialysis (HD) the CDC with an American Society of Nephrology aim to target zero infections in hemodialysis facilities. The nurse a play main role and direct response from all hemodialysis patient and to be knowing and understand about the essential infection prevention and how to break the transmission of pathogen, these links, causative agent infectious reservoir, portal of exit from the reservoir, mode of transmission, portal of entry into host and susceptible host (Ebrahim et al., 2023; Salem, 2019). Personal protective equipment (PPE) Gloves, gowns, surgical masks, goggles/ face shields should be used in dialysis unit and the patient should be wear mask and the choice of PPE depend of the patient condition, should be change as soon as possible if contamination of blood or body fluid lastly the PPE id disposable not used again.

In hemodialysis most be give importance to equipment and instrument to assist in protection of transmission of infection in this unit clinical equipment and other items should be disposed and used for one patient, when to give patient medication in hemodialysis first wash hand, proper preparation and

single use of injection. Environmental control and Waste management is the last two point in the infection control in hemodialysis unit measure containers for waste should be available at the point of use, sharps container and the staff should be caution to prevent of injury, hemodialysis fluid should be disposed directly into a drain (Organization, 2021). Health care professionals are constantly exposed to microorganisms. Many of which can cause serious or even lethal infections (YASSIN et al., 2018).

Nursing professionals play an important role in the prevention and control of hospital infections since they carry out direct contact with the individual, invasive and potentially contaminated procedures, as well as the manipulation of patient equipment, instruments and medications (Chitimwango, 2017; Salem, 2019). To prevent of infection in hemodialysis have many measure to be knowing and practicing by the nurse and other health care staff this measure firstly place and facility setting special area for rest, drink and eat, clean room for special procedure like dressing, intra veins of medication, storage of drugs supplies and equipment, specific area for remove protective equipment, area for infected patient after to prepare the sitting the hand hygiene is importance to minimize transmission of the infection in hemodialysis unit and is the basic in the steps of standard Precautions, the World Health Organization (WHO) is recommended to use of hand hygiene before and after touching a patient or surroundings patient, Before clean/ aseptic procedures and After body fluid exposure risk. If the hand is not soiled the nurse can use alcohol-based hand rub (Agrawal et al., 2022).

Assessment level of nurses' knowledge and practice about infection control technique is vital action to control infection in hospital. Patient who admitted hospital usually are highly susceptible to infection. Thus, the application of universal precautions protected staff, patients and environment from infection it is restricted uses in hospital to promote patient safety and decrease risk (Tafere et al., 2023). All nurses, in all roles and settings can demonstrate a leadership in infection prevention and control by using their knowledge, skills, and judgment to initiate appropriate and immediate infection control procedures. WHO classified some role of nursing staffs for infection control. Nurses at different levels, namely: the senior nursing administrator, the ward charge nurse and the nurse in charge of infection control. In addition, control committee needs to be established for developing training programmer for members of the nursing staff; supervising the implementation of techniques for the prevention of infections. An effective knowledge about hospital infection and prevention can reduce the rate of infection and its consequence (Kubde et al., 2023).

METHODOLOGY

A descriptive Cross-Sectional Design was implemented in the current study to achieve the stated objectives. The study started from October 18th, 2023, and is expected to conclude by April 20th, 2024. The study was conducted in Al-Najaf City/Al-Najaf Al-Ashraf Health Directorate at Al-Sadder Medical City - Hemodialysis Unit. A Non-Probability (Convenience Sample) of 62 nurses was included in the study, selected from the Hemodialysis Units.

Study Population and Sampling:

The target population includes nurses working in hemodialysis units in Al-Sadder Medical City. Inclusion criteria encompass registered nurses actively employed in the unit for at least six months, while exclusion criteria rule out interns and nurses on extended leave during the data collection period.

Instrument Development:

An assessment tool was developed and validated by the researcher to evaluate nurses' knowledge concerning Infection Control in Hemodialysis Units. The tool consists of two parts:

Part I: Demographic Characteristics: Eight items are included, covering age, gender, level of education, participation in training sessions, location of training, number and duration of training sessions, and years of experience in the Hemodialysis Unit.

Part II: Nurses' Knowledge Concerning Infection Control: This section includes 25 items assessing knowledge about infection control strategies, use of personal protective equipment (PPE), and general principles of infection control. Items are structured on a two-point Likert scale (poor/good) to classify knowledge levels.

Data Collection:

Data was collected between (February 5th and February 20th, 2023), by using semi-structured questionnaires administered directly to participants. The researcher explained the study's objectives and obtaining informed consent from participants.

Ethical Considerations:

The study received approval from the Al-Najaf Health Directorate's Ethics Committee. Written informed consent was obtained from all participants. Participants were assured of their right to withdraw from the study at any point without consequences.

Data Analysis:

The collected data were analyzed using SPSS software version 19 and Microsoft Excel 2010. Statistical methods employed included:

Descriptive Statistics:

Frequencies, percentages, means, and standard deviations to summarize demographic and knowledge data.

Inferential Statistics:

Pearson's Correlation Coefficients to examine relationships between variables, and Chi-Square tests (X^2) to assess associations between nurses' knowledge and demographic characteristics.

Scoring System:

Nurses' knowledge was classified as poor (mean score < 1.5) or good (mean score ≥ 1.5) based on their responses to the questionnaire items. Results were presented in tabular form with accompanying interpretations.

RESULTS

Table (1) shows that the majority of the study sample (70%) are within (23-30) years old. Regarding gender, the study results revealed that the majority (61.3%) are female and remaining are male. In addition, the study results present that (48.4%) of the sample are college, while (32.3%) are institute graduate. additionally, the study results reveal that (83.9%) of the sample are haven training sessions in hemodialysis units that was most of training sessions inside of Iraq. In regards to number of training sessions, (77.4%) of the study sample are have one to five training sessions in hemodialysis units. While concerning duration of training sessions (50%) is between (1-12) day. additional to highest percentage (48.4%) at Years of experience (2-6) years and lowest percentage (6.5%) more than (13) years.

Table (2) shows that the overall assessment for nurses' knowledge was poor.

While table (3) shows that there is a non-significant relationship between the nurses' knowledge and their demographic data except with their level of education at p-value 0.002.

DISCUSSION:

The demographic data reveals that most of the nurses (70%) fall within the age group of 23–30 years, with females representing 61.3% of the sample. Nearly half of the participants (48.4%) held a college-level education, and the majority (83.9%) reported participating in training sessions, primarily conducted within Iraq (80.6%). The duration of these training sessions most commonly ranged from 1 to 12 days (50%). Additionally, 48.4% of the nurses had between 2–6 years of experience. These findings highlight a workforce in hemodialysis units that is relatively young, predominantly female, and moderately experienced.

The results agreed with existing many studies on the critical role of demographic factors, such as (age, level of education, and training), on nurses knowledge and practices. Alanazi et al., 2022

emphasized that younger nurses with higher level of education tend to have a stronger grasp of infection control protocols.

Also; (Singh et al., 2023) found that the training sessions play an essential role in improving adherence to infection prevention procedures. Additionally, study done by (Rababa et al., 2022) confirmed that the educational interventional programs for younger nurses significantly enhance their understanding about infection control. However, the study's finding that most training occurred domestically (80.6%) may point to a gap in exposure to global best practices, as highlighted by (Soomro et al., 2024) and their results emphasize that the international training experiences are very important.

Furthermore; the current study results revealed that the overall assessment of nurses' knowledge of (77.4%) exhibiting poor knowledge towards the infection control and a mean score of 1.42, which falls below the acceptable threshold of 1.5. Only 22.6% of the participants with good knowledge. These results emphasize the urgent need for targeted educational programs to address knowledge deficits.

Lowe et al., 2021 identified inadequate knowledge as a significant barrier to effective infection prevention in hemodialysis units. Hammoud et al., 2021; also highlighted the positive impact of periodic evaluations and training programs on improving nursing competency. Moreover, (Naik, 2022, Esposito et al.2022) reported that a direct correlation between poor knowledge about infection control and increasing the incidence of healthcare-associated infections (HAIs).

Bridging this knowledge gap is, therefore, crucial not only for reducing HAIs but also for enhancing overall patient safety and healthcare quality. Finally; the analysis of the relationship between demographic characteristics and nurses' knowledge revealed a significant association only with education level (p-value = 0.002). This indicates that higher education levels are strongly linked to better infection control knowledge. These findings align with previous research by (Yao, 2021), which highlighted the positive influence of advanced education on nurses' understanding of infection prevention protocols. Similarly.

CONCLUSIONS:

The results of the study indicate important aspects that need to be changed to improve nurses' knowledge of infection control in dialysis units. Addition to; a significant association between level of education and knowledge. Regular and comprehensive training courses, and exposure to international training practices, are essential to address these knowledge gaps and reduce infection risks in healthcare settings.

RECOMMENDATIONS:

Nurse in hemodialysis units must take the opportunity for continuing their education to maintain knowledge and skills, and Proper guidelines for the qualifications and training of infection control nurses should be clearly delineated within the proposed legislation, and the role and authority of infection control nurses must be established. The infection control nurse needs to be a major part of an audit system that ensures high compliance with infection control standards.

REFERENCES:

Agrawal, A., Ison, M. G., & Danziger-Isakov, L. (2022). Long-term infectious complications of kidney transplantation. *Clinical Journal of the American Society of Nephrology*, 17(2), 286-295.

Alanazi, O. A., Alharbi, M. H., Al Dawsary, B. M. M., Albishi, S. H., Al Zaher, Z. H., Alresheedi, F. A., Alotibi, J. D., Alanazi, A. S., Al Dawsari, M. S., & Aldosari, K. G. (2022). THE ROLE OF NURSES IN PREVENTING HOSPITAL-ACQUIRED INFECTIONS. *Chelonian Research Foundation*, 17(2), 1922-1931.

Chitimwango, P. C. (2017). Knowledge, attitudes and practices of nurses in infection prevention and control

within a tertiary hospital in Zambia Stellenbosch: Stellenbosch University].

Ebrahim, E. E., Palanivelu, P., Eltayeb, M. M., Vellaiyan, A., & Sobeh, D. E. S. (2023). Assessment of Nurse's knowledge about the Infection Control in the Hemodialysis (HD) Unit. *Journal of Pharmaceutical Negative Results*, 2022-2028.

Esposito, D., Schaumann, D., Rondinelli, M., Kalay, Y. E., Curtin, K. M., & Mitchell, P. Modeling and Simulating the Impact of Human Spatial and Social Behavior on Infection Spread in Hospitals. In Collective Spatial Cognition (pp. 251-277). *Routledge*.

Hammoud, S., Khatatbeh, H., Zand, A., & Kocsis, B. (2021). A survey of nurses' awareness of infection control measures in Baranya County, Hungary. *Nurs Open*, 8(6), 3477-3483. https://doi.org/10.1002/nop2.897.

Kubde, D., Badge, A. K., Ugemuge, S., & Shahu, S. (2023). Importance of Hospital Infection Control. *Cureus*, 15(12), e50931. https://doi.org/10.7759/cureus.50931.

Lowe, H., Woodd, S., Lange, I. L., Janjanin, S., Barnet, J., & Graham, W. (2021). Challenges and opportunities for infection prevention and control in hospitals in conflict-affected settings: a qualitative study. *Confl Health*, 15(1), 94. https://doi.org/10.1186/s13031-021-00428-8.

Muhaibes, A. S. K. F. J. Comparative study of nurses' knowledge regarding preventive measures and precautions of viral hepatitis B & C at hemodialysis units among southern provinces of Iraq. *Turkish Journal of Physiotherapy and Rehabilitation*, 32, 3.

Naik, S. (2022). Mentoring Infection Preventionists: An Infection Prevention Practice Fellowship Program.

Organization, W. H. (2021). Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed: interim guidance, 12 July 2021.

Rababa, M., Bani-Hamad, D., & Hayajneh, A. A. (2022). The effectiveness of branching simulations in improving nurses' knowledge, attitudes, practice, and decision-making related to sepsis assessment and management. *Nurse education today*, 110, 105270.

Salem, O. A. (2019). Knowledge and practices of nurses in infection prevention and control within a tertiary care hospital. *Annals of Medical and Health Sciences Research* 4p.

Silva, R. d. (2018). Atuação da enfermagem na prevenção e controle de infecção relacionada à assistência à saúde= actuation of nursing in the prevention and control of infection related to health care Universidade Brasil].

Singh, S., Kaur, K., Saini, R. S., Singh, S., Aggarwal, H. K., & Chandra, H. (2023). Impact of structured training program about Hospital Infection Control practices on Knowledge and Perception of nursing students at public and private nursing teaching institute of Northern India- An interventional study. *J Educ Health Promot*, 12, 168. https://doi.org/10.4103/jehp.jehp_1471_22.

Soomro, A., Junejo, Z., Soomro, P., Soomro, P., & Bashir, M. (2024). Knowledge and Practice of Standard Infection Control Precautions among Staff Nurses at Isra University Hospital, Hyderabad. *Pakistan Journal of Multidisciplinary Innovation*, 3(2), 1-8.

Tafere, T. Z., Belachew, T. B., Feleke, D. G., & Adal, G. M. (2023). Assessment of knowledge and practice of nurses regarding infection prevention and associated factors at Debre Tabor Comprehensive Specialized Hospital, Northwest Ethiopia. *Front Public Health*, 11, 1225570. https://doi.org/10.3389/fpubh.2023.1225570.

Yao, T. (2021). An Investigation of Breastfeeding Knowledge, Attitude, and Promotion Intention Among Chinese Healthcare Professionals in China. Oklahoma City University.

YASSIN, S. I., SOLIMAN, M., Hoda, I., OSMAN, N. A., & SALMA, A. (2018). Assessment of infection control knowledge and practices among hemodialysis nursing staff in Kasr Al-Ainy Hospitals. *The Medical Journal of Cairo University*, 86(June), 1649-1656.

TABLES:

Table (1): Demographic Characteristic of The Study Sample

Demographic data	Rating and intervals	Frequency	Percent
Age / Years	Less than 22	4	6.5
	23 - 30	44	71
	31 - 37	6	9.7
	38 - 45	5	8.1
	46 and more	3	4.8
	Total	**62**	**100**
Gender	Male	24	38.7
	Female	38	61.3
	Total	**62**	**100**
Levels of educations	Nursing School	8	12.9
	institute	20	32.3
	College	30	48.4
	Post graduate	4	6.5
	Total	**62**	**100**
Training sessions	Yes	52	83.9
	No	10	16.1
	Total	**62**	**100**
Location	No	10	16.1
	Inside Iraq	50	80.6
	Outside Iraq	2	3.2
	Total	**62**	**100**
Number of training sessions	No	10	16.1
	1 - 5	48	77.4
	6 - 10	2	3.2
	11 and more	2	3.2
	Total	**62**	**100**
Duration of training sessions / days	No	10	16.1
	1 - 12	31	50
	13 - 24	8	12.9
	25 and more	13	21
	Total	**62**	**100**
Years of experience in hemodialysis Units	1	21	33.9
	2 - 6	30	48.4
	7 - 12	7	11.3
	13 an more	4	6.5
	Total	**62**	**100.0**

Table (2): Overall Assessment of Nurse's knowledge concerning Infection Control

Main domain	Rating	Frequency	Percent	M. S.	Assessment
Overall knowledge	Poor	48	77.4	1.42	Poor
	Good	14	22.6		
	Total	62	100		

M.S (mean of scores), poor (mean of score less than 1.5), good (mean of score more than 1.5).

Table (3): Relationship between the Nurses' Knowledge and their Demographic Characteristic

Demographic Data	Chi-Square Value	D.F.	P-Value
Age / Years	4.304	4	0.366
Gender	0.972	1	0.324
Levels of Education	14.570	3	0.002
Training Sessions	0.045	1	0.831
Location	0.908	2	0.635
Number of Training Sessions	1.485	4	0.829
Duration of Training Sessions	6.694	4	0.153
Years of Experience	1.365	4	0.850

NS: Non-Sig. at P>0.05, S: Sig. at P<0.05, HS: high significant at p-value less than 0.01.