Original Article

Nurses' Knowledge regarding Safety Measures toward Blood Borne Diseases in Hemodialysis Units, At Khartoum State- Sudan (2021- 2022)

Aldowha Mohammed Aldowha [1], Higazi Mohammed Ahmed[2], Hanadi Mohammed Elhassen Mukhtar[3]
[1]PhD Nursing science candidate- Al Neelain University, 2022.
[2] Associate professor medical surgical nursing- Karary University.
[3] Assistant professor pediatric nursing - Al Neelain University.
Corresponding author: Aldawaha Mohammed Aldawaha, PhD Nursing science candidate- Alneleen University, Khartoum, Sudan, 2022,
Email address: abonhal19843@gmail.com, Cell phone No: 002499115237603, 0024910429729

Abstract

Background: Nurses play an important role at the dialysis units, they are the key health caregivers responsible for applying the foremost skills and principles of infection control steps throughout the process of hemodialysis. This may reflect their attitude and knowledge of infection control principles.The **aim of** this study to assess nurses' knowledge regarding safety measures towards blood borne diseases in hemodialysis units.

Methods: This is a descriptive, cross-sectional hospital based study, conducted at Khartoum main haemodialysis centres- Khartoum State, Sudan. Six main public hospitals were selected, plus the hospitals that provide haemodialysis. Seventy nurses providing haemodialysis were enrolled in this study, data was collected using self-administered questionnaire with an observational check list for data collection, data analysis was carried out using the statistical package for social sciences (SPSS), and the results were presented in descriptive and numerical forms as well as cross table P value considered significant at (0.05).

Result: This study, revealed that participant nurses have poor knowledge about hand washing 34 (48.6) and mode of transition 29 (41.4%). The common causes of blood borne diseases was 34 (48.6%), while their knowledge was inadequate towards diseases that can be transmitted through blood 40 (57.1%). There is significant relationship between the course and efficiency of sterilization of the dialysis machine *P-value* < 0.031.

Conclusion: The study concluded that total knowledge of participant was inadequate in spite of that they missed some information about infection control such as hand washing, methods of transmission and sterilization of machine. The study recommend regular in- service training for staff by workshop, seminar and audit regarding establishment and activation of infection control unit in each hospital, and have to employ qualified staff with supervised practice and establish standardize check list and guidelines.

Keywords: blood borne diseases, nurses, knowledge, safety measures

Introduction

End stage renal disease (ESRD) is a common problem worldwide, the majority of patients with his condition are on hemodialysis [(1).] In the United States, over 661,000 people have kidney failure, of whom 468,000 enrolled in dialysis and 193,000 have a functioning kidney transplant [(2).] Most patients who require renal replacement therapy undergo hemodialysis (HD). By the year 20 around 750,000 patients are expected to possess end stage renal disease (ESRD), and over 500,000 would require hemodialysis [(3).]

Various complications may occur in patients who are on hemodialysis or abdominal catheters in patients who are using continuous ambulatory

peritoneal dialysis (CAPD) [4]. These vascular access complications those seen in patient with a vascular surgical procedure (eg, bleeding, local or disseminated intravascular infections [DIC], vessel [graft] occlusion). The native peripheral vascular system can be affected by higher rates of amputation and revascularization procedures. Peritoneal dialysis catheter exposes patients to peritonitis risk and local infection, as it act as a foreign body and provides a gateway of entry for pathogens from the external environment [5].

Hemodialysis (HD) is related to considerable morbidity and mortality. Infections Account for about 15% of all deaths during this Population. The blood borne diseases have high mortality and morbidity rates, especially among patients with renal failure because they have low immunity. The incidence rate of renal Failure is11/10,000/year while the annual mortality rate is 7.3/10,000/year [4]. Due to its invasive procedure patients on hemodialysis (HD) are at high risk of infections. Infections acquired in dialysis units can prolong hospitalization date and/or prolong illness in patients, and increase treatment cost. There are no adequate data on the prevalence of Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections in HD patients. [6]. Common serious blood born diseases (BBD) encountered during hemodialysis include hepatitis B virus (HBV), hepatitis C virus (HCV) and human deficiency virus (HIV), malaria and hemorrhagic viral infections. Wright in1999 found that hepatitis outbreaks in hemodialysis patients and staff were reported in the late 1960s [7.].

Nurses play an important role in dialysis unit, they are the key health caregivers, responsible about applying the foremost skills and principles of infection control steps throughout the process of hemodialysis, and this may reflect their attitude and knowledge of infection control principles [8].

Senior nursing leaders, alongside with other organizations, must make sure that the healthcare facility provides enough resources to enable people for a consistently adherence to infection prevention practices. As practice of every nurse can be demonstrated by the care they provide. Teams for care provision are role models for other nurses and other disciplines [9].

Methods

This is descriptive cross sectional, Hospital based study was carried out in hemodialysis centres in Khartoum State. The total number of centres examined was35. They constituted all the available haemodialysis centres in Khartoum State at the time of the study. The study was conducted in 6 public hospitals selected main hospitals, provide haemodialysis in Khartoum State, including ;(East Nile Hospital located Al Khartoum Bahri, Ahmed Gasim Hospital, Bashier Teaching Hospital, Ibn Sina Specialized Hospital, Tropical Diseases Teaching Hospital and Ombada Teaching Hospital) .The targeted populations was all nurses working in the Hemodialysis units in the six main hospitals. Both gender during study period and willing to participate (70).). A designed structured, self-administered close ended questionnaire was used to collect the data from study subjects. Rational scaling was used (adequate, inadequate, poor knowledge) adequate knowledge for more or equal 75percent inadequate knowledge for more or equal 50percent Poor knowledge for less than 50 percent [12]

The tool was examined by expertise in the field of the study and their comments about content and context was considered. Piloting was done among 10 nurses and alpha Cronbach's test was 84%. Data was analyzed by using statistical package of social program (SPSS) P value considered significant at (0.05).The research was respected the rights of participants, Consent was obtained from all participants after explanation.

Result

Table (1): Demographic data of Study group

Item				
Qualification	**Diploma**		**Bachelor**	**Master**
	23(32.9%)		37 (52.9%)	10 (14.3%)
Gender	**Male**		**Female**	
	20 (28.6 %)		50 (71.4%)	
period of experience in Hemodialysis	< One Year		1-5 Years	> 5 Years
	11 (15.7%)		16 (22.9%)	43(61.4%)
Attend training course about infection control In Hemodialysis	**> 2 Years**	**Twice**	**Once**	**None**
	20 (28.6 %)	15 (21.4%)	23(32.9%)	12 (17.1%)
last training course attend	**< One Year**		**1-3 Years**	**> 3 Years**
	20 (28.6 %)		22 (31.4%)	29(40 %)
Source of information regarding infection control in Hemodialysis	Conference		Journals Articles	University
	15 (21.4%)		14 (20.0%)	41 (58.6%)

Table 2: level of knowledge of study group about blood transmitted disease

Item	Using of PPP			
	Never	**Rare**	**Always**	**Usually**
Gloves	7(10%)	0.00%	48 (68.6%)	15(21.4%)
protective glasses	51 (72.9 %)	11(15.7%)	4 (5.7%)	4 (5.7%)
Facemask	17(24.3%)	3(4.3%)	29 (41.4%)	21(30%)
Face shield	59 (84.3%)	5(7.1%)	2 (2.9%)	4 (5.7%)
apron gowns	39 (55.7%)	9(12.9)	11(15.7%)	11(15.7%)

Table 3: personal protective equipment using by study group

Item	Level of knowledge		
	Adequate	**Inadequate**	**Poor**
Situation of wash hands	26(37.1%)	10 (14.3%)	34(48.6%)
Blood transmitted disease	14 (20.0 %)	40 (57.1%)	16 (22.9%)
Rout of Transmission	27 (38.6%)	14 (20.0%)	29 (41.4%)
Common causes of blood borne disease among nurses	17 (24.3%)	14 (20.0%)	39 (55.7%)
Efficiency in sterilization of dialysis machine	20 (28.6%)	27 (38.6%)	23 (32.9%)

Table 4: Frequency of using infection control precaution by study group

Item	Frequency of using infection control precaution			
	Never	**Once**	**Twice**	**Three Or More**
Contact with positive Accidental patients	55(78.6%)	9(12.9%)	9(12.9)	2(2.9%)
Accidental injured by needle	51 (72.9%)	13(18.6%)		6 (8.6%)
Accidental contact with patient blood	37(52.9%)	15(21.4%)	10(14.3%)	8(11.4%)
Frequency screening for Virology examination	**Monthly**	**Every Three Month**	**Every Six Month**	**Annually**
	5(7.1%)	58(82.9%)	4(5.7%)	3(4.3%)

Table (5) total knowledge of the study group

Item			
	Mean	**Std. Deviation**	**Level of knowledge**
Situation of wash hands	2.0286	.65875	Inadequate
Blood transmitted disease	2.0145	.89923	Inadequate
Rout of Transmission	2.3143	.84344	Poor
Common causes of blood borne disease among nurses	2.0429	.78824	Inadequate
Efficiency in sterilization of dialysis machine	2.2429	1.06914	Poor

Table (6) Cross tabulation between Training course and efficiency

Item					**Total**	**P Value**
		Good Knowledge	**Satisfied Knowledge**	**Poor Knowledge**		
Training course	< one year	**11**	**7**	**2**	**20**	**0.03**
	1-3 years	**5**	**7**	**10**	**22**	
	> 3 years	**4**	**12**	**11**	**27**	
	4.00	**0**	**1**	**0**	**1**	
Total		**20**	**27**	**23**	**70**	

Table (7) Cross tabulation between Training course and blood transmitted diseases

					Total	P value
		Adequate Knowledge	**Inadequate Knowledge**	**Poor Knowledge**		
Training course	**< One year**	4	2	14	20	0.319
	1-3 years	6	6	10	22	
	> 3 years	7	5	15	27	
	>4.00	0	1	0	1	
Total		17	14	39	70	

Discussion

This descriptive cross sectional hospital based study was conducted with aim to assess nurses' competences regarding safety measures for blood borne Diseases in Hemodialysis units, The present study reveal that, more than half of (52%) the study group have bachelor degree and most of them were female (71%) ,while the two third of them (61.4%) range of their experience was more than five years .Furthermore the training background of the study group in hemodialysis ,it was found that, most of the them (81.4%) were exposed to training during their work in hemodialysis, but only more than quarter (28.6%) of them were have training course in the last year . These findings was in agreement with the study done Ireland, it was found over half nurses in the sample had a qualification in renal dialysis and the majority had received an infection control education at orientation to their renal dialysis unit The study showed that less than half of respondents last received education in infection control within their unit in the previous 12 months, with a quarter not having received an education in their unit for 3 or more years [(11)].

the study justify that study group use personal protective equipment during the care of patient on hemodialysis as flow, they were always wear uses gloves 61 (87.1%) more than two third of them and face mask 60 (85.7%) only less than half of them, insipid of there was no protective glasses, Face shield and apron gowns These finding was in agreement, with study done in Sudan , which reveal that, every day, healthcare workers are exposed to dangerous and deadly blood borne pathogens through contaminated needle sticks. It is one of the greatest risks faced by the Frontline healthcare worker. The Independent Study Module is to inform nurses about the law, the additional protections it provides, and present other strategies the nurse can use to reduce occupational exposure to blood borne pathogens [(12)].

From the above finding it was concluded that, nurse and their patient were at risk blood borne contaminated, regarding level of knowledge of the study group the present study showed that nurse have poor knowledge about blood transmitted diseases because more than one third of them have no information about hand washing 4(48.6%), , Disease that can be transmitted through blood 29 (41.4%), common causes of blood borne disease among nurses 34(48.6%) while their knowledge was satisfied Disease that can be transmitted through blood 40 (57.1%) only. They were significant relationship between course and efficiency in sterilization of dialysis machine P-value < 0.031 and no significant relationship between course and blood borne P-value < 0.319

These finding was in agreement with study done in Egypt'. The study found that, healthcare workers had poor knowledge about Universal Standard Precautions Guidelines, and did not fully appreciate their occupational risk regarding hepatitis B infection, a set of recommendations was proposed for the formulation and implementation of standard precautions guidelines [(13)].the results indicated that more, These finding indication that nurse how poor level of knowledge about blood borne disease in which present them and their patient to contamination and effect their practices of patient outcome, also their information was form under gradate and not update, and also not provide to nurses personal protective equipment like, Insufficient personal protective equipment (PPE) e.g. gloves, face mask by (75.7%) and Unavailable waste management & safety box by (61.4%)

Conclusion

- The study concluded that total knowledge of participant was inadequate in spite of that they missed some information about infection control such as hand washing, methods of transmission and sterilization of machine.

- there was in significant relationship between course and blood borne disease and significant relationship between training course and efficiency p value

Recommendations

- By the hospital manager and head nurse have to activate in- service regular training for staff by workshop, seminar and audit. Establishment and activation of infection control unit in each hospital, and have to employ only qualified staff and supervise the newly staff.
- By the ministry of health and health authorities have to be establish standardize check list guidelines.

Acknowledgement

I most grateful to the selected hospitals at Khartoum state authorities for their consent and support.

I would like to thank all the hemodialysis nurse staff who helped me a lot in this work

I also thanks Alneleen University, Faculty of Nursing Sciences.

References

1- Bittl JA. Catheter interventions for hemodialysis fistulas and grafts. JACC: Cardiovascular Interventions. 2010; 3(1):1-11. https://pubmed.ncbi.nlm.nih.gov/20129561 / Accessed December 2020

2- United States Renal Data System. 2009 Annual Report United States Renal Data System. Available at http://www.usrds.org/. Accessed: December 2020

3- Suliman SM, Beliela MH, Hamza H. Dialysis and transplantation in Sudan. Saudi Journal of Kidney Diseases and Transplantation. 1995;6(3):312 https://www.sjkdt.org/article.asp?issn Accessed December 2020

4. Dahdaleh S, Malhotra P. Treatment of Central Nervous System Complications of Renal Dialysis and Transplantation. *Curr Treat Options Neurol*. 2019 (3):13. https://www.dialysisready.com/?gclid. Accessed February 2021

5. Campbell DJ, Johnson DW, Mudge DW, Gallagher MP, Craig JC. Prevention of peritoneal dialysis-related infections. *Nephrol Dial Transplant*. 2015 Sep. 30 (9):1461-72. https://pubmed.ncbi.nlm.nih.gov/25294849/ Accessed February 2021

6. Adane T, Getawa S (2021) The prevalence and associated factors of hepatitis B and C virus in hemodialysis patients in Africa: A systematic review and meta-analysis. PLoS ONE 16(6): e0251570. https://doi.org/10.1371/journal.pone.0251570 Accessed February 2022

7. Mohammed Ezzeldien,Assess the Patients' Knowledge about Safety Measures Related to BloodBorne Diseases in Haemodialysis Units, in Khartoum State, Sudan,Texila International Journal of Nursing, 5(1) 2019. DOI:10.21522/TIJNR.2015.05.01.Art004 Accessed December 2020

8. Karkar A (2018) Infection control guidelines in hemodialysis facilities. Kidney Res ClinPract 11(37): 1-3. doi: 10.23876/j.krcp.2018.37.1.1 Accessed October 2021

9. Carrico RM, Garrett H, Balcom D, Glowicz JB. Infection Prevention and Control Core Practices: A Roadmap for Nursing Practice. Nursing. 2018; 48(8):28-29. https://www.dettolarabia.com/common-infections/germs-and-illness-prevention Accessed December 2021

10. Aluko O., Adebayo A., Adebisi T., Ewegbemi M., Tolani A., et al. (2016): Knowledge, attitudes and perceptions of occupational hazards and safety practices in Nigerian healthcare workers. BMC Res Notes 9: 71. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4744628/ Accessed February 2022

11. Higgins M, Evans DS. Nurses' knowledge and practice of vascular access infection control in hemodialysis patients in the Republic of Ireland. J Ren Care. 2008 Jun; 34(2):48-53. doi: https://pubmed.ncbi.nlm.nih.gov/18498567/
Accessed December 2021

12. Yousif KI, Abu-Aisha H, Abboud OI. The effect of an educational program for vascular access care on nurses' knowledge at dialysis centers in Khartoum State, Sudan. Saudi Journal of Kidney Diseases and Transplantation. 2017; 28(5). https://www.sjkdt.org/article.asp?issn=1319-
Accessed October 2021

13. Bakry S, Mustafa A, Eldalo AS, Yousif M. Knowledge, attitude and practice of health care workers toward Hepatitis B virus infection, Sudan. International Journal of Risk & Safety in https://pubmed.ncbi.nlm.nih.gov/22751191/
Accessed Augusts 2021