

Effect of an Educational Programme on Dialysis Nurses' Knowledge and Practices Related to Blood Borne Diseases during Haemodialysis Procedures, in Khartoum State, Sudan

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Abstract

This study was conducted to assess the effects of the educational programme on knowledge and practices of nurses working in haemodialysis centres Khartoum State 2014-2016 about Blood Borne Diseases. There is a lack of knowledge and practices of nurses working in haemodialysis centres, which may lead to outbreaks of blood-borne diseases in haemodialysis patients and even the nurses themselves. Due to this, an educational programme was designed to solve this problem. The lack of knowledge and practices of nurses working in haemodialysis centres was the leading cause of blood-borne disease outbreaks. The general objective is to assess the impact of an educational programme about blood-borne diseases on knowledge and practices of nurses working in haemodialysis centres. Study design, Interventional quasi-experimental study design, health facilities based study. The total number of the study subjects in this study revealed that the knowledge of nurses in the haemodialysis centres regarding prevention of blood-borne diseases show significantly improved, the knowledge improved from $65 \pm 7.6\%$ to $75 \pm 6.6\%$ $P < 0.0001$ practices were improved from $42.8 \pm 3.5\%$ to $62.7 \pm 9.5\%$ $P < 0.0001$ after the application of the educational programme. We recommend applying the tested educational programme and raise haemodialysis nurses' awareness about infection control by periodic training and assessment. The limitations of this study are starting in 191 and ended by 140 the attrition rate is 26.7%.

Keywords: Educational Programme, Dialysis, Knowledge, Practices, Blood Borne Diseases, Haemodialysis.

Introduction

End-stage renal failure (ESRF) is a common problem worldwide and the majority of these patients are on haemodialysis. Bakry et al., 2012 found that the prevalence of HCV in dialysis patients varies considerably throughout the world, with reported prevalence ranging from 3.9% to 71%. The number of blood transfusions and the length of time on dialysis have consistently been associated with HCV prevalence. Healthcare workers had poor knowledge about Universal Standard Precautions Guidelines, and do 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 (1).

Bittl, 2010 found that more than 1 in 1,000 patients in the U.S. has end-stage renal disease, and most patients who require renal-replacement therapy undergo haemodialysis (HD). By the year 2020, more than 750,000 patients are expected to have end-stage renal disease (ESRD), and over 500,000 will require hemodialysis (2).

Doa'a et al., 2009 found that the knowledge, attitude and practices were showing a significant increase after health education intervention with higher percent change of the KAP. The reasons for non-compliance with the application of preventive measures to protect against BBP were lack of

resources, work overload and lack of training. Continuous education and in-service training on prevention of BBP transmission are mandatory to protect HCW (3).

Elamin et al., 2010 report that a national survey conducted in 2009 for chronic kidney disease in Sudan, showed that at that time, there were 41 active HD centres in the country serving the total of 2858 patients (4).

Foley and Leyden, 2012 found that since these guidelines were introduced, other blood-borne viruses, notably HCV and HIV have been discovered, and failures of infection control practices still lead to outbreaks of HBV in haemodialysis units. Also in 1972, the Rosenheim report in the UK established guidelines which included routine tests for hepatitis B surface antigen and isolation facilities for dialysing patients with hepatitis B virus which resulted in a dramatic fall in cases of hepatitis (5).

Suliman et al., 1995 wrote a report about renal replacement therapy in Sudan. Sudan is a large country with 30 million inhabitants. Peritoneal dialysis was started in 1968, while haemodialysis was started in 1973. At that time, there were only 16 haemodialysis machines serving 56 patients in two centres in Sudan. There were also 15 peritoneal dialysis beds for 70 intermittent peritoneal dialysis patients in three centres. Only a few patients were on continuing ambulatory peritoneal dialysis in Sudan. The first renal transplant was in 1974. Since then all the transplants have been from living donors. The scholars of Islam in Sudan oppose to a donation from cadavers. There are more efforts being made to improve these services. Also found that Chronic renal failure (CRF) is common in Sudan. The estimated incidence of new cases was about 70-140 per million inhabitants per year (6).

Wreghitt, 1999 found that patients on regular HD are prone to blood-borne diseases (BBD) unless appropriate precautions are taken. The common BBD that may be encountered during hemodialysis include hepatitis B virus (HBV) infection, hepatitis C virus (HCV) infection, human immune deficiency virus (HIV) infection, malaria and, sometimes, haemorrhagic viral infections. Wreghitt in 1999 found that Hepatitis outbreaks in haemodialysis unit patients and staff were reported in the late 1960s (7).

Yousif et al., 2017 found that a structured educational programme based on the K/DOQI clinical practice guidelines for HD vascular access care had a significant impact on the dialysis nurses' knowledge (8). Currently (in 2017) there are over 3000 patients with viable renal transplants being followed up in Khartoum (National Center for Kidney Diseases and Surgery, personal communication).

In Sudan, there are limited efforts to subject dialysis nurses to regular educational courses on the correct practices in their field. This study aims at exploring the current status of correct knowledge and practices related to blood-borne disease prevention among dialysis nurses. The study will also explore the degree of improvement in KAP after delivering an educational programme designed to cover BBD prevention.

Problem statement

There is a clear gap of knowledge and practices among haemodialysis nurses in the Sudan. Would an educational program based on current evidence based data improve the practices related to prevention and management of blood-borne diseases (BBD) in the haemodialysis centres in Khartoum State, Sudan?

Justification

Educational programmes of standard operating procedures have major benefits in gaining appropriate knowledge, attitudes and practices (KAP) by haemodialysis nurses. This would allow nurses to avoid and prevent potential hazards of blood-borne diseases that may occur during haemodialysis. Such hazards are a continual threat to both patients and healthcare providers.

Null hypothesis (H0)

There will be no difference between knowledge and practices related to prevention of BBD among dialysis nurses in Khartoum State, prior to and after exposing them to an educational programme designed for this purpose.

Study objectives

General objective

To assess the effect of an educational programme about blood-borne diseases on knowledge and practices of nurses working in haemodialysis centres.

Specific objectives

1. To demonstrate educational programme about blood-borne diseases for haemodialysis nurses.
2. To assess nurses' knowledge regarding blood-borne diseases pre-and post the intervention.
3. To identify the haemodialysis nurses' practices regarding blood-borne diseases pre-and post the intervention.

Materials and Methods

Study design

Intervention quasi-experimental study design, health- facility-based study.

Study area

The study was carried out in hemodialysis centres in Khartoum State. There were five centres in Khartoum, Khartoum North there were seven centres and Omdurman has five, centres. The total number of centres examined was 17. They constituted all the available haemodialysis centres in Khartoum State at the time of the study.

Study populations

The study involved nurses who work in haemodialysis centres in Khartoum State during the period from November 2014 to November 2016.

Inclusion criteria

The study population consisted of all the nurses with at least six months job experience in haemodialysis.

Sample size

All nurses working in haemodialysis in Khartoum State who met the inclusion criteria. The number reached 191.

Study Variables

Duration of experience

Routes of transmission

Immunization

Sterilization

Disinfection

Data collection

Tools of Data collection

Observation using checklists and interview by using a questionnaire (see appendix 1). The questionnaire and checklist were prepared in English, but in Arabic translations were availed by the researcher whenever needed.

Data collection technique

Interviewing and checking list questionnaire method.

Intervention method

An intense educational programme was designed by the researcher based on an actual assessment of hemodialysis nurses' knowledge regarding blood-borne diseases in the light of the available literature. The intervention was developed in the English language to cover the blood-borne disease definition, signs and symptoms, methods of transmission, complications, treatment, vaccination,

virology screening and safety measures (see appendix 1). Different teaching methodology as lectures with multimedia shows pictures and videos, checking lists, discussion, demonstration, and re-demonstration was used.

Scoring

For knowledge questions 75% correct answers out of all questions.

For attitude questions 25% correct answers out of all questions.

For practice questions 25% correct answers out of all questions.

The scores obtained by the nurses before and after the educational programme were compared for statistical differences.

Data processing and analysis

The data were analyzed by using frequency analysis, proportions, % and p-value type of analysis. Paired Samples t-Test Statistic was used to compare means. Statistical package of social science (SPSS), was presented in texts and figures.

Ethical considerations

Ethical approval was obtained from the AlZaiem Al-Azhar University before conducting the study, Research Department of the Ministry of Health, public administration for renal diseases and transplant authorities also gave permission to conduct the study. Data was anonymously collected; the participants were free to withdraw from the study at any time they wish. Written informed consent from each individual participant was obtained.

Results

Results

Table 4.1. The socio-demographic characteristics pre-and post-intervention (n = 140 = 100%)

Paired Samples t-Test Statistics					
The Socio-Demographic Variables:	Diff bet means	SD	SE	t	p-value
1- Educational level (Diploma, Bachelor, Master, PhD).	-0.04	0.47	0.04	-0.9	0.37
2- Gender (Male, Female).	0.06	0.49	0.04	1.4	0.17
3- The period of experience in haemodialysis (6 Months to year, 2 years, 3 years or more).	0.06	0.76	0.06	1.0	0.32

Paired Samples t-Test Statistics.

Table 4.2: Distribution of correct knowledge about the haemodialysis educational programme on nurses' knowledge related to blood-borne diseases at haemodialysis units in Khartoum State, 2014-2016 pre-and post-intervention (n = 140)

Table 4.2.1. Knowledge scores related to what are the blood-borne diseases (BBD)?

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
HIV can be transmitted through blood	136(97.1) 139(99.3)	0.02	0.19	0.02	1.35	0.18
HBV can be transmitted	133 (95) 137(97.9)	0.03	0.27	0.02	1.27	0.21

through blood						
HCV can be transmitted through blood	135(96.4) 137(97.9)	0.01	0.24	0.02	0.71	0.48
Plasmodium of malaria can be transmitted through blood	35(25.0) 116(82.9)	0.58	0.59	0.05	11.6	0.0001

Comment: There was a significant improvement in relation to the transmission of malaria through blood (transfer). The nurses thought HIV, HBV and HCV are not transmitted by blood transfer.

Table 4.2.2. Knowledge scores related to daily habits during the HD session

Paired Samples t-Test						
Variables of knowledge	Means before/after program	Diff bet means	SD	SE	t	p-value
6- Involvement drinking or eating utensil can transmit BBD	105(75.0) 128(91.4)	-0.16	0.49	0.04	-3.97	0.0001
6- Using patient's blanket or cover can transmit BBD	101(72.1) 125(89.3)	-0.17	0.52	0.04	-3.89	0.0001
6- Using a razor of a patient can transmit BBD	140(100.0) 139(99.3)	-0.01	0.08	0.01	-1	0.32

Comment: There was a significant improvement in relation to the correct daily habits to be practiced in the HD unit.

Table 4.2.3. Knowledge scores related to tools, reuse during the HD session

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
7- Is BBD transmitted by re-using an artificial kidney (Dialyzer)?	134(95.7) 138(98.6)	0.03	0.24	0.02	1.42	0.16
7- Is BBD by re-using the Hemodialysis Solution (acid)?	46(32.9) 68(48.6)	0.16	0.68	0.06	2.73	0.007
7- Is BBD transmitted by re-using the HD powder (Bicarb)	43(30.7) 61(43.6)	0.13	0.69	0.06	2.21	0.03

Comment: There was a significant improvement in relation to the scores of the correct approach to re-use of dialysis components.

Table 4.2.4. Knowledge scores related to isolation of patients during the HD session

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
8- Do you isolate patients infected with HBV?	129(92.1) 139(99.3)	0.07	0.28	0.02	2.97	0.004
9- Do you isolate patients infected with HCV?	129(92.1) 138(98.6)	0.06	0.3	0.03	2.54	0.01
10- Do you isolate patients with HIV/AIDS?	129(92.1) 138(98.6)	0.09	0.33	0.03	3.09	0.002
11- Does the allocation of HD machine to patients remain in the same room prevent transmission of BBD?	81(57.9) 88(62.9)	-0.05	0.74	0.06	-0.8	0.43

Comment: There was a significant improvement in relation to the scores of the correct approach to sterilizing the dialysis machine.

Table 4.2.5. Knowledge scores related to Reduction of transmission of BBD by sterilization of HD machine

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
12- Do you sterilize HD machines after every session reduces the transmission of BBD?	126(90.0) 136(97.1)	0.07	0.33	0.03	2.55	0.012
13- Is sterilized with water (Rinse) enough to kill germs transmitted through blood?	125(89.3) 137(97.9)	-0.09	0.33	0.03	-3.09	0.002
14- Is sterilization of HD machine for 32-33 min with a citric acid solution enough to kill germs transmitted through blood?	32(22.9) 73(52.1)	-0.29	0.62	0.05	-5.61	0.0001
15- Is the short sterilization for 22 minutes with a solution of citric acid is enough to kill germs transmitted through blood?	77(55.0) 118(84.3)	-0.29	0.61	0.05	-5.7	0.0001
16- Is sterilized with heat for 30-41 minutes is enough to kill germs transmitted through blood?	115(82.1) 125(89.3)	0.07	0.49	0.04	1.73	0.09

Table 4.2.6. Knowledge scores related to cleaning objects and HD machine in the dialysis room to reduce transmission of BBD

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
17- Do you clean the outside of the HD machine with the lyzoformin prevents BBD?	5(3.6) 130(92.9)	0.89	0.31	0.03	34.03	0.0001
18- if you dialyze a patient with HCV and sterilize the machine can you use it for an uninfected patient?	76(54.3) 122(87.1)	0.33	0.62	0.05	6.3	0.0001
19- Do clean HD beds and wiped with the lyzoformin solutions to reduce the transmission of BBD?	127(90.7) 139(99.3)	0.09	0.31	0.03	3.32	0.001
20- Does sterilization of catheter equipment reduce the transmission of BBD?	138(98.6) 136(97.1)	-0.01	0.21	0.02	-0.82	0.42

Comment: There was a significant improvement in relation to the scores of the correct approach to clean/sterilize parts of dialysis components.

Table 4.2.6. Knowledge scores related to effect of protective wear during HD to reduce transmission of BBD

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
21- Does wearing gloves reduce the transmission of BBD?	139(99.3) 139(99.3)	0.0001	0.12	0.01	0.0001	1
21- Does wearing protective glasses reduce the transmission of BBD?	104(74.3) 137(97.9)	0.24	0.46	0.04	6.08	0.0001
21- Does wearing face mask reduce the transmission of BBD?	116(82.9) 139(99.3)	0.16	0.39	0.03	4.98	0.0001
21- Does wearing a shield to protect the face reduce the transmission of BBD?	108(77.1) 138(98.6)	0.21	0.45	0.04	5.69	0.0001
21- Does wearing Apron gown reduce the transmission of BBD?	125(89.3) 138(98.6)	0.09	0.34	0.03	3.26	0.001

Comment: There was a significant improvement in relation to the scores of the correct approach to wear suitable protective wearing during the dialysis session.

Table 4.2.7. Knowledge scores related to working habits of nurses and cleaners in relation to transmission of BBD

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
22- When the nurses make a dressing of the catheter using the same glove from patient to patient	139(99.3) 138(98.6)	-0.01	0.15	0.01	-0.58	0.57
22- she uses sterile gloves and sterile instruments	135(96.4) 135(96.4)	0.0001	0.27	0.02	0.0001	1
22- When the nurses Do dressing for catheter without medical gloves	128(91.4) 135(96.4)	0.05	0.35	0.03	1.71	0.09
22- When the nurses are dressing for fistula without medical gloves	116(82.9) 133(95.0)	0.12	0.42	0.04	3.39	0.001
23- Because they cleaners sometimes empty acid Bouquets (HD solution) mixed from machines	100(71.4) 134(95.7)	0.24	0.49	0.04	5.83	0.0001
23- Because they use normal saline drip-lines from one machine to another	128(91.4) 135(96.4)	0.05	0.35	0.03	1.71	0.09

Comment: There was a significant improvement in relation to the scores of the correct approach to only some of the nursing approaches to combat spread of BBD.

Table 4.2.8. Knowledge scores related to effect of hand washing in relation to transmission of BBD

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
24. Do you wash your hands after touching patient instrument to reduce the transmission of BBD?	130(92.9) 136(97.1)	0.04	0.31	0.03	1.61	0.11
24. Do you wash your hands After removing gloves and the completion of the procedure to reduce the transmission of BBD?	127(90.7) 136(97.1)	0.06	0.34	0.03	2.21	0.03

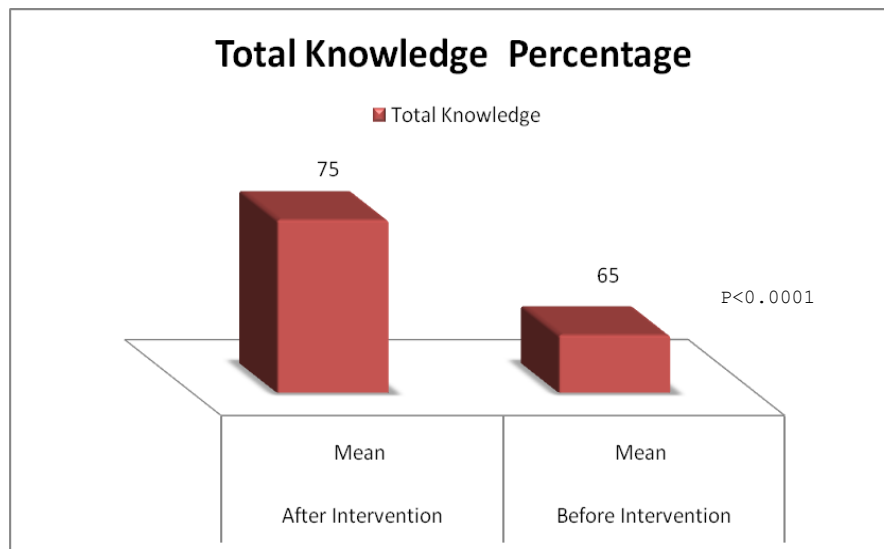
Comment: Hand washing was seen as an important practice in the prevention of transmission of BBD only after completion of a procedure.

Table 4.2.9. Knowledge scores related to the correct frequency for testing for viruses

Paired Samples t-Test						
Variables knowledge about:	Means before/after program	Diff bet means	SD	SE	t	p-value
Viruses periodic examination should be monthly	43(30.7) 64(45.7)	0.15	0.68	0.06	2.62	0.01
Viruses periodic examination should be 3-monthly	34(24.3) 18(12.9)	0.11	0.47	0.04	2.9	0.004
Viruses periodic examination should be 6-monthly	114(81.4) 127(90.7)	-0.09	0.41	0.03	-2.66	0.009
Viruses periodic examination should be annually	134(95.7) 139(99.3)	-0.04	0.22	0.02	-1.91	0.059

Comment: There was a significant improvement in relation to the scores of the correct approach to request viral examinations periodically.

Figure (1): Effect of hemodialysis educational programme on nurses' over all knowledge related to blood borne diseases at hemodialysis units in Khartoum State, 2014-2016.



Paired Samples t-Test Statistics

Table 4.2: Distribution of correct practices about the haemodialysis educational programme on nurses' practices related to blood-borne diseases at haemodialysis units in Khartoum State, 2014-2016 pre-and post-intervention (n = 140)

Table 4.3.1. Practices scores related to tools, reuse during the HD session

Paired Samples t-Test						
Variables Practices about:	Means before/after program	Diff bet means	SD	SE	t	p-value
1. Is he/she re-use the acid solution?	0.00(0.00) 82(58.6)	-0.59	0.49	0.04	-14.02	0.0001
2. Does he/she re-use Bicarb?	0.00(0.00) 140(100.0)	2	0.0001	0.0001	0.0001	0.0001
3. Does he/she re-use external transducer, pressure of venous and arterial?	0.00(0.00) 140(100.0)	2	0.0001	0.0001	0.0001	0.0001

Comment: There was a significant improvement in relation to the scores of the correct approach to re-use of dialysis components.

Table 4.3.2. Practices scores related to isolation of patients during the HD session

Paired Samples t-Test						
Variable: Practice Score on:	Means before/after program	Diff bet means	SD	SE	t	p-value
4. Does he/she the geographical isolation of the hepatitis B patients?	82(58.6) 69 (49.3)	0.19	0.58	0.05	3.77	0.0001
5. Does he/she the geographical isolation of hepatitis C patients?	103(73.6) 86(61.4)	0.24	0.66	0.06	4.38	0.0001
6. Does he/she the allocation of the haemodialysis machine without a geographical isolation of hepatitis B patients?	82(58.6) 71 (50.7)	0.09	0.29	0.02	3.77	0.0001
7. Does he/she the allocation of the haemodialysis machine without geographical isolation of hepatitis C patients?	102(72.9) 86(61.4)	0.13	0.34	0.03	4.53	0.0001
8. Is there a fixed Staff for isolated machines?	43(30.7) 33(23.6)	0.06	0.58	0.05	1.32	0.19
9. Is there a regular exchange of Staff for isolated machines?	89(63.6) 20(14.3)	0.49	0.59	0.05	9.68	0.0001

Comment: There was a significant improvement in relation to the scores of the correct practices regarding isolation of patients infected with viral diseases.

Table 4.3.3. Practices scores related to Reduction of transmission of BBD by sterilization of HD machine

Paired Samples t-Test						
Variable: Practice Score on:	Means before/after program	Diff bet means	SD	SE	t	p-value
10. Does he/she sterilize haemodialysis machines for long enough?	140(100.0) 139(99.3)	0.01	0.08	0.01	1	0.32
11. Does haemodialysis a patient is infected with blood-borne diseases after an infected patient through the blood in the same machine?	140(100.0) 140(100.0)	0.0001	0.0001	0.0001	0.0001	0.0001
12. Does he/she washes haemodialysis beds with lyzoformin solution? 12. Does he/she washes haemodialysis beds with lyzoformin solution?	0.00(0.00) 39(27.9)	0.28	0.45	0.04	7.33	0.0001

Comment: There was a significant improvement in relation to the scores of the correct practices regarding clean / sterilize parts of dialysis components.

Table 4.3.4. Practices scores related to effect of protective wear during HD to reduce transmission of BBD

Paired Samples t-Test						
Variable: Practice Score on:	Means before/after program	Diff bet means	SD	SE	t	p-value
13. Does he/she use personal protective equipment such as goggles?	140(100) 140(100)	0.0001	0.0001	0.0001	0.0001	0.0001
14. Does he/she use personal protective equipment such as gloves?	120(85.7) 139(99.3)	0.14	0.36	0.03	4.41	0.0001
15. Does he/she use personal protective equipment such as face mask?	11(7.9) 54(38.6)	0.31	0.52	0.04	6.97	0.0001
16. Does he/she use personal protective equipment such as face shield?	140(100) 140(100)	0.0001	0.0001	0.0001	0.0001	0.0001
17. Is he/she wearing apron gown?	0.00(0.00) 26(18.6)	0.19	0.39	0.03	5.63	0.0001

Comment: There was a significant improvement in relation to the scores of the correct practices regarding to wear suitable protective wearing during the dialysis session.

Table 4.3.5. Practices scores related to the effect of re-use of sterile disposable equipment in the transmission of BBD

Paired Differences						
Variable: Practice Score on:	Means before/after program	Diff bet means	SD	SE	t	p-value
18. Does he/she use gloves to the patient isolated and re-used for another patient is non-isolated?	140(100.0) 140(100.0)	0.0001	0.0001	0.0001	0.0001	0.0001
19. Does he/she washes gloves or wipe them with a solution and re-used?	140(100.0) 139(99.3)	-0.01	0.08	0.01	-1	0.32
20. Is he/she empties acetate bouquets at each other and re-used?	140(100.0) 140(100.0)	0.0001	0.0001	0.0001	0.0001	0.0001
21. Does he/she wipe used drip and re-used?	140(100.0) 140(100.0)	0.0001	0.0001	0.0001	0.0001	0.0001
22. Does he/she use aseptic technique when dressing catheter and connecting the patients?	0.00(0.00) 110(78.6)	0.79	0.41	0.03	22.58	0.0001
23. Is he/she is throwing a venous line in the basket when doing Prime?	128(91.4) 135(96.4)	-0.05	0.35	0.03	-1.71	0.09

Comment: There was a significant improvement in relation to the scores of the correct practices regarding to re-use of sterile disposable equipment's in the transmission of BBD.

Table 4.3.6. Practices scores related to effect of hand washing in relation to transmission of BBD

Paired Differences						
Variable: Practice Score on:	Means before/after program	Diff bet means	SD	SE	t	p-value
24. Does he/she washes his/her hands with the right way?	0.00(0.00) 101(72.1)	0.72	0.45	0.04	18.97	0.0001
25. Does he/she washes his/her hands before procedures?	0.00(0.00) 89(63.6)	0.64	0.48	0.04	15.57	0.0001
26. Does he/she washes his/her hands after procedures?	14(10.0) 139(99.3)	0.89	0.31	0.03	34.03	0.0001
27. Does he/she washes his/her hands after touching the patient Tools?	2(1.4) 135(96.4)	0.95	0.22	0.02	51.39	0.0001
28. Does he/she washes his/her hands through hand rub (Gel) in the case of visible dirt or wash his/her hands?	60(42.9) 122(87.1)	0.44	0.6	0.05	8.69	0.0001

Comment: There was a significant improvement in relation to the scores of the correct practices regarding to effect of hand washing in relation to transmission of BBD.

Table 4.3.7. Practices scores related to the vaccination of Hepatitis B

Paired Differences						
Variable: Practice Score on:	Means before/after program	Diff bet means	SD	SE	t	p-value
29. Does he/she advise the patient to take the Hepatitis B vaccine?	130(92.9) 140(100.0)	0.93	0.26	0.02	42.51	0.0001

Comment: There was a significant improvement in relation to the scores of the correct practices regarding to vaccination of Hepatitis B.

Table 4.3.8. Practices Scores Related to practices regarding Universal Precautions Guidelines

Paired Differences						
Variable: Practice Score on:	Means before/after program	Diff bet means	SD	SE	t	p-value
30. Does he/she dispose of needles in safety boxes?	1(.7) 140(100.0)	0.01	0.08	0.01	1	0.32
31. Is he/she disposed of haemodialysis needles in baskets?	133(95.0) 132(94.3)	0.01	0.31	0.03	0.28	0.78
32. Is he/she attaches a safety box at the patient's bed to dispose of haemodialysis needles?	33(23.6) 139(99.3)	0.23	0.44	0.04	6.17	0.0001
33. Does he/she put the needles in the haemodialysis machine or haemodialysis acid bouquet or	116(82.9) 42(30.0)	-0.53	0.59	0.05	-10.55	0.0001

the patient's bed before disposing it?						
34. Is he / she disposed plastic medical waste with needles in safety boxes?	128(91.4) 128(91.4)	0.0001	0.0001	0.0001	0.0001	0.0001
35. Does he/she use needless technique?	0.00(0.00) 57(40.7)	0.41	0.49	0.04	9.77	0.0001
36. Does he/she recap the needle after use?	118(84.3) 1(.7)	-0.84	0.39	0.03	-25.31	0.0001

Comment: There was a significant improvement in relation to the scores of the correct practices regarding to practices regarding Universal Precautions Guidelines.

Table 4.3.9. Practices Scores Related to practices regarding to virology screening

Paired Differences						
Variable: Practice Score on:	Means before/after program	Diff bet means	SD	SE	t	p-value
37. Does he/she take samples of virology screening with him/herself to the laboratory?	59(42.1) 140(100.0)	0.42	0.5	0.04	10.06	0.0001

Comment: There was a significant improvement in relation to the scores of the correct practices regarding to virology screening.

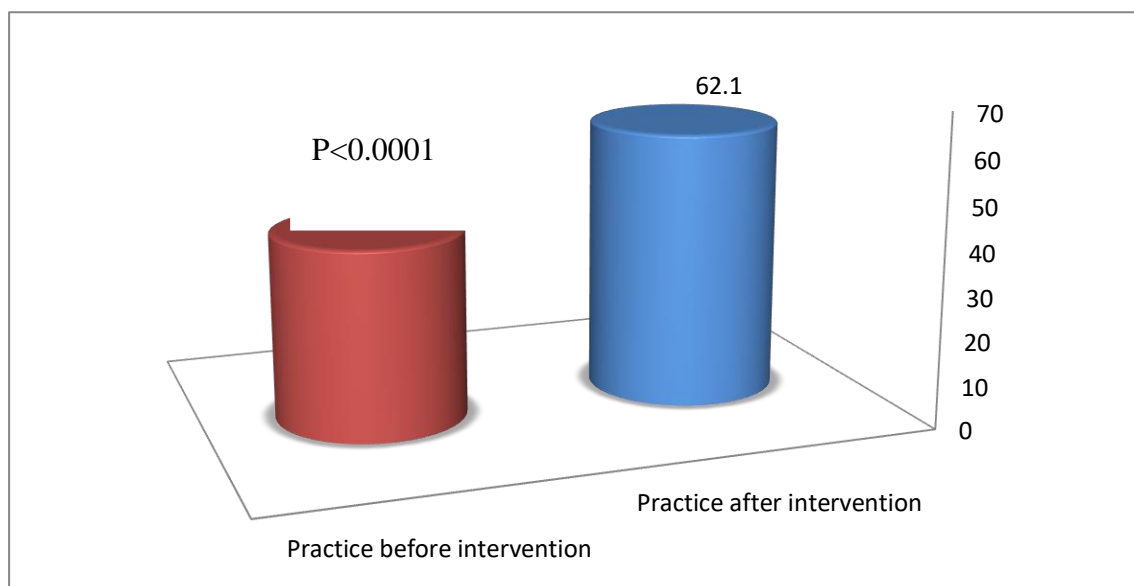


Figure 2. Effect of the haemodialysis educational programme on nurses' overall practices related to blood borne diseases at haemodialysis units in Khartoum State, 2014-2016

Discussion

The educational programme has significant effects on nurses' knowledge about the main function of the liver, complications of renal failure, and avoiding sharing needles and syringes. The educational programme played a significant role in some items which could raise the level of knowledge and practices toward prevention of hepatitis B virus (3).

In spite of having good practice level regarding infection control, nurses had fair knowledge level, as recommendations updating knowledge and practice of nurses through continuing in-service educational programmes; emphasizing the importance of following latest evidence-based practices of infection control in continuing education, training program providing training programmes for newly

nurses about infection control and at regular intervals; and a replication of this study using observation checklist should be done to assess the level of practice (4).

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 (5).

A huge number of dialysis sessions that shared the shift with this patient increased the risk, the dialysis machine was used afterwards by other patients in the following shifts prior to the next chemical disinfection, which led to exposure to infection. The machine was not labelled specifically. All patients potentially exposed to the HBV-positive patient. Follow-up of the unprotected persons among the personnel, as far as possible, did not demonstrate evidence of infection with HBV. They were included in vaccination protocols without evidence of intercurrent infection (6).

Farahnaz et al in 2012 found that. There was a significant relationship between knowledge and age, gender, occupational history, and educational history. There was also a significant relationship between attitude level and age, gender, occupational history, and educational history. Discriminatory attitude is common among health care providers to hepatitis C patients. It is, therefore, necessary to improve their knowledge level and attitude toward this disease (7).

Every day, healthcare workers are exposed to dangerous and deadly Bloodborne 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 Bloodborne pathogens (8).

Conclusion

The study revealed that haemodialysis nurses Knowledge and Practices regarding prevention of blood-borne diseases show significantly improved, the knowledge improved from $65 \pm 7.6\%$ to 75 ± 6.6 $P < 0.0001$ and practices were improved from $42.8 \pm 3.5\%$ to 62.7 ± 9.5 $P < 0.0001$ after the application of the educational programme.

Recommendations

To raise haemodialysis nurses' awareness about infection control by periodic training and assessment.

We recommend applying for the tested educational programme.

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