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Assessment of Nurses' Knowledge toward Vascular Access Devices for Patients with Hemodialysis at Baghdad Teaching Hospital

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Abstract: *As a result, increasing incidence of chronic kidney disease the use of vascular access devices has increase, but it still remains important to patients with chronic kidney disease to complete the process of hemodialysis fully.*
Objective: *the study objective is to assess nurse's knowledge toward vascular access devices and to find out the relationship between nurse's knowledge scores of the nurses and their selected demographic variable age, gender, marital status, level of education, years of experiences, and training sessions.*
Methodology: *A descriptive analytical study was conducted on a purposive "non-probability" sample of (80) nurses who have been working at hemodialysis units, were selected from Baghdad teaching hospitals which include Al-Yarmook teaching hospital, Baghdad Teaching Hospital, and Al-Kindy Teaching hospital, Al-Karama Teaching Hospitals, Al-Kadhmiyia Teaching Hospitals, Surgical Specialties Hospitals. A questionnaire was used as a tool of data collection for the period of started fromOctober2nd, 2015 through July30th,2016. Descriptive statistical analyses were used to analyze the data.*
The data were collected through the use of constructed questionnaire, which consist of two parts; (1) Demographic data form that consist (7) items and (2) Nurses' knowledge that consist of (16) items, by means of direct interview technique. Reliability of the questionnaire was determined through a pilot study and the validity through a panel of (28) experts. Descriptive statistical analysis procedures (frequency, percentage, mean of score) and inferential statistical analysis procedures (Chi-square) were used for the data analysis.
Results*: The results of the study indicated that (53.8%) of the study sample were female,their advance age within 33-37 years, (70%) were married and (50.0%) were graduate from High institute graduate (46.3%) had years of experience in hospital within (1-5) years and (62.2%) had years of experience in hemodialysis units within (1-5) years, (66.3%) don't sharing in training session.*
Conclusions: *The study indicated that there was significant relationship between (age, level of education, years of experiences in hemodialysis units, sharing in training session which established (by hospital, other institute inside or out Iraq) and nurses' knowledge toward vascular access devices.*
Recommendations: *The study recommended the special training session concerning vascular access devices in hemodialysis units. And booklets should be designed and presented to all hemodialysis nurses, in addition to make a new study that can assess nurses' knowledge concerning vascular access devices in hemodialysis units, the study recommended that the importance of employing Academic nurse in Hemodialysis units.*
Keywords: *Nurses' knowledge, Vascular Access Devices, Complication of VAD*

I. Introduction

Hemodialysis is a transient treatment for those patients who are candidates for kidney transplantation and a permanent treatment for the end-stage renal disease patients with no chance of transplantation [(1)].Hemodialysis needs vascular access sites with blood flow of at least 350 ml/min [(2)]. Vascular Access to the patient's vascular system must be established to allow blood to be removed, cleansed, and returned to the patient's vascular system at rates between 200 and 800 mL/minute. Several types of access are available [(3)].Without an appropriate vascular access, the quality of dialysis is reducing and its related morbidity and mortality increased [(4)]. The nurses play an important role in the therapeutic success and outcome of the patients because they minimize the patients risk factors for infections through maintaining strict aseptic technique, changing the (HD) Catheter dressing, inspecting the solution for signs of contamination. Monitoring the patients closely before, during, and after an exchange and recording his vital signs [(5)].

II. Methodology

Descriptive study was carried out at hemodialysis units of Baghdad teaching hospitals to assess nurse's knowledge toward vascular access devices, study started from October2nd, 2015 through July 30th,2016. A purposive "non-probability"sample of (80) nurses, who have been working at hemodialysis units, were selected

from Baghdad teaching hospitalswhich includeAl-Yarmook Teaching Hospital, Baghdad Teaching Hospital, and Al-KindyTeaching Hospital,Al-KaramaTeaching Hospital,Al-Kadhmiyia Teaching Hospital,Surgical Specialties Hospital.The data were collected in the period from 25th February,2015 to 25th April 2015.The researcher collected the samples by interview with nurses through a special designed questionnaire. This interview took a period of about 10-15 Minutes for each sample. The questionnaires was constructed and composed of two parts **Part 1**: **Demographic Characteristics**: It consists of (7) items which included: age, gender, marital status, level of education, Number of years in employment, Number of years in the hemodialysis units, number of training sessions, **Part II: Nurses' knowledge toward vascular access device**includes (16) item toward complication of Vascular access devices which include (central venous device and arteriovenous fistula and arteriovenous graft).A pilot study was carried out between the periods from February 1st,2016 to February 21th, 2016 on (10) nurses who work at hemodialysis units in Baghdad Teaching Hospitalto determine the reliability of the questionnaire and content validity was carried out through the 27 experts. Descriptive and inferential statistical measures were used to analyze the data.

III. Results

Table 1. Participants' Socio-demographicCharacteristics(N = 80)

Variables	**Frequency**	**Percent**
Age Groups (Years)		
18-22	1	1.3
23- 27	18	22.5
28- 32	22	27.5
33- 37	27	33.8
38-42	8	10
43 and more	4	5.0
Gender	**Frequency**	**Percent**
Male	37	46.3
Female	43	53.8
Marital Status	**Frequency**	**Percent**
Single	23	28.8
Married	56	70
Widowed	1	1.3
Educational Level	**Frequency**	**Percent**
Primary nursing school graduate	3	3.8
Secondary nursing school graduate	16	20.0
High institute graduate	40	50.0
Collage of nursing graduate	7	8.8
College of science graduate	14	17.5
Years of experience in hospitals	**Frequency**	**Percent**
1-5	37	46.3
6-10	27	32.5
11-15	10	12.5
16-20	3	3.8
21 and more	4	5
Years of experience in hemodialysis	**Frequency**	**Percent**
1-5	50	62.2
6-10	21	26.3
11-15	4	5
16-20	2	2.5
21 and more	3	3.8
Training Session	**Frequency**	**Percent**
None	53	66.3
1	17	21.3
2	3	3.8
3	1	1.3
4	4	5.0
5 and more	2	2.5

Table (1)reveals that the majority of the sample were females (43%) while (37%) were male. According to their age; the highest percentage of the nurses (27%) was within the age group (33-37) years. According to their marital status; the highest percentage of the nurses (56%) was married. Regarding their education level; the highest percentages of the nurses (40%) graduate from an institute. Concerning Years of employment; the highest percentage of the nurses (37%) within the group (1-5) years. According to their Year of experience in hemodialysis; the highest percentage of the nurses (50%) within the group (1-5) years, regarding theirtraining session; the highest percentage of the nurses (53%) having no training session concerning vascular access devices.

Table 2. Mean of Score of Nurses' Knowledge Toward Complication of Central Venous Devices for Patients' with Hemodialysis

C1	Items	Yes	No	Uncertain	M.S	Ass
1	Inadequate blood flow	52	15	13	2.63	Very good
2	clotting under the subclavian	22	32	26	1.86	Fair
3	Infection	73	2	5	2.86	Very good
4	Pneumothorax	5	55	20	1.41	Fair
5	*Edema	54	13	13	1.53	Fair
6	Aneurysm*	32	7	41	1.70	Fair

Table (2) showsthat the mean of score for item of nurses' knowledge toward complication of central venous devices for patients' with hemodialysis was present the majority of nurses reflect a fair knowledge in items (2,4,5,6) and the minority of nurses reflect a very good knowledge in items (1,3).

Table 3. Mean of Score of Nurses' Knowledge Toward Complication of AVF and AVG for Patients' with Hemodialysis

C2	Items	Yes	No	Uncertain	M.S	Ass
1	Edema	57	7	16	2.64	Very good
2	Hematoma	43	25	12	2.20	Good
3	Stenosis result from improper cannulation	45	20	15	2.28	Good
4	Steal syndrome due to ischemia of the distal	10	38	32	1.65	Fair
5	Congestive heart failure	13	37	30	1.74	Fair
6	Central vein stenosis	13	41	26	1.84	Fair
7	numbness and tingling in the extremity	50	11	19	2.43	Very good
8	*Clotting under the subclavian	48	17	15	1.64	Fair
9	*pneumothorax	45	15	20	1.63	Fair
10	*Inadequate blood flow	55	20	5	1.49	Fair

Table (3) shows the mean of score for item of nurses' knowledge toward Complication of AVF and AVG for patients' with hemodialysis was present that the majority of nurses reflect fair knowledge in items (4,5,6,8,9,10) and very good knowledge in items (1,7) and good knowledge in item (2,3).

Table 4. Association Between Nurses' Knowledge and Their Age Group (N=80)

Age Groups \ Knowledge	Fair	Good	TOTAL
18-22 years	0	0	0
23-27 years	12	7	19
28-32 years	7	17	24
33-37 years	9	18	27
38-42 years	0	4	6
43 ≤ year	0	4	4
TOTAL	28	52	80
χ^2 obs.= 12.398 df= 4 χ^2*crit.*= 9.488, P-value =*0.01*			

Table (4) shows that there is a significant relationship between nurses' knowledge and their age group.

Table 5. Association Between Nurses' Knowledge and Their Gender (N=80)

Knowledge / Gender	**Fair**	**Good**	**Total**
Male	**12**	**25**	**37**
Female	**15**	**28**	**43**
Total	**27**	**53**	**80**
χ^2obs.= 0.053 df = 1 χ^2crit.= 3.84 P≤ 0.05			

χ^2 Obs.= Calculated Chi-Square, df= degree of freedom, P= probability, χ^2 Crit.= Tabulated Chi-square.
Table (5) shows that there is no significant association between nurses' knowledge and their gender.

Table 6. Association Between Nurses' Knowledge and Their Marital Status (N=80)

Knowledge / Marital status	**Fair**	**Good**	**Total**
Single	**8**	**15**	**23**
Married	**18**	**38**	**56**
Divorced	**0**	**0**	**0**
Widowed	**1**	**0**	**1**
Separated	**0**	**0**	**0**
Total	**27**	**53**	**80**
□ ^{2}***obs.*****= 2.039** **df= 2** □ ^{2}***crit.*****= 5.99** ***P≤ 0.05***			

χ^2 Obs.= Calculated Chi-Square, df= degree of freedom, P= probability, χ^2 Crit.= Tabulated Chi-square
Table (6) shows that there is no significant association between nurses' knowledge and their marital.

Table 7. Association Between Nurses' Knowledge and Their Educational Level (N=80)

Knowledge / Education	Fair	Good	Total
Primary nursing school	2	1	3
Secondary nursing school	11	5	16
High institute	9	31	40
College of nursing	0	7	7
College of science	5	9	14
Total	27	53	80
χ 2 obs.= 16.07 df = 4 χ 2 crit.= 9.48 P-value =0.003			

χ^2 Obs.= Calculated Chi-Square, df= degree of freedom, P= probability, χ^2 Crit.= TabulatedChi-square
Table (7) shows that there is high significant association between nurses' knowledge and their educationallevel.

Table 8. Association Between Nurses' Knowledge and Their Years of Employment in Hospital (N=80)

Knowledge / Years	Fair	Good	Total
1 – 5	15	22	37
6 – 10	8	18	26
11 – 15	3	7	10
16 – 20	0	3	3
21 ≤	1	3	4
Total	27	53	80
χ^2 obs.= 2.595 df = 4 χ^2 crit.= 4.48P≤ *0*.05			

χ^2Obs.= Calculated Chi-Square, df= degree of freedom, P= probability, χ^2 Crit.= Tabulated Chi-square
Table (8) shows that there is no significant association between nurses' knowledge and their years of employment in hospital.

Table 9. Association Between Nurses' Knowledge and Their Years of Employment in Hemodialysis Unit

Knowledge / Years	**Fair**	**Good**	**Total**
1 – 5	**26**	**24**	**50**
6 – 10	**1**	**20**	**21**
11 – 15	**0**	**4**	**4**
16 – 20	**0**	**2**	**2**
21 □	**0**	**3**	**3**
Total	**27**	**53**	**80**
□ ^{2}***obs.*****= 19.925** ***df* = 4** □ ^{2}***crit.*****= 9.48** ***P-value=0.002***			

χ^2 Obs.= Observed Chi-Square, df= degree of freedom, P= probability, χ^2 Crit.= Chi-Square critical
Table (9) showed that there ishigh significant association between nurses' knowledge and their years of employment in hemodialysis unit.

Table 10. Association Between Nurses' Knowledge and Their participation in training courses (N=8)

Knowledge / Participation	Fair	Good	Total
Yes	4	23	27
No	23	30	53
Total	27	53	80
χ^2 obs.= 6.535 df = 1 χ^2 crit.= 3.84 P-value =0.01			

χ^2 Obs. = CalculatedChi-Square, df= degree of freedom, P= probability, χ 2 Crit.= Tabulated Chi-square.
Table (10) shows that there is a significant association between nurses' knowledge and their participation in training courses.

IV. Discussion

Discussion of the Socio-demographic Characteristics of Studied Sample (Table 1):

Through the data analysis of distribution of the socio-demographic variables, (Table 1)reveals that approximately half of the study sample (53.8%) were females. this result agrees with Bakey (2008) who showed that the majority of (51%) of nurse staff in hemodialysis were female [(6)],but this result disagrees with Bakey (2012) who showed in a study which was conducted in hemodialysis at Baghdad teaching hospitals that the majority of the study sample (53.3% %) were Male [(7)].

The highest proportion (33.8%) of the sample are within the age group (33-37) years old. This finding agree with a study done byPhilip (2016), who showed that the majority of (53.3%) in experimental group and (43.3%) in control group of the staff nurses was (26-35) years old [(8)]. Buttheresult disagrees with a study done byBakey (2008),who indicate that (43.1%) of them was (26-30) years old [(6)].

In regard to marital status, the majority (70%) of the sample were married. Concerning the level of education, most of them (50%) were nursing institute graduates, this result agrees with Bakey (2008) who showed that the majority (56.9%) of nurses were married and the level of education, most of them (40.4%) were nursing institute graduate [(6)]. But this result disagrees with the study which was conducted to investigate knowledge of and practices toward universal precautions among health care workers and medical students in 2 university hospitals in Mazandaran Povine, Islamic Republic of Iran, showed that the majority (64.3%) had bachelor degree in nursing [(9)].

Regarding years of experiences in hospitals, more than half of the study sample had (1-5) experiences years in hospitals that represented (46.3%). This result agrees with Bakey (2008) who showed that the majority of years of experiences in hospitals for nurses was (51.1%) [(6)], but the result disagree with the study was conducted to investigate knowledge of and practices toward universal precautions among health care workers and medical students in 2 university hospitals in Mazandaran Povine, Islamic Republic of Iran, shoes that the majority (40.6%) of the nurse staff had (0-5) years of experience in hospitals [(9)].

Regardingyears of experiences in hemodialysis, most of them than had (1-5) experiences years in hemodialysis units that represented (62.5%). And this finding comes in agreement with Bakey (2008) who reported that the majority of nurse staff had (56.9%) years of experience in hemodialysis units [(6).] But this result disagrees with (Nihmatolla, et al., 2005) reported that (82.5%) of nurses had (1-3) years of experiences in hemodialysis and peritoneal dialysis units [(10)].

The finding indicated that more than half of the study sample (66.3%) had no opportunity to be involved in training session concerning vascular access devices which established by the hospitals**,** the result agrees with Bakey (2008) who reported that the majority of nurse staff had (64.7%) had no opportunity to be involved in training session concerning hemodialysis which established by the hospitals**.** [(6)].

Discussion of nurses' knowledge toward complication of central venous devices for patients' with hemodialysis:

Table(2) showed that the mean of score for item of nurses' knowledge toward complication of central venous devices for patients' with hemodialysis was present the majority of nurses reflect a Fair knowledge in items (2,4,5,6)) the minority of nurses reflect very good knowledge in items (1,3). Based on the researchers' point of view, these finding mean that nurses who work in HD had fair level of knowledge concerningcomplication of central venous devices for all HD staff and needed to develop their knowledge to be up -to data of any knowledge related to vascular access devices.

This result supported by Jeong, et al., 2013 Showed in a study that the Complications associated with CVC use are known to increase patient morbidity and mortality, as well as increase medical treatment costs and length of stay [(11)].

Also, O'Grady, et al., 2011 show that the Central venous catheters (CVCs) are commonly used for vascular access in patients who require hemodialysis; CVC use is associated with bloodstream infections (BSI) because of skin breaks during insertion [(12)].

Discussion of nurses' knowledge toward complication of AVF and AVG devices for patients' with hemodialysis:

This tables (3) showed the mean of score for item of nurses' knowledge toward Complication of AVF and AVG for patients' with hemodialysis was present that the majority of nurses reflect fair knowledge in items(4,5, 6, 8,9,10) and very good knowledge in items (1,7) and good knowledge in items (2,3).

Based on the researcher 's point of view, these finding mean that nurses who work in HD had fair level of knowledge concerningcomplication of AVF and AVG and all HD staff nurses needed to develop their knowledge to be up-to-date of any knowledge related to vascular access device.

This results supported by Ikizler, et al.,2006 show in their study that the complication of AVF include thrombosis, infection, bleeding, increased venous pressure, arterial insufficiency, aneurysm, carpal tunnel syndrome, distal ischemia and even heart failure [(13)].

Also; Ghonemy, et al., 2016 show in his finding that the stenosis of the vascular access was the most common complication as it occurred in about 53% of the patients. Infection of the vascular access was the second common complication as it occurred in more than 50% of the patients. The incidence of Systemic infection occurred in 22% of the patients. Stenosis may have occurred partly due to excessive in-growth of fibrous tissue through multiple puncture holes, and partly due to repeated attacks of hypotension during and after the hemodialysis [(14)].

Discussion of Association Between Association between nurse's knowledge and their demographic characteristic Data (Tables 4-10):

Age: The data analysis of Table (4) shows that that was a significant relationship at p -value (0.01) level between nurses' knowledge and their age, this result agrees with the study which was done by Bakey (2008) who present that there was significant relationship between nurses' knowledge and their age [(6)].This result disagrees with study conducted by Paul (2007) who represents that there was no significant relationship between nurse's knowledge and their age [(15)].

Gender: Table (5) indicates shows that there was no significant relationship at p- value (≤ 0.05) level between nurse's knowledgeand their genderThis finding agree with Bakey (2008) showed that there was no significant relationship between nurse's knowledge and their age [(6)].

Marital Status:Table (6) revealed that there was no significant relationship at p- value(≤ 0.05) level between nurse's knowledge and their marital status.This result agrees with the study which was done by Bakey (2008) who present that there was no significant relationship between nurses' knowledge and their marital status [(6).] This result disagrees with the study which was done by Bakey (2012) who present that there was significant relationship between nurses' nurses' practice and their marital status [(7)].

Level of education: Table (7) revealed that there was a significant relationship at p -value (0.003) level between nurse's knowledge and their level of education.This result agrees with the study which was done by Bakey (2008) who present that there was significant relationship between nurses' knowledge and their education level [(6)].This result disagrees with the study which was done by Bakey (2012) who present that there was no significant relationship between nurses' practice and their education level [(7)].

Years of experiences in hospitals*:*Table (8) indicates that there was no significant relationship at p -value(≤ 0.05)level between nurse's knowledge and years of experiences in hospitalsThis result agrees with the study which was done by Bakey (2008) who present that there was no significant relationship between nurses' knowledge and years of experiences in hospitals [(6)].

Years of experiences in HD units**:** Table (9) showed that there is high significant relationship at p -value **(**0.002)level between nurse's knowledge and years of experiences in HD units. This result agrees with the study which was done by Bakey (2008) who present that there was significant relationship between nurses' knowledge and years of experiences in HD units [(6)]. this result disagrees with the study which was done by Bakey (2012) who present that there was no significant relationship between nurses' practice and years of experience in HD [(7)].

Training session: The results presented in table (10) reveals that there It shows that there was significant relationship at p -value(0.01)level between nurse's knowledge and their sharing in training session. This result agrees with the study which was done by Bakey (2008) who present that there was significant relationship between nurses' knowledge and years their sharing in training session in hospital [(7)].

V. Conclusion

The study indicated that there was significant relationship between (age, level of education, years of experiences in hemodialysis units, sharing in training session which established (by hospital, other institute inside or out Iraq) and nurses' knowledge toward vascular access devices.

VI. Recommendations

The study recommended the special training session concerning vascular access devices in hemodialysis units. Also, booklets should be designed and presented to all hemodialysis nurses, in addition to

make a new study that can assess nurses' knowledge concerning vascular access devices in hemodialysis units, the study recommended that the importance of employing Academic nurse in Hemodialysis units.

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