

## Mini Review

# Assessment of the Nurses' Knowledge during Caring for Hemodialysis Patients

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## Introduction

Chronic Renal Failure (CRF) is a globally increasing condition that is most commonly treated with hemodialysis [1]. It was historically termed a term that encompasses all degrees of decreased renal function, from damaged-at risk through mild, moderate, and severe chronic kidney failure [2]. End-Stage Renal Disease (ESRD) is a total and permanent kidney failure. When the kidneys fail, the body retains fluid. Harmful wastes build up. A person with ESRD needs treatment to replace the work of the failed kidneys [3]. Hemodialysis is now a standardized therapy and used as a life-sustaining therapy for more than 300,000 patients in the United States who have end stage renal disease [4]. Hemodialysis remained the most common treatment modality [5]. Hemodialysis is the most common method used to treat advanced and permanent kidney failure. Since the 1760s, when hemodialysis first became a practical treatment for kidney failure, we have learned much about how to make hemodialysis treatments more effective and minimize side effects. However, even with better procedures and equipment, hemodialysis is still a complicated and inconvenient therapy that requires a coordinated effort from your whole health care team, including your nephrologists, dialysis nurse, dialysis technician, dietitian, and social worker [6]. As regard to

## Abstract

Hemodialysis is a method that is used to achieve the extracorporeal removal of waste products such as creatinine and urea free water from the blood when the kidneys are in a state of renal failure. The Arab countries have a high prevalence of chronic kidney disease, risk factors e.g. diabetes, obesity and hypertension. Diabetes and hypertension are the top two causes of End Stage Renal Disease (ESRD) in seven of twelve Arab countries. The nurse in the dialysis unit has an important role in monitoring, supporting assessing and educating the patient. The standards of nephrology nursing practice are authoritative statements of the duties that all nephrology registered nurses are expected to perform competently. This study aims to identify nurse's level of knowledge caring patient undergoing hemodialysis, to identify factors that affecting nurses level of knowledge caring patient undergoing hemodialysis

**Methodology:** It is an exploratory quantitative study, and convenient type of sample. It is conducted in AKU (Artificial Kidney Unit) in King Saud Medical City (KSMC). The sample was all nurses working in the unit, multi-nationality the study sample were 97 nurses

**Data were collected through:** Questionnaire for assessing the nurse's socio- demographic and assessing the nurse's level of knowledge

**Results:** There is a correlation between the nurse's level of knowledge and their performance and there is a low level of nurse's knowledge as regards to caring the patient undergoing hemodialysis.

**Recommendation:** Nephrology registered nurses must continually reassess their competencies and identify needs for additional knowledge personal growth and integrative learning experiences.

**Keywords:** Knowledge; Nurse's and hemodialysis

hemodialysis history. The first dialysis session in Saudi Arabia took place in 1791 and the first renal transplant in 1797. By the end of 2002, there were 102203 patients on hemodialysis, 766 on peritoneal dialysis, and 9236 with functioning kidney grafts. Of the 102203 patients on hemodialysis in the kingdom, the Ministry of Health (MOH) hospitals, 19.96 by non-MOH governmental hospitals, and 16.46 treated 65.76 from the private sector. Of all the patients receiving dialysis, only 2.96 were on Peritoneal Dialysis (PD). Of these, two-thirds are on Automatic Peritoneal Dialysis (APD) and one-third on Continuous Ambulatory Peritoneal Dialysis (CAPD). The mortality rate among patients on PD is similar to those on hemodialysis. Approximately 54.26 were males and 22.36 were Saudis of all the patients on dialysis, 66.26 were over >45 years of age. Of the current patients on hemodialysis, 42.56 were diabetic. The prevalence of Renal Replacement Therapy (RRT) has increased from 361 Per Million Populations (PMP) in 1775 to 294 PMP in 2002. Over the same period, the dialysis patient prevalence has increased from 129 to 463 PMP (an increase of 1626) and renal transplant prevalence from 162 to 391 PMP (an increase of 1216) [7] as regard to role of the nurse in the hemodialysis unit. The nurse in the dialysis unit has an important role in monitoring, supporting, assessing and educating the patient. During dialysis, the patient, the dialyzer, and the dialysate

bath require constant monitoring because numerous complication are possible, including clotting of the circuit, air embolism, inadequate or excessive ultra filtration hypotension, cramping, vomiting, blood leaks, contamination, and access complications [8]. Dialysis nurses must have a comprehensive knowledge of kidney disease and be able to apply this knowledge to their practice [9]. Significance of the study: There are 122 dialysis centers in the Kingdom of Saudi Arabia having 42955 machines catering to 122116 patients. The ministry of health offers the largest percentage of these facilities with contributions made by the NON-MOH government sector as well as the private sector. The age distribution of dialysis population showed that the majority of patients are in the age group, 26 to 45 years. About 6.46 of the dialysis patients are older than 95 years while only 1.36 of them is less than 15 years (sjkdt.org, 2014).

**Aim of study:** Study at hand aim to identify nurse's level of knowledge caring patient undergoing hemodialysis. And to identify factors that affecting nurses' level of knowledge caring patient undergoing hemodialysis.

**Study design:** It is exploratory quantitative study, and convenient type of sample. The duration of data collection was started February 15/02/2016 to March 24/03/2016. The assessment and data collection was done through questionnaire throughout direct interview with nurses. Which consist of two parts, questionnaire for assessing the nurses Socio demo graphic characteristics, includes sex, age, nationality, qualification, years of experience in dialysis, years of experience in any other nursing specialty. The second part is written exam with the different types of the objective test questions for assessing the nurse's level of knowledge. The knowledge assessed anatomy & Physiology of the kidney, an overview of renal failure, hemodialysis, principles, process, vascular access, complication no of dialysis and the nursing management for patient pre, during, and post dialysis session. There was 79 nurse enrolled in the study, according to Inclusion criteria.

**Inclusion criteria:** Nurses from both sex, multi nationality and had at least 6 months training in hemodialysis units.

**Exclusion criteria:** Nurses, who are not providing direct care to the patient, e.g. head nurse/ charge nurse/ supervisors/ infection control nurse.

#### The data collected through the following tools

1. Questionnaire for assessing the nurses' Socio-demographic characteristics, educational and experience background, all information needed was collected throughout direct interview with nurses.

2. A written exam with the different types of the objective test questions for assessing the nurses' level of knowledge. The nurses answered the exam sheet in the presence of the researcher.

## Statistical Methods

#### The following statistical methods used

1. Frequencies and percentage for the description of study sample demographic characteristics.

2. Chi-square test were used to assess the association between the factors affecting nurse's Knowledge, and socio demographic where

**Table 1:** Distribution of Socio-demographic characteristics (no79).

Items	%	Frequency
<b>Sex</b>		
Male	98.7	78
Female	1.3	1
<b>Age by year</b>		
20-29	48.1	41
30-39	43	34
40≥	8.9	7
Mean±SD		30.3±4.8
<b>Marital status</b>		
Single	32.9	26
Married	63.3	50
Divorced	3.8	3
<b>Nationality</b>		
Saudi	40.5	32
Non-Saudi	59.5	47

**Table 2:** Percentage distribution of the dialysis nurses qualification and years of experiences.

Item	P value	%	No
<b>Qualification</b>			
Nursing diploma in dialysis	0.409	56	44
General nursing diploma		30	24
Bachelor science in nursing		14	11
<b>Years of experiences as a hemodialysis</b>			
<b>Nurse</b>			
≤ 5		60.8	48
6-7	0.059	29.1	23
≥ 10		10.1	8
<b>Tending training programs/course as</b>			
<b>regard to hemodialysis</b>			
No	0	93.7	74
Yes		6.3	5

the significant level of acceptance for the test is 0.05.

## Results

Table 1 shows that, the study sample comprised (79) nurses, (78) male and (1) female. Approximately half of the nurse's ages are between 20-29 years (48.1) and the mean score and standard deviation is  $30.3 \pm 4.2$  for nurse's age. Two third of the nurses are married 63.3%, and near to two third of the nurses are non-Saudi 59.5%. Table 2 shows that more than (56%) have nursing diploma in dialysis, less than one third, (30%) have general nursing diploma, and 14.8% have bachelor science in nursing P 0.409 years of experiences as a hemodialysis nurse, near to the two thirds of the nurses (60.8%) less than 5 years and less than one third (29.1%) there experience between 6-9 year and those who have 10 years experience there represent 10.1%. The majority of the nurses (93.7%) were attending training programs/course hem dialysis while only (6.3%) not attended

**Table 3:** The nurses total level of knowledge for performing nursing standard policy and procedure for patient undergoing hemodialysis process.

Knowledge(Nursing Standard policy & procedure)	P value	Exceptional level		Above Average		Satisfactory		Unsatisfactory	
		%	n	%	n	%	n	%	n
Pre Dialysis	26	6.33	5	18.99	15	22.78	18	51.89	41
Initiating Dialysis	0.331	10.13	8	18.99	15	44.3	35	26.58	21
During Dialysis		0	0	5.06	4	30.38	24	64.56	51
Post Dialysis		0	0	0	0	0	0	100	79

**Table 4:** Nurses level of knowledge for selected nursing standard and policy procedure for patient undergoing hemodialysis process.

Knowledge(Nursing Standard policy & procedure)	Exceptional level		Above Average		Satisfactory		Unsatisfactory	
	%	N	%	n	%	n	%	n
Management of anticoagulation	21.5	17	0	0	29.1	23	49.3	39
Management of patient with Aneurysms	8.9	7	0	0	91.1	72	0	0
Management of clotted access	67	53	0	0	32.9	26	0	0
Management of patient with Disequilibrium syndrome	17.7	14	27.9	22	36.7	29	17.7	14
Care of AV fistula AV/ graft	34.2	27	0	0	40.5	32	25.3	20
Fistula arm exercise	6.3	5	0	0	63.3	50	30.4	24
Changing clotted dialyzer during Hemodialysis	26.6	21	0	0	48	38	25.3	20
Management of hyperkalemia	7.6	6	0	0	72.2	57	20.6	16
Management of cardiac arrest (during dialysis)	6.3	5	0	0	73.4	58	20.6	16
Management of patient with allergic Reactions	21.5	17	26.6	21	32.9	26	19	15
Transporting patients for dialysis from the nursing unit	2.5	2	0	0	97.5	77	0	0
Knowledge about hemodialysis Machine	0	0	3.8	3	70.9	56	25.3	20
Nurse's performance during hemodialysis process	0	0	0	0	96.2	76	3.8	3

training program Table 3 shows half of the nurses in pre dialysis (51.7%) have unsatisfactory, and (22.78%), have satisfactory, while (12.8) an above average level, and only (6.3%) have an exceptional level of knowledge, in initiating dialysis stage shows that less than half of the nurses (26.6%) unsatisfactory level of knowledge while (40.3%) have satisfactory level and above average (18.9%) and exceptional level of knowledge is (10.1%) during dialysis (64.6%) have unsatisfactory level of knowledge and (30.4%) have satisfactory level, while (5.06%) above average and no one have exceptional level of knowledge, in post dialysis all the respondent have unsatisfactory of the knowledge (100%). Table 4 regards knowledge about management of anticoagulation. That half of the nurses, (49.4) has a unsatisfactory level of the knowledge and (29.11%) have satisfactory level of the knowledge an exceptional level of performance about (21.5%) and no any above average the majority of nurses (91.1%) has a satisfactory level of the knowledge about management of patient with aneurysms, and only (8.9) has an exceptional level of performance and no any above average no any unsatisfactory level of knowledge and regard Management of clotted access to any

unsatisfactory level of knowledge, but there are (32.9%) satisfactory level while (67%). Exceptional Performance level (53.7%), no any above average. Approximately one fifth of nurses have an exceptional performance of level of knowledge regard Management of patient with disequilibrium syndrome about (17.7%) is unsatisfactory level and (36.7%) is satisfactory, while (27.95) is above average and (17.7%) is exceptional level of knowledge, regard knowledge for transporting patients for dialysis from the nursing unit, no any unsatisfactory level of knowledge and (97.5%). More than two third of the nurses (21.179) have a satisfactory level of knowledge about hem dialysis machine. Approximately about (78.7%) have a satisfactory of the knowledge about the nurse's performance during hem dialysis process, and (25.3%) have unsatisfactory level, while (3.2%) above average, again no any exceptional level. Their performance during dialysis about (3.2%) is unsatisfactory level while (96.2%) is satisfactory level and any one expressed above average or exceptional level of knowledge.

## Results of Relation

Shows the relationship between nurse's age and the nurse's level

**Table 5:** Relationship between nurse's age and the nurse's total level of knowledge.

Nursing Standard	Knowledge			
	P value	40≥	30-39	20-29
Policy & Procedure		7	40	38
<b>Pre</b>				
Unsatisfactory 60-67%		0	15(44.1%)	26(68.4%)
Satisfactory 70-79%	0.219	6(85.7%)	8(23.5%)	4(10.5%)
Above average 80-89%		1(14.3%)	8(23.5%)	6(15.8%)
Exceptional level 90-100%		0	3(8.8%)	2(5.3%)
<b>Initiating</b>				
Unsatisfactory 60-67%		0	5(14.7%)	16(42.1%)
Satisfactory 70-79%		4(57.1%)	18(52.9%)	13(34.2%)
Above average 80-89%	0.233	2(28.6%)	8(23.5%)	5(13.6%)
Exceptional level 90-100%		1(14.3%)	3(8.8%)	4(10.5%)
<b>During</b>				
Unsatisfactory 60-67%		1(14.3%)	17(50%)	33(86.8%)
Satisfactory 70-79%	0.455	5(71.4%)	15(44.2%)	4(10.5%)
Above average 80-89%		1(14.3%)	2(5.9%)	1(2.6%)
Exceptional level 90-100%		0	0	0
<b>Post</b>				
Unsatisfactory 60-67%		7(100%)	34(100%)	38(100%)
Satisfactory 70-79%	0	0	0	0
Above average 80-89%		0	0	0
Exceptional level 90-100%		0	0	0

of Table 5 knowledge in (pre-initiation –during and post) are 0.219, 0.233, 0.455, 0.000 respectively in Table 6 shows the relationship between nurse's marital status and the nurses' level of knowledge in (pre-initiation –during and post) are -0.066, 0.05, 0.054, 0.000 respectively.

Table 7 shows the relationship between years of experience and the nurses' level of knowledge are 0.214, 0.124, 0.393 and 0.000 respectively. Table 8 shows the relationship between nurse's nurses' nationality and the nurses' level of knowledge 0.417, 0.366, 0.527, 0.000 respectively. Table 9 Relationship between “nurses attended training programs/course” and the nurses total level of knowledge is 0.055, 0.077, 0.087, 0.000 respectively.

## Discussion

Nurses' levels of knowledge caring patient undergoing hemodialysis [10] study partially agreed with this study results, which indicated that nurses stated that they have an unsatisfactory of the knowledge regarding management of anticoagulation (49.3%) while respondents expressed satisfactory level in management of clotted access which is (32.9%) this is nearly agree with study done in Ismailia hospital where their knowledge regard complication during dialysis is (46.0%) [11]. Regard Knowledge about hemodialysis machine, the nurses result is satisfactory level (70.9%) [12] This results is more satisfactory than result done in center in Mansoura city whose result is (40.0%) [13]. The results of the current study revealed that nurse's level of knowledge of nursing standard policy and procedure performed

**Table 6:** The relationship between nurse's marital status and the nurse's total level of knowledge no (79).

Nursing Standard	Knowledge			
	P value	Divorced	Married	Single
Policy & Procedure		3	50	26
<b>Pre</b>				
Unsatisfactory 60-67%		2(4.9%)	24(48%)	15(57.7%)
Satisfactory 70-79%	-0.066	1(5.6%)	13(26%)	4(15.4%)
Above average 80-89%		0	12(24%)	3(11.550)
Exceptional level 90-100%		0	1(2%)	4(15.4%)
<b>Initiating</b>				
Unsatisfactory 60-67%		1(33.3%)	10(20%)	10(38.55)
Satisfactory 70-79%		2(66.7%)	24(48%)	9(34.6%)
Above average 80-89%	0.05	0	11(22%)	4(15.4%)
Exceptional level 90-100%		0	5(10%)	3(11.5%)
<b>During</b>				
Unsatisfactory 60-67%		3(100%)	28(56%)	20(76.9%)
Satisfactory 70-79%	0.054	0	20(40%)	4(15.4%)
Above average 80-89%		0	2 (4.0%)	2(7.7%)
Exceptional level 90-100%		0	0	0
<b>Post</b>				
Unsatisfactory 60-67%		3(100%)	50(100%)	26(100%)
Satisfactory 70-79%		0	0	0
Above average 80-89%	0	0	0	0
Exceptional level 90-100%		0	0	0

**Table 7:** Relationship between nurse's years of experience and the nurse's total level of knowledge no (79).

Nursing Standard	Knowledge			
	P-Value	>10	6-7	<5
Policy & Procedure		no.8	no.23	no 48
<b>Pre</b>				
Unsatisfactory 60-67%		1(12.55)	9(39.1%)	31(64.6%)
Satisfactory 70-79%	0.214	5(62.5%)	7(30.4%)	6(12.5%)
Above average 80-89%		1(12.5%)	6(26%)	8(16.7%)
Exceptional level 90-100%		1(12.5%)	1(4.4%)	3(6.3%)
<b>Initiating</b>				
Unsatisfactory 60-67%		0	4(17.4%)	17(25.4%)
Satisfactory 70-79%	0.124	7(87.1%)	10(43.5%)	18(37.5%)
Above average 80-89%		0	7(30.4%)	8(16.7%)
Exceptional level 90-100%		1(12.5%)	2(8.7%)	5(10.4%)
<b>During</b>				
Unsatisfactory 60-67%		2(25%)	11(47.8%)	38(79.1%)
Satisfactory 70-79%	0.393	5(62.5%)	10(43.5%)	9(18.6%)
Above average 80-89%		1(12.5%)	3(8.7%)	1(2%)
Exceptional level 90-100%		0	0	0
<b>Post</b>				
Unsatisfactory 60-67%		8(100%)	23(100%)	48(100%)
Satisfactory 70-79%		0	0	0
Above average 80-89%	0	0	0	0
Exceptional level 90-100%		0	0	0

**Table 8:** The relationship between “nurse’s nationality” and the nurse’s total level of knowledge no (79).

Nursing Standard	Knowledge		
	P value	Non-Saudi	Saudi
Policy & Procedure			47
<b>Pre</b>			
Unsatisfactory 60-67%		15(31.9%)	26(81.3%)
Satisfactory 70-79%	<b>0.417*</b>	15(31.9%)	3(9.4%)
Above average 80-89%		4(8.6%)	2(6.3%)
Exceptional level 90-100%		13(27.6%)	1(3.1%)
<b>Initiating</b>			
Unsatisfactory 60-67%	<b>0.366**</b>	5(10.6%)	16(50%)
Satisfactory 70-79%		24(51.1%)	11(34.4%)
Above average 80-89%		12(25.5%)	3(9.4%)
Exceptional level 90-100%		6(12.7%)	2(6.3%)
<b>During</b>			
Unsatisfactory 60-67%	<b>0.527**</b>	20(42.6%)	31(97%)
Satisfactory 70-79%		23(48.9%)	1(3.1%)
Above average 80-89%		4(8.55)	0
Exceptional level 90-100%		0	0
<b>Post</b>			
Unsatisfactory 60-67%		47(100%)	23(100%)
Satisfactory 70-79%		0	0
Above average 80-89%	<b>0</b>	0	0
Exceptional level 90-100%		0	0

for patient undergoing hemodialysis process as regards to care of arteriovenous fistula/graft to initiate HD and dual lumen catheter dressing change (temporary vascular access), is 40.5% is satisfactory While less than one thirds of the nurses have an exceptional level of skills for performing care of AV Fistula/graft. Knowledge the current study results revealed that the correlation between the nurse’s total level of knowledge and their age in initiation and during dialysis and *p* value is significant which is highly significant this result\* and, 455'.233. While showed unsatisfactory level regard marital status 24(48%) *p* value -0.066 also the study at hand shows that non-Saudi nurses has a satisfactory of the knowledge while initiating dialysis. Based on *P*-value, 366\*\* is above than 0.05, so there is no statistical significant difference between the nurses’ nationality and the nurses’ level of knowledge at initiating dialysis while non-Saudi nurses have an unsatisfactory knowledge post dialysis. Based on *P*-value, (0.000) the researcher made scanning in literature no any researcher measure the relation between demographic data and knowledge.

### Conclusion and Recommendation

Most of the nurses participated in this study are non-Saudi, female and married aged between 20-29. Majority of nurses have nursing diploma in dialysis with 5 years or fewer experiences as a hemodialysis nurse, but they do not attend to any training programs/course about.

**Hemodialysis:** According to the study’s results and findings, the following recommendations can be drawn. The hospitals should

**Table 9:** Relationship between “nurses attended training programs/course” and the nurses’ total level of knowledge (no 79).

Nursing Standard	Knowledge		
	P value	No	Yes
Policy & Procedure			5
<b>Pre</b>			
Unsatisfactory 60-67%		2(40%)	39(52.7%)
Satisfactory 70-79%	<b>0.055</b>	1(20%)	17(23%)
Above average 80-89%		2(40%)	13(17.6%)
Exceptional level 90-100%		0	5(6.8%)
<b>Initiating</b>			
Unsatisfactory 60-67%		1(20%)	20(27%)
Satisfactory 70-79%		2(40%)	33(44.6%)
Above average 80-89%	<b>0.077</b>	1(20%)	14(18.9%)
Exceptional level 90-100%		1(20%)	7(9.5%)
<b>During</b>			
Unsatisfactory 60-67%		2(4.%)	49(66.2%)
Satisfactory 70-79%		3(60%)	21(28.4%)
Above average 80-89%	<b>0.0.87</b>	0	4(5.4%)
Exceptional level 90-100%		0	0
<b>Post</b>			
Unsatisfactory 60-67%		5(100%)	74(100%)
Satisfactory 70-79%	<b>0</b>	0	0
Above average 80-89%		0	0
Exceptional level 90-100%		0	0

implement new educational plans to increase nurse’s level of knowledge standard policy and procedure for patients undergoing hemodialysis process including pre, initiating, during, post dialysis stages. Improving hospital work environment and improve the health care system to include. The decision-makers in the hospitals should encourage and motivate nurses to attend training programs/course related to hemodialysis.

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