Patients' Perception Regarding Hemodialysis in Zagazig University Hospital Based on the Knowledge, Practice and Attitude Model

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Article History: Received 10th June, Accepted 5th July, published online 10th July 2023

Abstract

Background: Hemodialysis refers to how well toxins and waste products are removed from the patient's blood and has a major impact on their well-being. Hemodialysis delivery should be adequate to improve adequacy of life and to prolong survival. **Aim** to assess the patients' perception regarding hemodialysis in Zagazig university hospital based on the knowledge, practice and attitude model. **Subject: Design**: A descriptive research design was used in this study. **Sample:** Convenient sample equal 217 of patients who have renal failure and undergoing hemodialysis. **Setting:** This study was conducted at hemodialysis units in Zagazig university hospital at Zagazig city, Sharkia governorate, Egypt. **: -Tools:** One tool was used, interviewing questionnaire sheet composed of **5** parts;(demographic data of patient, medical history, patient knowledge about hemodialysis , the reported practice and attitude of patient about the hemodialysis) **Results:** 69.1% of the studied patients had unsatisfactory level of total knowledge regarding hemodialysis, while 30.9% of them had satisfactory level**,** 57.1%of the studied patients had inadequate level of total reported practice regarding hemodialysis and 42.9% of them had adequate level, 71.6%of the studied patients had negative attitude regarding hemodialysis. While, 28.4% of them had positive attitude**. Conclusion** there was a low level of knowledge and attitude that is correlated with subjects' practice scores. Also observed a positive correlation between attitude and practice scores. **Recommendations**: Developing health educational programs that would help patient to increase knowledge, improve practice and attitude regarding hemodialysis

Keywords: Attitude, Knowledge, Practice, Hemodialysis, Zagazig University Hospital Perception

Introduction

Chronic kidney disease (CKD) is defined as a progressive and irreversible loss of kidney function. As per glomerular filtration rate (GFR), an adult reports 60 ml/min/1.73 m^2 or less than that indicates a loss of half or more of normal kidney functioning. CKD is considered a public health problem worldwide. Usually, majority of patients with CKD require replacement treatments including hemodialysis (HD), peritoneal dialysis (PD), and kidney transplantation, among which hemodialysis are the most common replacement modalities ***(Esfan et al., 2020).***

Globally, the prevalence of chronic kidney disease (CKD) was estimated to be 10 million people worldwide, 13.4% in all five stages and 10.6% in stages 3–5, with a 7% increase in end-stage renal disease (ESRD) observed worldwide. The mean prevalence of CKD in high-income countries is approximately 8.6% in men and 9.6% in women. While, 80% of those people living in low- and middle-income countries

(LMICs). A lower income has been identified to be a significant factor associated with CKD prevalence ***(Thurlow et al., 2021).***

Dialysis in general is a procedure of removing waste products and excess fluid from the blood when the kidneys stop working properly. Dialysis composed of two types' peritoneal dialysis and hemodialysis. Hemodialysis is the most commonly utilized therapeutic intervention for patients with end stage renal disease (ESRD) and is generally a safe procedure ***(Mohamedi & Mosha, 2022).***

An estimated 3.7 million people received hemodialysis worldwide in 2021. However, 5.9–9.8 million people were estimated to require hemodialysis, suggesting that ≥2.3 million people might have died because of lack of access to this life-sustaining therapy ***(Bello et al., 2022).***

Hemodialysis is the transport process by which a solute passively diffuses down concentration gradient from one fluid compartment (either blood or dialysate) into the other. The goal of hemodialysis is exiting of the toxins from the body and preservation of its intracellular and extracellular composition in normal range as much as possible.

The adequacy of hemodialysis refers to how well toxins and waste products are removed from the patient's blood and has a major impact on their well-being. Hemodialysis delivery should be adequate to improve adequacy of life and to prolong survival ***(Somji et al., 2020).***

Currently, the standard practice is intermittent in-center 3 to 5 hours of thrice-weekly hemodialysis (HD) in developed countries and many developing countries. Due to economic challenges, however, twice-weekly HD is commonly practiced in several developing countries especially in Asia and Africa. Hemodialysis initiation is needed for CKD, acute kidney injury and many other life-threatening diseases ***(Kron et al., 2022).***

Knowing that illness perceptions and treatment perceptions of patients on dialysis are related to outcomes. Illness perceptions are constantly being updated as patients acquire new illness knowledge, attitude and practice regarding changes on life and health related to illness. Patients' perception regarding disease influence negatively or positively on treatment, health outcome and quality of life ***(Glyde et al., 2019).***

A Knowledge, Practices and attitude (KAP) survey is a quantitative method (predefined questions formatted in standardized questionnaires) that provides access to quantitative and qualitative information. Knowledge, attitudes, and practices are critical components of behavioral change models. Knowledge is the understanding of the information, which is the conscious and non-symbolic perception of meaning. Attitude refers to a positive or negative evaluation of an objective. Practice refers to regular activities that are influenced by widely shared social norms and beliefs ***(Wang et al., 2020).***

Nurses work closely with patients and, therefore, hold a key position in terms of patient perception. A close therapeutic relationship may be developed between nurses and patients on long-term dialysis because they spend several hours a week together during treatment. The dialysis nurses are responsible for treatment administration, information and guidance on topics such as fluids, diet and medication, among others ***(Andersen- Hollekim et al., 2019).***

Community health nurses (CHN) have an important role as advocacy care providers, consultants and educators to help chronic kidney disease patients undergoing hemodialysis to achieve optimal hemodialysis adequacy. CHN must have professional skills in supporting patients on hemodialysis and collaborating in evaluating adequate attainment so as to improve the quality of life for hemodialysis patients ***(Faridah et al., 2021).***

Significance of the study

In Egypt, the estimated annual incidence of ESRD is around 740 per million and the total prevalence of ESRD patients on maintenance hemodialysis was 571 per million populations. The highest proportion of patients with ESRD was estimated 30.8% for patients' age from 50years to 59 years and 60.4% of patients on maintenance hemodialysis from rural areas ***(Abou-Bakr et al., 2022).***

The most commonly associated complications of hemodialysis include hypotension, muscle cramps, nausea and vomiting, headache, pruritus, fever and chills. Many of the complications are associated with hypotension. Rarely, life-threatening complications such as arrhythmias and other cardiovascular

complications occur. Advanced preparation helps avoid dialysis-associated complications such as a malfunctioning catheter or poorly functioning fistula, causing temporary vascular access insertion culminating in sepsis, thrombosis, bleeding, and accelerated mortality ***(Raja & Seyoum, 2020)***

Aim of the Study

This study aims to assess the patients' perception regarding hemodialysis in Zagazig university hospital based on the knowledge, practice and attitude model through:

1. Assessing patients' knowledge regarding hemodialysis.
2. Appraising patients' reported practice regarding hemodialysis.
3. Evaluating patients' attitude regarding hemodialysis.

Research Question:

- What is the level of patients' knowledge regarding hemodialysis?
- What is the level of patients' reported practice regarding hemodialysis?
- Are the patients have positive attitude regarding hemodialysis?

Subject and methods

Research design:

A descriptive research design was applied to achieve the aim of this study.

Setting:

The current study was conducted in hemodialysis units in Zagazig university hospital at Zagazig city, Sharkia governorate, Egypt

Sampling:

Patients with renal failure and undergoing hemodialysis.

Type of the sample:

Convenient sample was used**.**

Sample size: Total number of patients in one year begins of August 2022 to end of January 2023 is 500 patients in hemodialysis unite in Zagazig university hospital at Zagazig city, Sharkia governorate so the target population of this study were 217 patients, the sample size calculation was calculated by using the following equation:

$N= N/ \{1+N (e)^2\}$ ***(Screedharan et al, 2019)***

Where n = sample size

N = population size is 500

e= 0.05 is the level of population

n= 500/ {1+500(0.0025)} =217.

Tool for data collection:

One tool was used to collect study sample for achieving of study aim through:

A structured interviewing questionnaire:

Data for this study was collected by using an interview questionnaire sheet which consists of five parts:

Part I:

Demographic data of patient, this part consists of 7 items as age, gender, marital status, educational level, job, monthly income and residence.

Part II: Patients' health history

Patients' health history which included past and present patients' history. Past medical history this part consist of 6Q as taking analgesics for long period of time, other chronic diseases, reasons that led to your renal failure, symptoms and investigations when discovering renal failure and how long have you been on dialysis. Present history this part consist of 11Q as intravenous line that you use to perform dialysis, time of dialysis session, number of dialysis sessions per week, basic weight, take on regular medication and complaints after hemodialysis sessions as dehydration, hypotension, dyspnea, anemia and need a blood transfusion during session.

Part III: Patients' knowledge about renal failure and hemodialysis.

Which was used to assess the knowledge of patients about hemodialysis, and consist of 26 closed end questions as (meaning of renal failure, causes, signs and symptoms, lab investigations, complications, management of renal failure, definition of hemodialysis, advantages, types, time of hemodialysis and patients' life style). It was guided by ***(Kallenbach, 2020) & (Wu, et al, 2021)***

Scoring system: for knowledge questions, the correct answer was scored as a one degree and the wrong answer or don't know was scored as a zero degree. These scores were summed and were converted into a percent score, Total knowledge scores were classified as follows: The total score knowledge divided into the following:

- **Satisfactory level** if score ≥ 60% (≥15.6 score).
- **Unsatisfactory** level if score <60% (<15.6 score).

Part IV: Patients' reported practice: it was guided by ***(Pessoa & Linhares, 2015),*** aimed to assess practice of hemodialysis patients. It includes of the following subitems:

Part 1: Practice regarding self-care during maturation of the arteriovenous fistula: it was included; avoid traumas on the limb, exercise with a malleable object, avoiding excessive weight , ensure dressing clean and dry, ensure verification of fremitus in artetiovenous link and bandage shouldn't be tight. **6 Q with 12 score.**

Part 2: Practice regarding care while using the arteriovenous fistula: it was included; avoid carrying heavy objects, drawing blood with the arm in which they are located arteriovenous fistula, avoid measuring blood pressure, administration medication, washing arm with soapy water before dialysis, tight clothing should not be worn on the arm in which it is located arteriovenous fistula, use cold compresses followed by warm compresses, avoid sleeping on the arm that contain the arteriovenous fistula, disinfection it before and after hemodialysis, examine the arteriovenous fistula on daily basis and make sure that there is a shaver with finger and daily washing the arteriovenous fistula **11Q with 22 score.**

Part 3: Practice regarding nutrition: it was included; reduce water intake, reduce sodium, potassium, phosphorous intake and increased intake of protein rich foods 5 closed end question**.**

Scoring system:

Total reported practice scores were classified as follows: The scale was contained of 22 Q, the total scores of the scale were 44 grades, each item was evaluated as "done" was taken two score, "sometimes" was taken one score and "not done" was taken zero. These scores were summed and were converted into a percent score. It was classified into 2 categories: The total score practice divided into the following:

- Adequate practice if score ≥ 60% (≥26.4 score).
- Inadequate practice if score from <60% (<26.4 score).

Part IV: Assessment of patients' attitude: it was guided by ***(Machado, et al, 2015)*** and aimed to assess attitude of hemodialysis patients, this part consists of (**26Q**) closed ended questions and, the total score of patient's attitude were 78 grades. As feel that the diet matches your current lifestyle, feel the benefits of limiting your intake of foods, eg fruits and vegetables, feel that the dietitian attaches great importance to restricting certain foods., feel the benefits of cutting back on salt, think it's hard to maintain your diet over time, get frustrated trying to stick to this strict diet..

Scoring system:

The scale was contained of 26 Q, the total score of patient's attitude were 78 grades, each item was evaluated as "Always" was taken three score, "sometimes" was taken two score and "rare" was taken one score. These scores were summed up and were converted into a percentage score. It was classified into 2 categories:

- **Positive** attitude if score ≥ 60% (≥46.8 score).
- **Negative** attitude if score <60% (<46.8 score).

Validity:-

The developed tool would be formulated and submitted to three experts in community health nursing (Helwan University) and two from medical surgical nursing (Helwan University) to assess the content validity, the expertise reviewed the tools for clarity, relevance, comprehensiveness, simplicity, and applicability; minor modifications were done and the final forms were developed.

Reliability*:*
In the present study, reliability was tested using Chronbach's Alpha coefficients for patient's knowledge regarding hemodialysis which was 0.837, patient's reported practice regarding hemodialysis which was 0.875 and patient's attitude regarding hemodialysis which was .717.

Ethical considerations:
An official permission to conduct the proposed study was being obtained from the Scientific Research Ethics Committee at faculty of nursing Helwan University. Participation in the study was voluntary and subjects was be given complete full information about the study and their role before signing the informed consent. The ethical considerations was include explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it was not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs was be respected.

Pilot study:
A pilot study was carried out on 10% (22 patients) of sample size to test the applicability, clarity and efficiency of the tools. Depending on the results of the pilot study no modifications or refinements were done and the patients were included in the actual study sample.

Field work:
Data collection of the study was started at the beginning of August 2022 until the end of January 2023.The investigator introduced herself to the patients, explained the aim of the study and its implication and how to fill in knowledge questionnaire, and ensure their cooperation. Interviewing patient was carried out in specialized room in hemodialysis unit in zagazig hospital (Sharqia-Egypt). The sheet took about 30 -45 minutes to complete. Data was being collected at 2days/week (Interviewing 4 patient on Monday and 5 patient on Thursday from 9am to 12 pm) every week within 6months. Interviewing sheet was be completed by the investigator from patient.

III- Administrative Item:
A written approval letter was being issued from Dean of Faculty of Nursing, Helwan University. The letter was being directed to the director of governmental hospitals in Zagazig university hospital for conducting the study. After explanation of the study aim and objectives, an official permission was obtained from the Dean of faculty of nursing and the general manager of Zagazig university hospital asking for cooperation and permission to conduct the study.

IV-Statistical Item:
Data were summarized, tabulated, and presented using descriptive statistics in the form of means and standard deviations as a measure of dispersion. A statistical package for the social science (SPSS), version (26) was used for statistical analysis of the data, as it contains the test of significance given in standard statistical books. Probability (P-value) is the degree of significance, less than 0.05 was considered significant. The smaller the P-value obtained, the more significant is the result (*), less than 0.001 was considered highly significant (**) and the correlation coefficient was done by using the Pearson correlation test. Fisher's Exact Test is a way to test the association between two categorical variables. When in case of small cell sizes (expected values less than 5). Chi-square (X2) test of significance was used in order to compare proportions between qualitative parameters.

Result
Table (1) shows that 86.2 *%* of the studied patients their age ranged between ≥ 49 years, the Mean SD of age was 51.41 ± 7.23 years, gender and marital status, 61.3% and 89.9% of them were male and married, respectively. 77.9% of them reside at rural area.

Table (2) displays that, 34.1% of the studied patients take analgesics for a long time, 71.0% of the studied patients had history from chronic disease, 72.7% of them had hypertension. Furthermore, 92.2% of them had a decrease urine output when renal failure was detected. Also, 73.7% of them had renal failure for more than 5 years.

Table (3) shows that, 90.8% of the studied patients perform dialysis from arteriovenous connection. Also, 92.6% of them undergoing 3 dialysis sessions per week. 75.1% of them undergo a 4-hour dialysis session. 66.7% of them drinking water to treat dehydration, 75.0% of them toke medicines such as iron to treat anemia. Also, 95.4% of them don't need a blood transfusion during the session.

Figure (1) shows that, 69.1% of the studied patients had unsatisfactory level of total knowledge regarding hemodialysis While, 30.9% of them had satisfactory level.

Table (4). Shows that, 86.2% and 98.2% of the studied patients have correct answer regarding the causes of renal failure and times of hemodialysis, respectively. While 88.0% and 81.6% of them had incorrect answer regarding the types of acute and chronic renal failure, respectively.

Figure (2) shows that, 71.6% of the studied patients had negative attitude regarding hemodialysis. While, 28.4% of them had positive attitude.

Table (5) shows that 30.9% of the studied had satisfactory total level of knowledge, while 69.1% had unsatisfactory total of level knowledge .Also 42.9%,57.1% of the studied had adequate and inadequate level of total practice, moreover 28.4% had positive total attitude and 71.6% had negative total attitude .

Table (6) indicated that, there was highly significant positive correlation between total knowledge score and total reported practice score and total attitude score regarding hemodialysis among the studied patients at P value ‹ 0.01.

Table (1): Frequency Distribution of the Studied Patients according to their Demographic Characteristics (n=217).

Demographic characteristics	**No.**	**%**
Age		
18-<29 years	13	6.0
29-<49 years	17	7.8
≥ 49 years	**187**	**86.2**
Mean ± S **33.7 ± 8.09**		
Gender		
Male	**133**	**61.3**
Female	84	38.7
Marital status		
Single	4	1.8
Married	**195**	**89.9**
Divorced	4	1.8
Widowed	14	6.5
Working status		
Not working	**120**	**55.3**
An employee	30	13.8
Free business	13	6.0
On a pension	54	24.9
Monthly income		
Not sufficient to cover the costs of treatment	**207**	**95.4**
Sufficient to cover the costs of treatment	10	4.6

Residence		
Urban	48	22.1
Rural	**169**	**77.9**

Table (2): Frequency Distribution of the Studied Patients according to their Past History (n=217).

Items	**No.**	**%**
Take analgesics for a long time		
Yes	**74**	**34.1**
No	143	65.9
If the answer is (yes), mention the period (n=74)		
One month or more	4	5.4
A year	**50**	**67.6**
More than year	20	27.0
Suffer from any chronic diseases?		
Yes	**154**	**71.0**
No	63	29.0
***If the answer is (yes), what is it? (n=154)**		
Hypertension	**112**	**72.7**
Diabetes mellitus	83	53.9
***Reasons that led to your renal failure**		
Lupus erythematosus	36	16.6
Kidney infection	107	49.3
Kidney cancer	5	2.3
Partial or complete blockage in the artery that supplies blood to the kidneys	63	29.0
High blood pressure	**112**	**51.6**
Diabetes mellitus	83	38.2
***Symptoms that appeared when discovered renal failure**		
Decreased urine output	**200**	**92.2**
Muscle contraction	126	58.1
Fatigue, general weakness	196	90.3
Itching	7	3.2
***Investigation that were conducted when diagnosing renal failure**		
Kidney functions	**217**	**100.0**
Urine analysis	192	88.5
X-ray of the abdomen	193	88.9
A sample of kidney tissue	4	1.8
How long have you been on dialysis		
Less than a year	8	3.7
From one year to 5 years	49	22.6
More than 5 years	**160**	**73.7**

Table (3): Frequency Distribution of the Studied Patients according to their Present History **(n=217).**

Items	No.	%
Intravenous line that you use to perform dialysis		
Arteriovenous connection	**197**	**90.8**
Central venous catheter in the neck	0	0.0
Intravenous catheterization of the femoral artery (Mahurkar)	20	9.2
Number of dialysis sessions per week		
One session	4	1.8
Two sittings	8	3.7
3 sessions	**201**	**92.6**
More than 3 sessions per week	4	1.8
Time of dialysis session		
Two hours	0	0.0
3 hours	17	7.8
4 hours	**163**	**75.1**
More than 4 hours	37	17.1
Basic weight that should be maintained		
60-<70	66	30.4
70-<80	**104**	**47.9**
80-90	47	21.7
Mean ± SD	**73.49 ± 8.15**	
***Medications that you take on a regular basis**		
Erythropoietin	**192**	**88.5**
Iron tablets	74	34.1
Vitamin D	121	55.8
Vitamin B12	128	59.0
Take medications regularly according to the doctor's instructions		
Yes	**209**	**96.3**
No	8	3.7
Suffer from dehydration after the dialysis session		
Yes	**60**	**27.7**
No	4	1.8
Sometimes	153	70.5
If the answer is yes, what is the treatment that you take to treat dehydration? (n=60)		
Drinking water	40	**66.7**
Intravenous fluid	20	33.3
Suffer from hypotension after the dialysis session		
Yes	17	**7.8**
No	16	7.4
Sometimes	184	84.8
If the answer is yes, what is the treatment that you take to treat hypotension? (n=17)		
Intravenous fluid	**17**	**100.0**
Suffer from dyspnea after the dialysis session		
Yes	87	**40.1**
No	130	59.9
***If the answer is yes, what is the treatment that you take to treat dyspnea? (n=87)**		
Oxygen sessions	**80**	**94.3**

Bronchodilators	76	87.4
Sleeping in a relaxed position	12	13.8
Suffer from anemia as a result of dialysis		
Yes	**80**	**36.9**
No	137	63.1
***If the answer is yes, what is the treatment that you take to treat anemia (n=80)**		
Medicines such as (iron)	**60**	**75.0**
Vitamin B12	26	32.5
Blood transfusion	0	0.0
Eating foods rich in iron	39	48.8
Need a blood transfusion during the session		
Yes	10	4.6
No	207	95.4

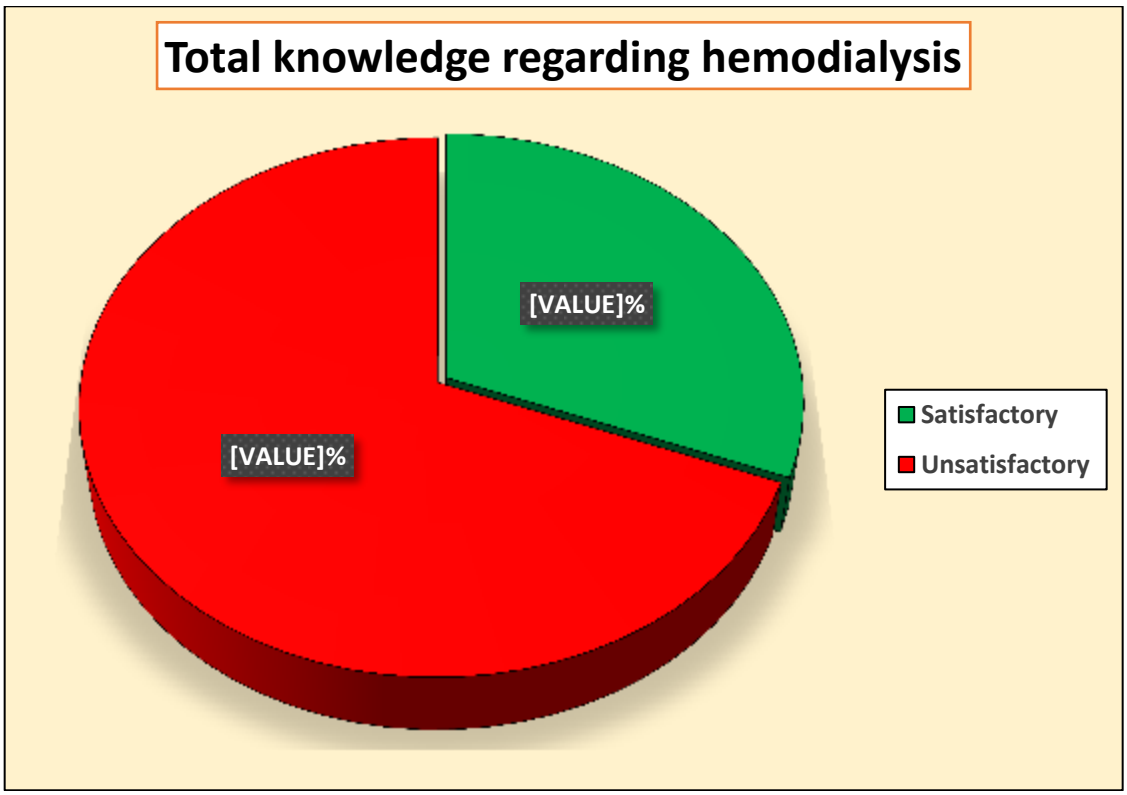

Figure (1): Percentage Distribution of the Studied Patients according to their Total Knowledge Regarding Hemodialysis **(n=217).**

Table (4): Frequency Distribution of the Studied Patients according to Total Reported Practice Regarding Hemodialysis **(n=217).**

Items	**No. of items**	**Adequate**		**Inadequate**		**Mean ± SD**
		No.	**%**	**No.**	**%**	
Self-Care during maturation of the arteriovenous fistula	**6**	102	47.0	115	53.0	6.54 ± 3.47
Care while using the arteriovenous fistula	**11**	89	41.0	128	59.0	14.11 ± 3.60
Nutrition	**5**	61	28.1	156	71.9	4.29 ± 3.73
Total reported practice	**22**	**9 3**	**42.9**	**124**	**57.1**	**24.95 ± 8.57**

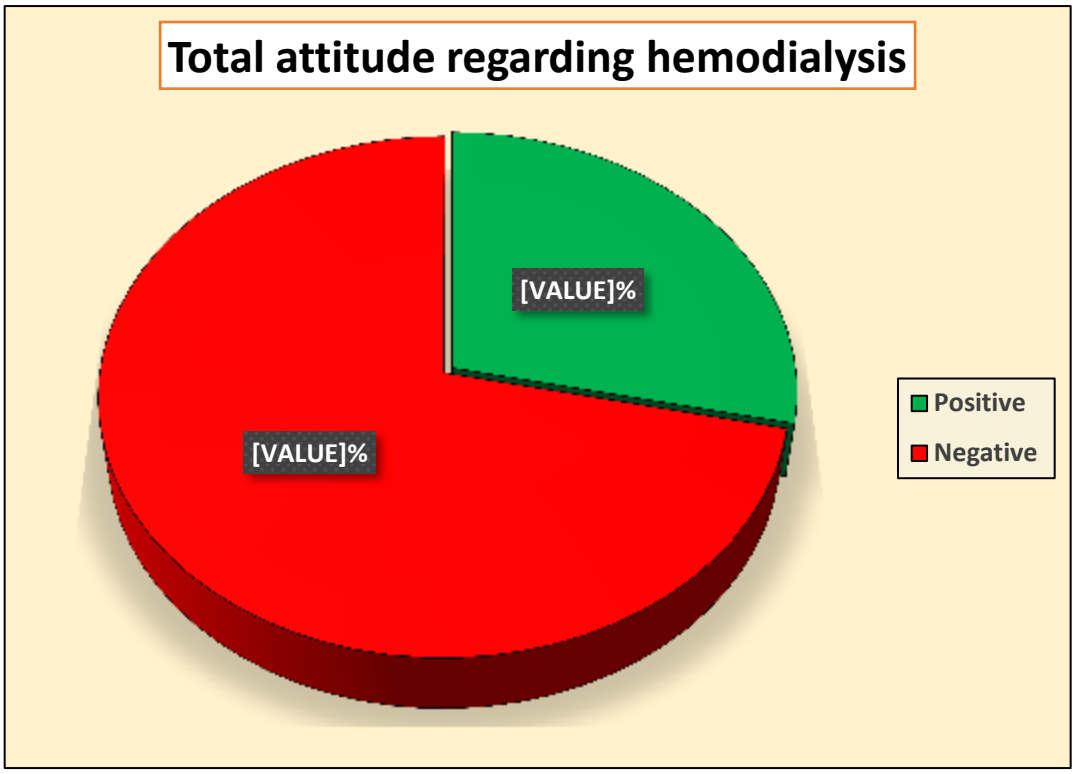

Figure (2): Percentage Distribution of the Studied Patients according to their Total Attitude Regarding Hemodialysis **(n=217)**

Table (5): Frequency Distribution of the Studied Patients according KPA model Regarding Hemodialysis among the Studied Patients (n=217).

ITEMS		Score
Total knowledge	Satisfactory	30.9%
	Unsatisfactory	69.1%
Total practice	Adequate level	42.9%
	Inadequate level	57.1%
Total attitude	Positive	28.4%
	Negative	71.6%

Table (6): Correlation between Total Knowledge Score, Total Reported Practice Score and Total Attitude Score Regarding Hemodialysis among the Studied Patients (n=217).

Items	Total knowledge		Total reported practice	
	R	P-Value	R	P-Value
Total knowledge			0.675	0.000**
Total attitude	0.604	0.000**	0.594	0.000**

Discussion

Hemodialysis (HD) is an alternate of renal functioning for survival, either temporary (waiting for renal transplantation) or lifelong. Hemodialysis is the only type of dialysis being offered to ESRD patients in Egypt as peritoneal dialysis is not common **(Hassaballa et al., 2022).** HD has many implications which affect physical, psychological or social aspect of life e.g. fatigue, bone pain, dyspnea, low self-esteem, anxiety, depression (**Iqbal et al., 2021).**

Demographic data of studied patients:

In relation to characteristics of the studied patients, the current study revealed that, majority of the studied patients their age ranged between ≥ 49 years, with the mean ± SD of age was 51.41 ± 7.23 years. This study was on the same line with ***Spies et al., (2020)*** who carried out a study entitled "Knowledge, attitude and practices of patients receiving maintenance hemodialysis in Bloemfontein, South Africa" and represented that (70.7%) of the studied patients their age group was ≥ 50 years with mean ±SD 53.51±6.24 years. Contrariwise, this finding was disagreed with ***Peter et al., (2021)*** in their study titled "Knowledge and attitude of the patients undergoing hemodialysis regarding their dietary management, India" and mentioned that (28.6%) of the studied patients their age group were ≥50 years. From the investigators point of view, these results might be due to that renal failure is more common at this age

Regarding patients' past history, the present study found that, more than one third of the studied patients take analgesics for a long time and more than two thirds of them toke analgesics from one year. This study was on the same line with **Ali & Khalid, (2021)** in their study titled "Chronic renal disease and related factor in patients undergoing hemodialysis at public hospital, Lahore city" and revealed that (24.2%) of the studied patients received general analgesics. Also, this result was agreed with **Ahmed et al., (2021)** in their study "Health related quality of life among chronic kidney disease patients undergoing hemodialysis in Pakistan" and reported that (80.4%)of the studied patients take analgesic from one year or less.

Concerning to present history, the constant study represented that, most of the studied patients perform dialysis from arteriovenous connection and undergoing 3 dialysis sessions per week. This result was on the same line with ***Naseef et al., (2023)*** in their recent study titled "Quality of life of Palestinian patients on hemodialysis, Egypt" and stated that (66.4%)of the studied patients had hemodialysis sessions for ≥3 sessions per week. . From the investigators point of view, these results might be due to the patient's health condition and the extent to which patient adheres to medications and other doctor's instructions

Regarding to patients' knowledge about hemodialysis (Answer research question NO (1), the current study represented that, more than two thirds of the studied patients had unsatisfactory level of total

knowledge regarding hemodialysis. While, less than one third of them had satisfactory level. This result was agreed with ***Fadlalmola & Elkareem, (2020)*** who conducted a study titled "Impact of an educational program on knowledge and quality of life among hemodialysis patients in Khartoum state" and reported that (75.2%)of the studied patients had unsatisfactory knowledge level regarding hemodialysis. Contrariwise, this finding was disagreed with ***Dawood, (2020)*** who carried out a study entitled "Assessment of Patient's Knowledge Regarding Hemodialysis Therapy at Imam Hussein Medical City in Holly Karbala Governorate" and found that (67.6%)of the studied patients had good knowledge regarding hemodialysis. In investigators point of view, this might be related to their educational level.

Concerning to patients' reporting practice about hemodialysis (Answer research question NO (2) ,the constant study represented that, more than half of the studied patients had inadequate level of total reported practice regarding self-care during maturation of the arteriovenous fistula and care while using the arteriovenous fistula. While, less than three quarters of them had inadequate level of total reported practice regarding nutrition. This result was in agreement with ***Bharati, (2022)*** reported that (86.5%) of the studied patients had inadequate practice level regarding caring of arteriovenous fistula. Also, this finding was in agreement with ***Velraja et al., (2022)*** in their recent study titled "Knowledge, attitude, and practices of renal diets among hemodialysis patients, India" and found that (64.0%) of the studied patients had poor practice regarding renal diets among hemodialysis patients. From the investigators point of view, this result may be due to patients needed to enhance their skills about practice related to care arteriovenous fistula.

Regarding total patients' attitude (Answer research question NO (3)**,** the constant study represented that, less than three quarters of the studied patients had negative attitude regarding hemodialysis. While, more than one quarters of them had positive attitude. This study was in agreement with ***Spies et al., (2020)*** who carried out a study entitled "Knowledge, attitude and practices of patients receiving maintenance hemodialysis in Bloemfontein, South Africa" and stated that (60.0%) of the studied patients had negative attitude regarding hemodialysis. Contrariwise, this result was dissimilar to ***Dhanalakshmi & Malathi, (2023)*** in their recent study titled "Effectiveness of video assisted teaching program on knowledge and attitude regarding hemodialysis among patients with chronic renal failure, India" and mentioned that (55.8%) of the studied patients had positive attitude regarding hemodialysis preprogram. From the investigators point of view, these results might be due to that patients usually have a lot of stress psychological problems.

Correlation between Total Knowledge, Practice and Attitude Score. The present study revealed that, there was highly significant positive correlation between total knowledge score, total reported practice score and total attitude score regarding hemodialysis among the studied patients. this result was supported by ***Amarasinghe et al., (2022)*** in their recent study titled "Assessment of knowledge, attitudes and practices (KAP) on arterio-venous fistula (AVF) care among end stage renal disease (ESRD) patients on hemodialysis-study in uva province, Sri Lanka" and reported that there was strong positive correlation between total knowledge, attitude and practice. Also, this finding was on the same line with ***Wolide et al., (2020)*** who conducted a study entitled "Knowledge, attitude and practices toward chronic kidney disease among care providers in Jimma town" and found that there was positive correlation between total knowledge, attitude and practice among the studied patients. From the investigators point of view, these results might be due to that satisfactory knowledge of patients regarding hemodialysis improves total reported practice and patients attitude related hemodialysis among studied patients.

Conclusion

Based on findings of the present study, it can be concluded that:

More than two thirds of the studied patients had unsatisfactory level of total knowledge regarding hemodialysis. while, nearly one third of them had satisfactory level. Additionally, more than half of the studied patients had inadequate level of total reported practice regarding hemodialysis and more than one third of them had adequate level. Moreover, less than three quarters of the studied patients had negative attitude regarding hemodialysis. While, more than one quarters of them had positive attitude. Also, there was strong positive correlation between total knowledge, practice and attitude of the studied patients.

Finally, concluded that, the studied patients had poor knowledge and inadequate practice and negative attitude regarding hemodialysis.

Recommendation

Based on the findings of the present study, the following can be recommended:

- Health education through mass media concerning hemodialysis, arteriovenous fistula and methods of preventing renal failure.
- Developing a simplified illustrated and comprehensive booklet for improving

Patients' knowledge, attitude and practice regarding hemodialysis and caring of arteriovenous fistula.

- Encourage patients to make group discussion regarding the hemodialysis and renal failure to exchange their experience about the disease under observation from community health nurse.
- Replication of the same study on larger probability sample at different geographical locations for data generalizability.

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