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Assessment of Nurses' Perception regarding Children undergoing Hemodialysis

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Abstract

Background: Hemodialysis is a type of renal replacement therapy, where filtration of the blood by the kidney is supplemented by artificial equipment, that uses a machine called a dialyzer to filter the patient's blood outside his body. **The study aimed to:** assessment of nurses' perception regarding children undergoing hemodialysis. **Design:** A descriptive research design was used in this study. **Setting:** This study was conducted at pediatric hemodialysis units at Benha University Hospitals and Cairo University (Abu El-Rish Child Hospital). **Sample:** A convenience sample include60 nurse (30 nurses from Benha University Hospitals and 30 nurses from Abu El-Rish Child Hospital). **Tools:** two tool, 1st A structured interview questionnaire was used to assess, (A) nurses 'demographic data, (B)child personal data, (C)past and current medical history, nurses' knowledge regarding chronic kidney disease& hemodialysis and Nurses 'attitude regarding hemodialysis for children, 2nd Tool: observational check list to assess nurses' practice regarding care of children undergoing hemodialysis. **Results:** 43.3% of the studied nurses had an average of total knowledge level regarding Children undergoing hemodialysis, 86.7% of studied nurses had negative total attitude regarding Children undergoing hemodialysis and 83.3% of the studied nurses had adequate level of total practice regarding Children undergoing hemodialysis. **Conclusion:** There was a positive statistically significant correlation between total Knowledge, attitude and Practices of studies nurse regarding children undergoing hemodialysis. **Recommendations:** Apply and implement an educational program to increase nurses' perception regarding hemodialysis of children.

Key words: *Assessment Nurses perception, Children, Hemodialysis.*

I. Introduction

Hemodialysis is the predominant approach to treat end-stage renal disease (ESRD) children. Hemodialysis is a procedure used to cleanse blood & remove waste products like urea and creatinine from the blood. Dialysis is necessary when there is a significant electrolyte imbalance, fluid overload, hyperammonemia, in children with kidney injury. congenital abnormalities of the kidney and urinary tract and glomerular disorders are common causes of pediatric kidney failure that require dialysis **(Naheed et al.,2023).**

The hemodialysis machine washes the child's blood with a Central venous catheter (CVC) that is placed in a large blood vessel or a surgically created Arteriovenous fistula (AVF). The blood passes through an artificial kidney or dialyzer where excess water and waste products are removed **(Marcdante et al., 2022).** Dysfunctional dialysis access disrupts scheduled dialysis treatment (three times \weak) and is associated with higher mortality rates. Continuous care to child dialysis access is essential to the improvement of child condition. It's important to take care of the vascular access to prevent complications **(Sobh et al., 2019).**

Globally, there is an increase in both the incidence and prevalence rates of individuals suffering from End-Stage Renal Disease (ESRD) in children and adolescents is the cause of morbidity and mortality. in the United States Renal System's 2019 annual report, the prevalence of ESRD in children and adolescents was 98.7 per million population **(Saran et al.,2020).** In the European Union countries, its prevalence ranged from about 55–60 to 70–75 pmarp in Spain and Italy. In the Arabic region, the prevalence of Chronic Renal Failure (CRF) among pediatric in Saudi Arabia is 80 to 120 per million population (pmp) **(Masalskiene et al., 2021)**.

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Children during the process of hemodialysis require vascular access for prolonged periods, arteriovenous fistula, graft, or central venous catheter. The arteriovenous fistula is the most favorite type of access because it provides good blood flow for dialysis, Nurses have an important role to prolong the period of AVF and reduce complications. Needling of arteriovenous fistula prior to hemodialysis is important to the hemodialysis process. Successful needling is required to do the hemodialysis treatment using the arteriovenous fistula. Incorrect techniques lead to complications including stenosis, infections, hematoma, bleeding and pain **(Osman et al., 2023).**

Hemodialysis children have changes in the body due to chronic renal failure. Uremia-related skin changes, changes in skin color due to anemia, having a shunt or fistula in the arm, weight gain due to fluid overload, social relations, and experience fear of rejection by others, deterioration of self-care behaviors **(Ahmed et al., 2020)**.Dialysis is the most effective method to remove toxins from the body but have many complication such as cardiovascular complications (hypertension), increased coagulability, anemia and increased arterial venous infection ,stenosis **(Magor et al., 2022).**

Nurses' perceptions of children in dialysis are often shaped by compassion, resilience, and a focus on holistic care. Nurses' perceptions focus on attitude and knowledge towards the treatment process and care of hemodialysis children. Nurses view these children as courageous fighters, with unique physical and emotional needs that require specialized attention. Understanding the challenges these young children face, nurses strive to create a comforting environment, providing both medical support and emotional reassurance. Nurses' perceptions emphasize the importance of empathy, patience, and effective communication in delivering quality care to children undergoing dialysis **(Okeke, 2023).**

Community health nurses can help by involving children suffering from chronic kidney disease in health care decisions, and informing children of all treatment options. Children undergoing hemodialysis require specialized nursing care, including the establishment of therapeutic and interpersonal relationships. A nurse plays a vital role in providing information, care, support, understanding and therapeutic counseling to children & families about the disease. Nursing management must be provided to reduce the complications of renal function and the stresses of dealing with a life-threatening illness **(Whiteside et al., 2020).**

II. Significance of the study:

A study performed in Alexandria University at Egypt. discovered that 587 children had end stage renal disease (ESRD) and only 549 (93%) of children with ESRD were treated by hemodialysis **(Ahmed et al., 2022).** There are a growing number of children with End stage renal disease (ESRD) who are undergoing hemodialysis. in Egypt the number of hospitalized children with chronic renal failure from births to 15 years of age approximately 1.36%, 93.5% of children with ESRD received hemodialysis in university hospitals (**Mohamed et al., 2024).**

various complications occur as a result of renal failure, and frequency depends on the stage of chronic kidney disease. Anemia is the most common complication with the prevalence being >93% at stage 5 CKD. growth impairment, high blood pressure, Hormonal imbalances can delay or disrupt normal sexual development, Toxin accumulation can cause confusion, seizures, Long-term CKD increases the risk of heart failure and arrhythmias so that is important to treated by hemodialysis to reduce this problem& improve health of children overall **(Harada et al.,2022).**

III. Aim of the Study:

The aim of this study was to assess nurses' perception regarding children undergoing hemodialysis through the following objectives:

1. Assessing nurses 'knowledge regarding children undergoing hemodialysis.
2. Determining nurses' attitude regarding children undergoing hemodialysis.
3. Appraising nurses' practice regarding children undergoing hemodialysis.

Research question:

1. What are nurses' knowledge about children undergoing hemodialysis?
2. What are nurses' attitude regarding care of children undergoing hemodialysis?
3. What are nurses' practices regarding children undergoing hemodialysis?
4. Is there a relation between nurses' knowledge, attitude, practices, and their demographic characteristics?
5. **The operational definition of perception of nurses regarding hemodialysis** was focused on attitude and knowledge towards the treatment process and care of hemodialysis children.

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IV. Subject and Methods

The subject and methods of this study was portrayed under items as following:

I- Technical item.
II- Operational item.
III- Administrative item.
IV- Statistical item.

I- Technical Item:

The technical item includes research design, setting, subject and tools for data collection.

Research design*:*

A Descriptive research design was used to conduct this study.

Setting:

This study was conducted at pediatric hemodialysis units affiliated to both Cairo University (Abu El-Rish Child Hospital) and Benha University Hospitals. The pediatric hemodialysis unit at Abu El-Rish Child Hospital was located on the fourth floor. This unit divided to four parts; first part consists of room include 12 hemodialysis machines for negative hepatis c & 9 machines for positive hepatis c. The second part includes 3 machines for acute hemodialysis cases. The third part includes 4 bed intensive care unit. The fourth part includes 4 bed peritoneal dialysis. While the pediatric hemodialysis unit at Benha university was located on floor 4 and consisted of 2 rooms including 14 hemodialysis machines for negative hepatis c & room consists of 7 machines for positive hepatis c .and room consist of 2 bed for intensive hemodialysis cases.

Sampling:

Convenience sample of all nurses dealing with children undergoing hemodialysis therapy (30 nurses from Benha University Hospitals and 30 nurses from Abu El-Rish Child Hospital).

Tools for data collection:

Data was collected through using the following Two tools.

1st tool: Structured interviewing questionnaire was used in the study; it is developed by investigator after reviewing the national and international related literature and contains three parts.

Part I: A) Demographic characteristics of the studied nurses: include age, gender ,education level, marital status, years of experience of their place of work &place of residence.

B) Personal data of studied children which include age, sex, educational level, rank of children in family &place of residence.

C)Past and present medical history of studied children include: period of disease, age of starting & reason of hemodialysis, symptoms of kidney failure that appeared on the child, how many dialysis sessions per week, how long does session take, method used for dialysis, have you had complications because of a dialysis session & what this complication, have you ever been to the hospital, if answer yes what is the number of the admition times, does he do periodic follow-up, the number of follow-up times, is there any family member suffering from kidney failure, if answer yes who is it.

Part II: Nurses' knowledge regarding chronic kidney disease& hemodialysis include : definition , causes , symptoms , most children susceptible , methods used to treat chronic kidney failure, definition & method used of hemodialysis, best time to do a routine virus & kidney function tests for a child with dialysis treatment, the physical , physiological ,psychological effects& complications of dialysis on the child, nursing care for a child undergoing dialysis before, during & after the session , the blood transfusion is given to a child & complications that may occur when transfusion of blood for a hemodialysis child with, appropriate diet for child with hemodialysis, nursing care for the Vistula & advice that nurse give to the parents for child undergoing hemodialysis.

Scoring system for knowledge:

Composed of 22 closed ended questions, each knowledge question was scored by zero for wrong, one for «correct incomplete » and 2 for correct complete. The total knowledge scores ranged from 0-44, The questions were evaluated as follows:

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Total score knowledge

Poor knowledge < 60% (<26.4scores)

Average knowledge 60%- 75% (26.4<33scores)

Good knowledge ≥ 75 % (33-44 scores)

Part III: Nurses'attitude regarding hemodialysis for children include items such as the nurse feel worried about installing hemodialysis links in children, feel hopeless dealing with children, feel stressed by the abundance of nursing care provided to children, feel bad when financial problems are not resolved regarding the purchase of treatment for the child, feel disturbed when complications occur because of connecting the child to the blood dropsy machine, became harsher with dealing with children, feel bad for hemodialysis child to repeat the same complaint every day, engorging the questions of the child / his family due to the lack of time and the large number of burdens during work, stress at work affected the efficiency in providing nursing care for children , feel uncomfortable and bored from the length of the hemodialysis session.

Scoring system for attitude:

10 closed ended questions. Each question was scored by one for a disagreement, two for a neutral and 3 for agree. Total attitude scores range from 10-30 scores.

Negative attitude< 60% (<18 score).

Positive attitude> 60% (18-30 score).

2nd Tool:

Observational check list to assess nurses' practices regarding care of children undergoing hemodialysis including practices before dialysis section consist of 16 steps, during hemodialysis section consist of 5steps, after hemodialysis section consist of 10steps.

Scoring system for practices:

31 closed ended questions. Each practice was scored by one for «done practice», zero for a «not done practice ». The total practices scores range from 0-31.

Total score reported practice

Inadequate practices < 60% (<18.6 scores)

Adequate practices > 60% (18.6-31 scores)

Validity and Reliability:

The study tools were tested for content and face validity by jury of three experts in the field of Community Health Nursing (One) and Pediatric Nursing (Two) to evaluate the items Tools as well as the entire instrument as being relevant and appropriate to test what experts wanted to measure. The face validity of the questionnaire was calculated based on experts' opinion after calculating content validity index (%) of its items and it was 94%.

The experts were asked to evaluate the individual items on the study tools in relation to their relevance and appropriateness in terms of the construct and if the items adequately measure all dimensions of the construct. The experts were asked to evaluate individual items and rate items on a 4-point scale as follows; not relevant scored (1), Little relevant scored (2), relevant scored (3) and very relevant (4).

A pilot study was carried out on 10% of the study subjects and was included in the total sample. To assess reliability, the study tool was tested by the pilot subjects for calculating Cronbach's Alpha which was 0.80 for knowledge questionnaire, 0.99 for practice questionnaire and 0. 85 for attitude.

Ethical considerations:

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

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II- Operational Item:

Preparatory phase:

It will include reviewing past, current, national, and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

Pilot study:

The pilot study will be done on 10% (6 nurses) of the sample to examine the clarity of questions and time needed to complete the study tools. Based on the results, modification will be done (if necessary). Subjects included in the pilot study will be include from the study.

Field work:

An official letter issued from Dean Faculty of Nursing, Helwan University, and directed to the director of Pediatric Hemodialysis Units at Benha University Hospitals and Cairo University (Abu El-Rish Child Hospital) including the aim of the study to obtain permeation. Informed consent was obtained from participants.

Data was collected starting at the beginning of March 2024 until May 2024 3days/week from 9am-1pm within 2.5 months, 2nurse /day, 24 nurse /month, 60 nurse /2.5 month. The questionnaire sheet takes about 20 minutes by the investigator from each nurse to complete.

III- Administrative Item:

After the explanation of the study aim and objectives, an official permission was obtained from the Dean of faculty of nursing and the general manager of Helwan hospital asking for cooperation and permission to conduct the study.

IV-Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 24, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describes a categorical set of data by frequency, percentage or proportion of each category, using Chi-square test (χ^2). Correlation between variables was evaluated using Pearson's correlation coefficient (r). Significance was adopted at $p<0.05$ for interpretation of results of tests of significance.

IX.Results

Table (1): Show that 70% of nurses their age was from 20<30 years. Also, 50% of nurses have a Bachelor of Nursing. Moreover 76.7% of nurses were married. As the number of years'experience in the dialysis unit was equal between less than 1year, from the year < to 5years and in more than 10 years is 26.7%.

Table (2): Displays that, 50 % of studied child aged ≥12 years. 65% of child gender was female. Also, the equal percentage 30% of the Children had read &write and primary level. 76.7% of children resided in rural areas.

Table (3): Show that, 60% of child period of illness was 3-<5 years. Regarding the age of child at the onset of dialysis, 63.3% of studied children were from 5-<10 years. Also, 36.7 % of the studied children suffering from congenital defects as the reasons for the child's dialysis. Also, 43.3 % of the symptoms of kidney failure that appeared on the child were oliguria. Regarding to number of dialysis sessions per week 83.3% of them had 3 times a week.

Figure (1): Shows that, 73.2% of Studied children had 4hours done dialysis session, while 1.7 % of them had 2 to 2.5 hours of dialysis sessions.

Figure (2): Show that, 82.8% of the number of follow up times was once a month, 13.8% once every 3months & 3.4% once every 6 months.

Continue Table (3): Show that, 76.7% of studied children used fistula for hemodialysis, 66.7% of them had complications because dialysis sessions & 23.3% of this complication was bleeding at the arterial junction site & ecchymosis around the arteriovenous junction. Moreover 90% of the studied children were hospitalized & the admission times mean ± SD was 3.26 ±1.68 as regards the reason of hospitalization was 70.4% associated with renal failure or dialysis. Also, 73.3% of family members don't suffer from kidney failure. Furthermore,37.5% of person affected by family were the father.

Figure (3): show that, 43.3%of studied nurses had average of total knowledge level regarding Children undergoing hemodialysis, 36.7% from studied nurse had poor knowledge & 20% had good Knowledge level regarding Children undergoing hemodialysis.

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Figure (4): show that, 86.7% of studied nurses had negative total attitude & 13.3% of studied nurses had positive attitude regarding children undergoing hemodialysis, Range =13, Mean ± SD = 14.43±3.41, $\chi 2$=20.66 & P=0.02.

Table (4): Regarding the level of total nurses' observational practices regarding children undergoing hemodialysis this table clarify that 83.3% hade adequate level of practice while 16.7 % 0f the studied nurses had inadequate level of practice and range 24, Mean ± SD 55.1**±7.65.**

Table (5): reveals that there was positive statistically significant correlation between total Knowledge, attitude and Practices of studies nurse.

Table (1): Frequency Distribution of the Nurses according to their Demographic Characteristic (60)

Nurse's demographic characteristics	No	Percent
Age in years		
20 -<30 years	42	**70**
30 -<40 years old	18	30
≥40 years	--	--
Academic qualification		
Nursing Technician	14	23.3
Bachelor of Nursing	30	**50**
Postgraduate studies in nursing.	16	26.7
Marital status		
Single	8	13.3
Married	46	**76.7**
Divorced	2	3.3
Widower	4	6.7
Number of years' experience in the dialysis unit:		
<of the year	16	**26.7**
1- <5years	16	**26.7**
5 -< 10 years	12	20
≥10 years	16	**26.7**

Table (2): Frequency Distribution of the child's personal data (n=60)

child's personal data	No	Percent
Age in years		
3 -<6 years	10	16.7
6 -< 9 years	6	10
9-<12 years	14	23.3
≥12 years	30	**50**
Gender		
Male	21	35
Female	39	**65**
The level of education		
He does not read or write	6	10
Read and write	18	**30**
Primary	18	**30**
Preparatory	14	23.3
High school	4	6.7
Place of residence		
Urban	14	23.3
Rural	46	**76.7**

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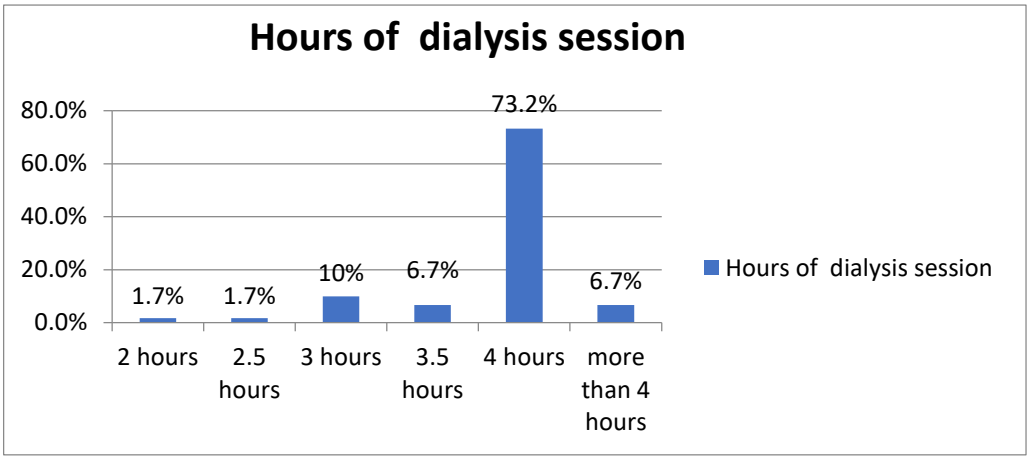

Figure (1): Percentage Distribution of the Studied Children undergoing hemodialysis regarding their hours of dialysis session (n=60).

Table (3): Frequency Distribution of the Studied Children undergoing hemodialysis regarding past and present medical history (n=60).

Child past and present medical history	No	%
The period of illness of the child in years		
3 -<5 years	36	**60**
5 -<9 years	20	33.3
9 - ≤12 years	4	6.7
The age of the child at the onset of dialysis		
5 -< 10 years	38	**63.3**
10- <15 years	14	23.3
≥15 years	8	13.3
The reason for the child's dialysis		
A child suffering from a congenital defect.	22	**36.7**
Allergy to some medication.	2	3.3
A child suffering from genetic diseases such as the syndrome.	18	30
A child suffering from accumulation of toxins.	18	30
Symptoms of kidney failure that appeared on the child		
Weaknesses and general emasculation.	14	23.3
Swelling in the ankles.	4	6.7
Change the color of urine.	10	16.7
lack of concentration and delayed growth.	4	6.7
Oliguria.	26	**43.3**
Headache.	2	3.3
Number dialysis sessions per week		
2 times a week.	8	13.3
3 times a week.	50	**83.3**
More than three times a week.	2	3.3

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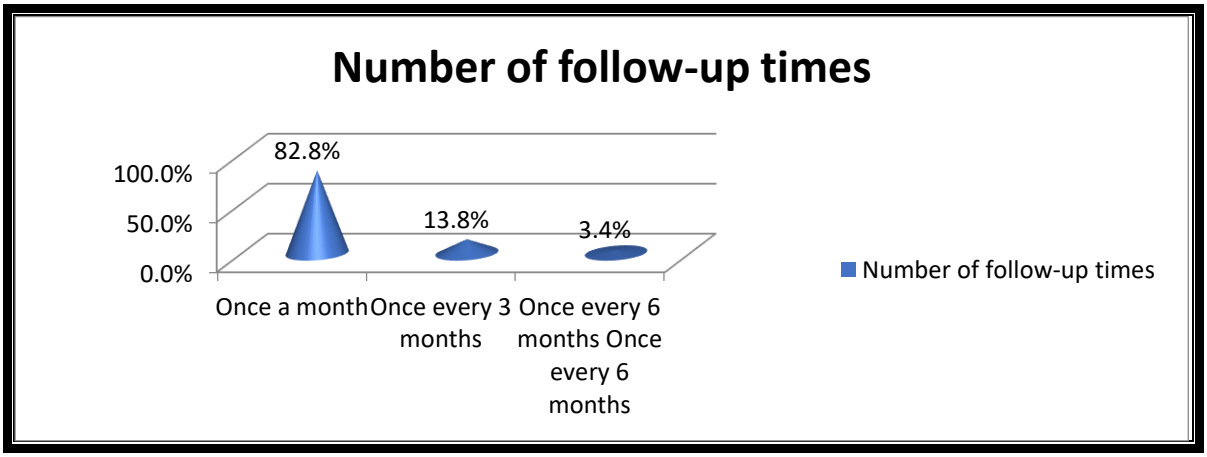

Figure (2): percentage Distribution of the Studied Children regarding number of follow up times (n=60).

Continue Table (3): Frequency Distribution of the Studied Children regarding past and present medical history (n=60).

Child past and present medical history	No	%
Method used for the child in dialysis		
Hemodialysis catheter (central venous catheter).	14	23.3
Fistula (arterial &venous connection).	46	**76.7**
Complications because of a dialysis session		
Yes	40	**66.7**
No	20	33.3
Complications type (40)		
Bleeding at the arterial junction site.	14	**23.3**
Thrombosis in the place of arterial link.	6	10
Ecchymosis around the arteriovenous junction.	14	**23.3**
Tumor around the arterial link.	6	10
Have you ever been to the hospital		
Yes	54	**90**
No	6	10
Admission times 3.26 ±1.68		
Reason for hospitalization (54)		
Associated with renal failure or dialysis.	38	**70.4**
Complications of kidney failure or dialysis.	16	29.6
Periodic follow-up		
Yes	58	**96.7**
No	2	3.3
Family member suffering from kidney failure		
Yes	16	26.7
No	44	**73.3**
Person affected from family (16)		
Father.	6	**37.5**
Mother	4	25
Sister	4	25
Grandma	2	12.5

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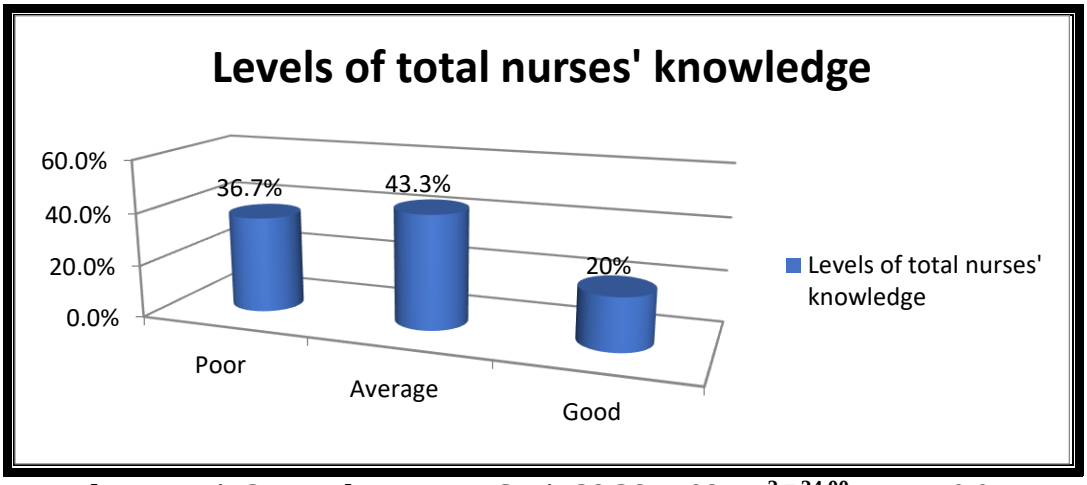
Part III: Nurses knowledge regarding Children undergoing hemodialysis. Answered research question number (1): What are nurses' knowledge about children undergoing hemodialysis? in Figure (3)

Figure (3): Percentage Distribution of the Total Studied Nurses according to their knowledge about children undergoing hemodialysis (n=60)



the range is 21 the Mean ± SD is 28.36±5.08 $\chi^{2} = 24.00$ P =0.04

Part IV: Nurses attitude regarding Children undergoing hemodialysis. Answered research question number (2): What are nurses' attitudes regarding care of children undergoing hemodialysis? In Figure (4)

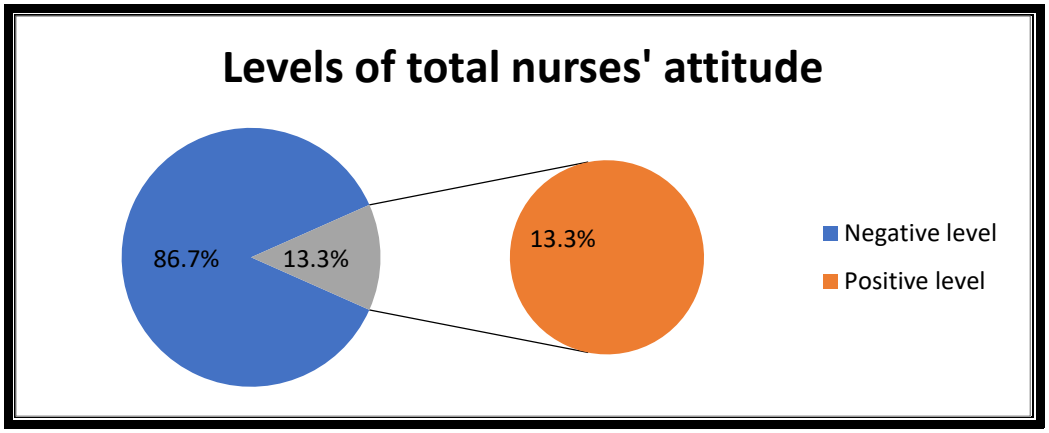


Figure (4): Percentage Distribution of the Studied Nurses according to their Attitude toward children undergoing hemodialysis (n=60)

Part V: Nurses practice regarding Children undergoing hemodialysis.
Answered research question number (3): What are nurses' practice regarding children undergoing hemodialysis? in table (4)

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Table (4): Frequency Distribution of the Total Studied Nurses according to their observational practices regarding children undergoing hemodialysis (n=60)

Total nurses' practices	Studied Sample		χ^2	P
	No.	%		
Levels of total nurses' practices:				
Adequate	**50**	**83.3**		
Inadequate	**10**	**16.7**	**32.33**	**0.000**
Range	**24**			
Mean ± SD	**55.1±7.65**			

Part VI: correlations between the studied variables.

Answered research question number (4): Is there a relationship between nurses' knowledge, attitude, reported practices and their demographic characteristics? In table (5).

Table (5): Correlation between Total Level of Knowledge, Attitude and Reported Practices among the Studied Nurses (n=60)

Knowledge practices and attitude	Changes of scores of total knowledge, practices, and attitude					
	Knowledge		Practices		Attitude	
	R	P	r	P	r	P
Knowledge	**1**	----	0170	0.194	0.285	0.02
Practices	0170	0.194	**1**	-----	0.127	0.333
Attitude	0.285	0.02	0.127	0.333	**1**	---

R= correlation coefficient test. P=p-value (highly statistically significance) at p<0.001

X. Discussion

Chronic kidney Disease (CKD) is the major health problem worldwide. Hemodialysis is the most common method used to treat kidney failure. Hemodialysis (HD) is life-saving treatment through medical procedures to remove fluid and waste products from the blood and to correct electrolyte imbalances. HD is used to treat both acute (temporary) and chronic (permanent) kidney failure. HD is a therapy for kidney failure that uses a machine called a dialyzer to filter the patient's blood outside his body. HD is not a cure for kidney failure, it helps patients feel better and live longer. HD in the pediatric age group is performed through central venous catheters (CVC). Arteriovenous fistulas or AVG ***(Saeed& Khatam, 2020).***

Part I: Demographic characteristics of the studied nurses regarding hemodialysis children.

Regarding demographic characteristics of the studied nurses, the finding of the current study revealed that, less than three-quarters (of the studied nurses were in age group from 20<30years(table1). This result was consistent with the results of study performed by **Machaly et al., (2020)** in Suez Canal University Hospitals and Ismailia General Hospital, Egypt (n=60), in their recent study titled "Effect of Implementing Evidence Based Nursing Guidelines on Nurses' Performance Regarding Care Provided for Children Undergoing Hemodialysis" and found that (58.3%) of the studied nurses were aged between 20 to 30 years From investigator point of view, dealing with hemodialysis children experienced nurses not newly graduated.

Regarding gender and marital status, the finding of the current study illustrated that, more than three-quarters of the studied nurses were female and married. These finding were agreed with ***Alsolami, et al., (2024)*** Whose conducted study in Saudi Arabia, (n=197). Titled "Hemodialysis nurses' knowledge, attitude, and practices in managing vascular access: A cross-sectional study in Saudi Arabia" and clarified that, (85.0%) of studied nurses were female and married.

From investigator point of view these may be related to male to female enrollment ratio in nursing colleges at most Egyptian universities reflects the gender distribution in nursing profession, which is female. This information sheds light

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on the demographic set of the field and can be useful for these looking to understand trends in health care education and the workforce.

Concerning educational level, the results of the present study revealed that half of the studied nurses had a Bachelor of Nursing. This result agrees with ***Afify et al., (2022)*** whose conducted study Pediatric Intensive Care Units (PICU) at Benha University Hospital and Specialized Pediatric Hospital. (n=77) in their recent study titled "Nurses' Knowledge and Practices regarding Care of Children Undergoing Vascular Access and its Related Complications" and clarified that half of the studied nurses (51.9 %) had a Bachelor of Nursing.

Regarding years of experience, the current study revealed that more than one fifth of the studied nurses' equal between < of years, from the years to <5years, and > 10 years of experience. This result was consistent with the results of study performed by ***Mohamed et al., (2023)*** whose conduct study in Mansoura University Children Hospital and Ain Shams University Hospital in Egypt. (n=80) in their study titled "Nursing Intervention for Application of Safety Measures for Children undergoing Hemodialysis" and revealed that years of experience of studied nurses 45% were > 10 years in hemodialysis.

From investigator point of view, dealing with Hemodialysis children need experienced nurses.

Part 2: personal data of the children undergoing hemodialysis.

Regarding personal data of the children undergoing hemodialysis, the findings of the current study revealed that, half of children undergoing hemodialysis was in age group≥12 years (taple2). This result was consistent with the results of study performed by ***Ghatas, et al., (2020)*** in Zagazig University Hospital (El sallam section), Egypt (n=60), in their recent study titled "Effect of Psychosocial Status of Children under Regular Hemodialysis on Their Quality of Life" and found that 53.3% of children's ages were from 11 to 14 years with mean age of 10 ±2.7 years.

Concerning educational level, the results of the present study revealed that, more than one quarter of hemodialysis children equal percentage of the Children have read &write and primary level. This result in the same line with ***Naheed et al., (2023)*** in District Head Quarter Hospital, Nankana Sahib Pakistan (n=50), in their recent study titled "Evaluation of Hemodialysis Complications among Children with Chronic Kidney Disease at District Head Quarter Hospital, Nankana Sahib" and revealed that (28.0%) were able to read &write, (45.0%) have done primary.

According to Arranging the child in the family, the current study showed that more than one quarter of them are the second This result was agreed with ***Ahmed et al., (2023)*** in at eight governmental hemodialysis units of the general hospitals in El Beheira Governorate– Egypt (n=50), in their recent study titled "Effect of Immersive Virtual Reality during Arteriovenous Fistula Puncture on Pain Intensity among Children Undergoing Hemodialysis in El Beheira Governorate" and revealed that 44.4% children are the first.

Regarding places of residence, the current study revealed that more than two thirds of children are residing in rural areas. This result was agreed with ***Kamal Eldin, et al., (2024)*** in Nephrology Unit at Beni-Suef University Hospital, Egypt (n=66), in their recent study titled "Assessment of Anxiety and Stress Levels in Children Undergoing Hemodialysis" and revealed that 68.2 % were from rural area.

From Investigator point of view this may be A dialysis place is dedicated to serving urban and rural areas alike.

Regarding gender of the children undergoing hemodialysis, the finding of the current study illustrated that, more than half of children were female. This result was agreed with ***Abdelsamie et al., (2022)*** in the Hemodialysis Unit at Alexandria University Children's Hospital, Egypt (n=50), in their recent study titled "Effect of Acupressure on Thirst among Children Undergoing Hemodialysis" and revealed that 56.7% were female.

Part II: past and present medical history of the studied children

Regarding the present history of children, the current study revealed that more than half of child period of illness in years is from 3-<5 (table 3). This result was disagreed with **Darwish et al., (2021)** in Assiut, Egypt (n=250). in their recent study titled "Health-related quality of life in children with chronic kidney disease in Assiut, Egypt" and revealed that in 36% of case exceeded 5 years.

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Regarding the age of children at the onset of dialysis, the current study revealed that more than three fifths of children from 5- <10 years. This result was disagreed **Mohamed et al., (2024)** at El-Monira Children Hospital's Pediatric Nephrology and Transplantation Center, Egypt (n=50). in their recent study titled "Effect of a Mobile Application Health Program on Knowledge, Self-care, and Self-efficacy of Children Undergoing Hemodialysis" and revealed that 23% of children were from 5-<10 years.

Regarding the symptoms of kidney failure that appeared in the child, the current study revealed that less than half of the symptoms are oliguria. This result was inconsistent with the results of a study performed by **Eryan et al., (2024)** in Center of Pediatric Nephrology and Transplantation (CPNT), Tertiary University Children's Hospital, (n=97). in their recent study titled "Clinical Characteristics and Outcome of Children Requiring First-Time Hemodialysis Over a Year: A Tertiary Center Cohort Study." and revealed that common symptoms 80.4%were anorexia among children.

Regarding the number of dialysis sessions per week, the current study revealed that majority of children have 3 times a week. This result was in the same line with the results of study performed by **Khalf-Allah et al., (2024)** in Assiut University Children Hospital, Egypt (n=60). in their recent study titled "Effect of muscle stretching and isometric exercises on quality of life in children undergoing regular hemodialysis." and revealed that 84.3% of children have 3 session per week.

Regarding to the reason for the child's dialysis, the current study revealed that more than one third of the children suffer from congenital defects. This result was disagreed **Darwish et al., (2021)**, Egypt (n=250). and revealed that 68.4% of children the reason of dialysis was nephrotic syndrome.

Regarding the method used to the child in dialysis, the current study revealed that more than three quarters of children use fistula for hemodialysis. This result in the same line with the results of study performed **Ali & Mohamed (2023)** pediatric hemodialysis units of Assiut University Children's Hospital., Egypt (n=60). in their recent study titled "Effect of Intradialytic Physical Exercise on Stress Level among Hemodialysis Children." and revealed that. 76.3% of children use fistula.

Regarding the hours of dialysis session, the current study revealed that less than three quarters had 4 hours of dialysis sessions. This result was agreed with the results of study performed by **Khalf-Allah et al., (2024)**, in Assiut University Children Hospital, Egypt (n=60). in their recent study titled "Effect of muscle stretching and isometric exercises on quality of life in children undergoing regular hemodialysis." and revealed that 74.8% of children had 4 hours of dialysis sessions.

Regarding the reason for hospitalization, the current study revealed that most children are hospitalized & more than three fifths are associated with renal failure or dialysis. This result disagreed with the results of a study performed by **Eryan et al., (2024)** and revealed that 10% of children had admissions to hospital with renal failure.

Regarding the complications that result from dialysis session, the current study shows that more than two thirds of children had complications. This result was disagreed with the results of study performed by **Ali & Mohamed (2023)** revealed that 90% of children don't have complications.

Regarding to the type of complications that happen because dialysis session, the current study shows that more than one fifth of this complication are bleeding at the arterial junction site & ecchymosis around the arteriovenous junction. This result disagreed with the results of study performed by **Ghatas et al., (2020)** and revealed that the main complications of hemodialysis were hypo or hypertension 56.7%.

Regarding family members suffering from kidney failure, the current study revealed that more than three fifths of family members don't suffer from kidney failure. This results in the same line with the results of study performed by **Mahmoud et al., (2024)** at children renal dialysis unit, Benha university hospital, (n=100). their recent study titled "Correlation between Psychological Problems, Self-esteem and Quality of Life among Children with Chronic Renal Failure." and revealed that 65% of family members don't suffer from kidney failure.

Regarding person affected from family, the current study revealed that more than one third affected by family is the father. These results agree with the results of a study performed by **Mahmoud et al., (2024)** and revealed that 52.5 % are father.

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Part IV: Nurses' knowledge regarding children undergoing hemodialysis Answering research Question no. (1) What are Nurses' knowledge regarding children undergoing hemodialysis?

Regarding total knowledge level of studied nurses regarding Children undergoing hemodialysis therapy (figure 6), the finding of this study clarifies that less than half of studies nurse had average knowledge about Children undergoing hemodialysis therapy(**Figure (2):** These results disagree with the study performed by ***Chen et al., (2023)*** at units in Sichuan Provinc, China (n=222) their recent study titled "Nurses' Performance Regarding Prevention of Vascular Access Complications among Children Undergoing Hemodialysis" and revealed that less than three quarters of the studied nurses had correct knowledge about Children undergoing hemodialysis therapy.

From Investigator point of view, nurses need more education to care safely for Hemodialysis children.

Fifth Part: Nurses' attitude regarding children undergoing hemodialysis. Answered to research question number (2): What are nurses' attitude regarding care of children undergoing hemodialysis?

Regarding studied nurses 'total attitude about Children undergoing hemodialysis therapy, the finding of present study revealed that more than three quarters of studied nurses had negative level, while less than one fifths of studied nurses had positive attitude regarding children undergoing hemodialysis ***(figure 3).*** This result disagrees with ***A Hammam et al., (2024)*** at the Pediatric Hemodialysis Unit at Children Hospital affiliated to Ain Shams University Hospital and Hemodialysis Unit affiliated to Al-Ayyat General Hospital in Egypt . (n=62) in their study entitled "Nurses' Performance Regarding Prevention of vascular Access Complications among Children Undergoing Hemodialysis" and clarified that less than one fifths of studied nurses had negative level, while more than three quarters of studied nurses had positive attitude regarding children undergoing hemodialysis.

Sixth Part: nurses' observational practices regarding children undergoing hemodialysis.

Answered research question number (3). What are nurses 'practices regarding children undergoing hemodialysis?

Regarding the level of total nurses' observational practices regarding children undergoing hemodialysis this table clarified that more than three quarters of studied nurse hade adequate level of practice ***(Table 4)***, this finding not consent with disagreed with ***Osman et al., (2023)*** whose conducted study in Pediatric Hemodialysis Unit at Children Hospital affiliated to Ain Shams University Hospital (n=50) in a study entitled "The effects of educational interventions on nurses' knowledge and practices in Hemodialysis Unit regarding infection control practices" and revealed that half of the studied nurses had "fair" level of practice.

correlations between the studied variables. Answer of research question number (3): Is there relation between nurses 'knowledge, attitude, practices, and their demographic characteristics?

The finding of current study revealed that there was positive statistically significant correlation between total Knowledge, attitude Practices & of nurse regarding children undergoing hemodialysis ***(Table 5)***, This result agrees with **A Hammam et al., (2024)** and clarified that there no statistical significance between total knowledge and attitude and reported practices of the studied nurses.

XI. Conclusion

In the light of current study results and answered research questions, it could be concluded that:

More than two fifths of the studied nurses' had average level of total knowledge regarding children undergoing hemodialysis, more than one fifths of studied nurses' had positive total attitude, while more than three quarter of the studied nurses' had adequate level of practice regarding children undergoing hemodialysis. Furthermore, there was a positive statistically significant correlation between total Knowledge, attitude and Practices of studies nurse regarding children undergoing hemodialysis.

There was a highly statistically significant relation between studied nurses' total knowledge and demographic characteristics as Marital status. There was a statistically significant relation between total attitude level of the studied nurses and demographic characteristics as (age & Academic qualification). There was statistically significant relation between total reported practices level of studied nurses and their aged &Number of years' experience in the dialysis unit.

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XII. Recommendations

From the present findings, the following recommendations were suggested:

1. Apply and implement an educational program to increase nurses' perception regarding hemodialysis of children.
2. Booklets and posters should be available in hospitals, clinics, for nurses about hemodialysis.
3. **Future research** on a large sample of nurses and other settings is needed.

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