
Assessment of Anxiety and Stress Levels in Children Undergoing Hemodialysis

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Abstract

Background: Children with chronic kidney disease undergoing hemodialysis therapy experience various physical and mental problems that contribute to psychological disorders such as stress and anxiety. It can affect the mental and physical components of poor quality of life. Several factors seem to trigger anxiety and stress in children on hemodialysis such as co-morbidities, uremia, failure of family support and restrictions in daily life. **Aim of the study:** was to assess anxiety and stress levels in children undergoing hemodialysis. **Design:** A descriptive research design was used to achieve the aim of this study. **Setting:** This study was conducted at Nephrology Unit at Beni-Suef University Hospital affiliated to Ministry of Higher Education and Alhomiya Hospital affiliated to Ministry of Health and population. **Sample:** A purposive sample of 66 children undergoing hemodialysis were included in the study. **Tools:** Three tools were used to collect the data. A predesigned questionnaire, Children's Manifest Anxiety Scale (CMAS) and Perceived Stress Scale (PSS). **Results:** The study findings showed that 66.7% of the studied children were in the age group 11 <15 years with Mean \pm SD 9.11 \pm 1.66, as well as 90.9% of the studied children undergoing hemodialysis had severe level of anxiety, and 6.1% of them had moderate level of anxiety, while, 3% of them had mild level of anxiety. The results of the study showed that, 55% of the studied children had severe level of stress, while 42% of them had moderate level of stress, and 2.6% had mild level of stress. Also, there was a positive correlation between children's total level of anxiety and their total level of stress. **Conclusion:** It can be concluded that, children undergoing hemodialysis most of them suffering from a severe anxiety, and more than half of them had a high stress level. Meanwhile there was a significant relation between children total level of anxiety and their gender, residence and duration of hemodialysis sessions. Also there was a significant relation between children total level of stress and their gender. Additionally the study concluded that, there was a positive correlation between children's total level of anxiety and their total level of stress. **Recommendations:** Application of psychosocial counseling program for children and their families together with social and educational support groups to enable children undergoing hemodialysis to live and function independently in adulthood.

Keyword: Anxiety, Children, Hemodialysis, Stress .

Introduction

Chronic kidney disease (CKD) is considered one of the significant public health problems worldwide. In developed countries, the mortality rate due to CKD is alarmingly high. Chronic kidney disease is characterized by a reduced glomerular filtration rate (less than 60 mL/min/1.73

m²) persisting for at least 3 months or the presence of kidney damage, regardless of the filtration rate (even if it is above 60 mL/min/1.73 m²) (Sandokji & Greenberg, 2020).

Determining the global prevalence of CKD is challenging due to late diagnoses, particularly in low-resource

areas, where children are frequently affected. The reported prevalence of CKD in children ranges from 18.5 to 58.3 cases per one million children worldwide. However, since CKD often lacks symptoms in its early stages, it is likely underreported or undiagnosed, indicating a potentially higher prevalence among children. In some cases, CKD can progress to end-stage renal disease (ESRD) (Farrag et al., 2022).

Chronic kidney disease occurs when a disease or condition impairs kidney function, causing kidney damage to worsen over several months or years. This includes; a fetal developmental problem, systemic lupus erythematosus, overuse of some medications such as nonsteroidal anti-inflammatory drugs (NSAIDs), kidneys injury, diabetes mellitus, hypertension, obstructed urine flow, kidney diseases, kidney artery stenosis and certain toxins (Gilbert et al., 2022).

The causes of CKD in children vary by age from birth to early teens usually have hereditary or congenital disease. From 15-19 years, the cause of CKD is most often glomerulonephritis. Chronic kidney disease also lead to numerous health problems, such as anemia, cardiac complications, bone loss, and death (Ghatas et al., 2020).

Hemodialysis (HD) is the most commonly used treatment method for kidney failure, is a treatment option that cleans the blood from excess waste products and removes excess fluid. The hemodialysis machine removes the child's blood by a central venous catheter (CVC) that is placed in a large blood vessel or a surgically created arteriovenous fistula (AVF) or arteriovenous graft (AVG). The blood passes through an artificial kidney or dialyzer where excess water and waste products are removed (Marcdante et al., 2022).

Although HD is not a curative measure, it alleviates many serious and sometimes lethal adverse outcomes of CKD. Children undergoing HD have a higher hospitalization rate than the general

population which in turn, triggers another set of problems such as anemia, CKD mineral bone disease, vascular access-related complications, and hypertension (Yahia et al., 2022).

Children undergoing hemodialysis face an emotional challenge due to several modifications required in their lifestyle. Anxiety and stress are the most prevalent psychological disorders among children undergoing hemodialysis and is associated with various conditions that result in poorer health outcomes, e.g. reduced quality of life and survival (George et al., 2022).

Anxiety and stress can arise as a consequence of several factors as a result of being sick, hospitalization, procedures, dangerous environment, which may lead to metabolic problems so, developmental delay. Also they can make things worse by disrupting cardiac and neurological systems, lowering immunological function, or altering dietary conditions. It can also have an impact on child's compliance (Al-Shammari et al., 2021).

Nurses are the main link between the pediatric hemodialysis unit and parents. So, the nurses must have different skills that equipped them to communicate and cooperate with parents who help in the prevention of social, physical, and psychological problems to their children as early as possible. Children undergoing hemodialysis require specialized nursing care, including the establishment of a therapeutic and interpersonal relationship, treatment of physical symptoms, and attention to the functional limitations, mental disorders, and educational needs of those children (Whiteside et al., 2020).

Significance of the study

Chronic kidney disease (CKD) is a progressive deterioration of kidney function in which the body metabolism, water, and electrolyte balance have been disturbed resulting in uremia. More than 90,000 children die annually worldwide due to renal failure. In Egypt, the estimated annual incidence of end-stage

renal disease (ESRD) is around 74/million and the total prevalence of children on dialysis is 264/million. Also, the incidence of chronic renal failure among pediatric patients on hemodialysis is around 15 per million a year (Al-Shammari et al., 2021).

Chronic kidney disease (CKD) is a debilitating condition that significantly impacts the physical and psychosocial well-being of children. Children with CKD and undergoing hemodialysis face various lifestyle restrictions, including dietary and fluid limitations, to manage their condition. The restrictions have a profound effect on their social and psychosocial functioning. Such restrictions can disrupt children's beliefs about their illness and their sense of personal control, resulting in stress, anxiety, and depression, which hinder their ability to cope and adjust to the challenges of CKD (Aljuaid et al., 2020).

The previous researches indicated that, poor psychological status of hemodialysis children could deteriorate the overall health of hemodialysis children which can affect the children's function in the future. Hence, the researcher found that is urgent to conduct this study to shed light on assessment of anxiety and stress levels in children undergoing hemodialysis.

Aim of the Study

This study aimed to assess anxiety and stress levels in children undergoing hemodialysis.

Research Questions

The present study will intend to answer the following questions:

- What is the anxiety level in children undergoing hemodialysis?
- What is the stress level in children undergoing hemodialysis?

Subjects and methods

Research Design:

A descriptive design was utilized for conducting this study.

Research Setting:

This study was conducted at Nephrology Unit at Beni-Suef University Hospital affiliated to Ministry of Higher Education and Alhomiya Hospital affiliated to Ministry of Health and population.

Research Subjects:

A purposive sample of (66) children undergoing hemodialysis in the previously mentioned settings was used to achieve the aim of this study. According to the following criteria:-

Inclusion criteria:

- Children undergoing hemodialysis.
- Children of both sexes.
- Children age from 8 years up to 15 years.
- Children who are conscious and able to communicate.

Exclusion criteria:

- Children not willing to participate in the study.
- Children diagnosed with mental or psychiatric disorders.

Tools of Data Collection:

Three tools were utilized in data collection:

Tool I: Predesigned questionnaire:

Part 1: socio-demographic characteristics of studied children as age, gender, sex, residence, ranking and level of education.

Part 2: Child medical history as duration of the disease, duration of dialysis, number of dialysis session, duration of dialysis session any complains before & after dialysis session and complications of hemodialysis.

Part 3: Children's knowledge regarding renal failure as definition of renal failure, causes, symptoms and primary methods used to treat renal failure.

Part 4: Children's knowledge regarding hemodialysis as definition of hemodialysis, indications, technique, psychological effects on a child

undergoing hemodialysis and complications.

Tool II: Children's Manifest Anxiety Scale (CMAS):

This tool was developed by **Castaneda and Mc Candless, (1956)** to assess anxiety level in children. The Arabic Version of the CMAS by **El-beblawy (1987)** was used to collect data. It consists of 53 closed ended questions.

Scoring System for Anxiety Scale:

Each item was categorized and scored as the following:

Yes was scored (1) No was scored (0)

According to children's responses, total level of anxiety was categorized as the following:

- From 0 to 18 was considered mild anxiety.
- From 19 to 28 was considered moderate anxiety.
- Equal to or more than (29) was considered sever anxiety

Tool III: Perceived Stress Scale (PSS):

The Perceived Stress Scale is a classic stress assessment instrument, was originally developed by Sheldon **cohen (1983)**. The Arabic Version of the PSS by **Ali et al.,(2021)** was used to collect data .The PSS consist of 10 items, using 5 points likert scale as the following:-

- (0) Never, (1) Almost Never, (2) Sometimes, (3) Fairly Often, (4) Very Often.

Scoring system for stress scale:

According to children's responses, total level of stress was categorized as the following:

- From 0 to 13 was considered low stress.
- From 14 to 26 was considered moderate stress.
- From 27 to 40 was considered high perceived stress

Operational Design:

The operational design for this study includes preparatory phase, content validity, pilot study and field work.

Preparatory Phase:

It included reviewing past, current, local and international related literature and theoretical knowledge of the various aspect of the study using books, articles, journals, internet and scientific periodicals magazines to develop tools for data collection and to get acquainted with the various study aspect of the research problem.

Content Validity:

Tools of data collection were investigated for their content validity by panel of three experts in pediatric and psychiatric nursing specialty from the Faculty of Nursing Benha University and Beni-suief University, who are selected to test content validity of the tools and to judge its clarity, relevance, comprehensiveness, understanding and applicability. The opinion was elicited regarding the layout, format and sequence of the questions and all of their remarks were taken in consideration and the tools were regarded as a valid from the experts' point of view.

Reliability:

Reliability of the tools was tested to determine the extent to which the questionnaire items related to each other. Cronbach's Alpha was be used to determine the internal reliability of the tool. It was (0.82) for knowledge questionnaire and (0.71) for PSS. Reliability of the CMAS was assessed by **El-beblawy (1987)** who reported an Alpha Coefficient of R= 0.84 indicating adequate internal consistency of scores on the measure.

Ethical Considerations:

An official permission to conduct the study was obtained from the Scientific Research Ethical Committee of Faculty of Medicine–Beni-suef University, **ApprovalNo:FMBSUREC/12022023/Ali**. Clarification of the nature and aim of the study was done on initial interview with each child's parents with an emphasis that the study yields no harm to the participants, stating the possibility to

withdraw at any time. Confidentiality of the information where it would not be accessed by any other party without taking permission of the participants.

Pilot study:

The pilot study was carried out at March, 2023 on 10% (6 children) of the total study sample (n=66) to examine the clarity of questions and time needed to complete the study tools. Based on the results, no modifications were done. Subjects included in the pilot study were included in the main study sample.

Field work:

The researcher interviewed each participated child to obtain the necessary information to assess anxiety and stress levels through using the previously mentioned three tools of the study. The researcher first introduced herself to them and gave them a complete background about the study. Throughout the interview, related information was recorded in the designed sheet depending upon the response of the participant. The time used for filling each sheet ranged between 35-55 min. Data were collected during the period from the beginning of March 2023 to the end of August 2023. Data were collected three days each week from the selected settings by rotation. The study

was conducted in the morning and afternoon shifts.

Administrative Design:

A written approval letter was being issued from Dean of Faculty of Nursing-Beni-suef University. The letter was being directed to the general manager of Beni-Suef University Hospital and Alhomiat Hospital asking for cooperation and permission to conduct this study. After explanation of the study aim, an official permission was obtained from the Dean of Faculty of Nursing Beni-suef University and the General Managers of Beni-Suef University and Alhomiat Hospitals. Consent was obtained from children's parents ensuring complete privacy and total confidentiality.

Statistical Design:

Data was computed and analyzed using Statistical Package for the Social Science (SPSS), version 24 for analysis. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and mean and standard deviations for quantitative variables. Pearson Correlation coefficient test was used to test correlation between variables. Statistical significance was considered at $P. \text{value} < 0.05$.

Results

Table (1): Number and Percentage distribution of socio-demographic characteristics for the studied children. (n=66)

Items	Studied Children (n= 66)	
	No	%
Age		
8 - <11 years	22	33.3
11 - <15 years	44	66.7
Mean± SD	9.11 ±1 .66	
Gender		
Male	29	43.9
Female	37	56.1
Residence		
Rural	45	68.2
Urban	22	31.8
Level of child's education		
Illiterate	21	31.8
Primary school	35	53.0
Secondary school	10	15.2
Ranking		
First	14	21.2
Second	29	43.9
Third	19	28.8
Fourth	4	6.1

Table (1): Clarified that 66.7% of the studied children were in the age group 11 <15 years with Mean ± SD 9.11 ±1 .66, and 56.1% of them were female. Also 68.2% of them were living in rural areas. Considering educational level, 53.0% of them were in primary school. As well as, 43.9% were ranked as second children in their families.

Table (2): Number and Percentage distribution of medical history for the studied children.
(n=66)

items	Studied children (n=66)	
	Frequency	Percent
Duration of the disease		
Less than a year	11	16.7
1 < 3 years	26	39.4
3 < 6 years	10	15.2
≥ 6 years	19	28.8
Duration of hemodialysis:		
Less than a year	3	4.5
1 < 3 years	23	34.8
3 < 6 years	38	57.6
≥ 6 years	2	3.0
Number of sessions per week:		
One session	23	34.8
Two sessions	20	30.3
3 sessions	23	34.8
More than 3 sessions	0	0.0
Duration of the hemodialysis session:		
2 hours	14	21.2
3 hours	15	22.7
4 hours	37	56.1
More than 4 hours	0	0.0

Table (2): Represented that 39.4 % of the studied children had a renal failure between 1 < 3 years, and 57.6% of them were undergoing hemodialysis between 3 < 6 years. While 34.8% of them had one or three hemodialysis sessions per week. Also, 56.1% of the studied children their hemodialysis session duration was 4 hours.

Table (3): Number and percentage of studied children knowledge about renal failure and hemodialysis.

Knowledge items	Frequency	Percent
Definition of renal failure		
Poor	7	10.6
Average	25	37.9
Good	34	51.5
Causes of renal failure		
Poor	6	9.1
Average	42	63.6
Good	18	27.3
Symptoms of renal failure		
Poor	2	3.0
Average	7	10.6
Good	57	86.4
Primary methods used to treat renal failure		
Poor	4	6.1
Average	62	93.9
Good	0	0
Definition of hemodialysis		
Poor	8	12.1
Average	26	39.4
Good	32	48.5
Indication of hemodialysis		
Poor	12	18.2
Average	6	9.1
Good	48	72.7
Methods of hemodialysis		
Poor	0	0
Average	17	25.8
Good	49	74.2
Psychological effects of hemodialysis		
Poor	0	0
Average	37	56.1
Good	29	43.9
Complications of hemodialysis		
Poor	8	12.1
Average	14	21.2
Good	44	66.6

Table (3): Illustrated that the highest percentages of the studied children had good knowledge regarding items: symptoms of renal failure, methods of hemodialysis, indication of hemodialysis, and complications of hemodialysis 86.4%, 74.2%, 72.7%& 66.6% respectively. While, 93.9% of them had average knowledge about Primary methods for treatment of renal failure.

Figure (1): Percentage distribution regarding degree of anxiety among studied children undergoing hemodialysis.

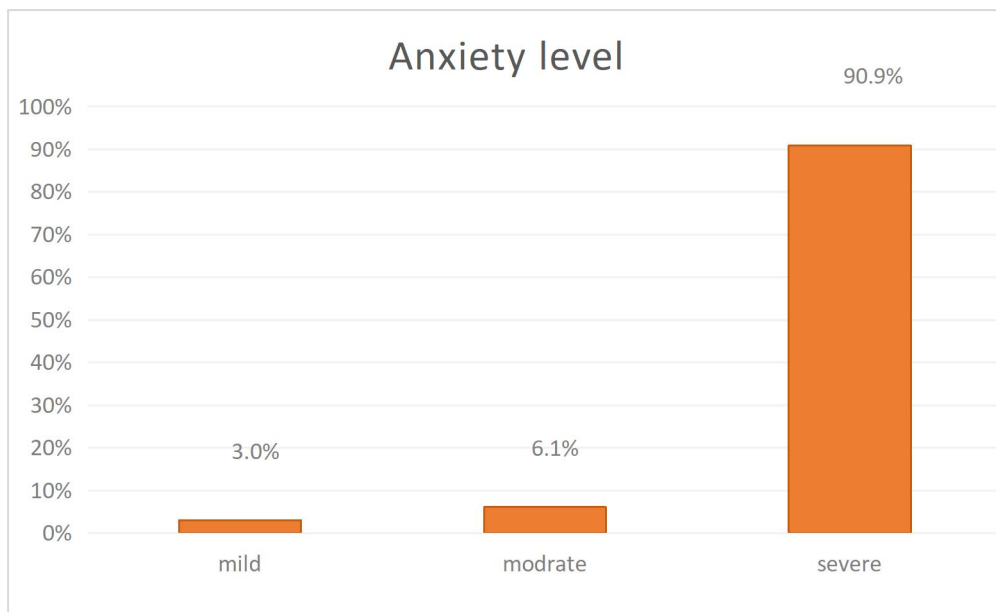


Figure (1): Revealed that 90.9% of the studied children undergoing hemodialysis had severe level of anxiety, and 6.1% of them had moderate level of anxiety. While, 3% of them had mild level of anxiety.

Table (4): Number and Percentage distribution of stress items responses among studied children undergoing hemodialysis.

Items		Frequency	Percent
In the last month, how often have you been upset because of something that happened unexpectedly as a result of hemodialysis?	Never	4	6.1
	Almost Never	9	13.6
	Sometimes	15	22.7
	Fairly Often	36	54.5
	Very Often	2	3.0
In the last month, how often have you felt that you were unable to control the important things in your life?	Never	0	0.0
	Almost Never	18	27.3
	Sometimes	15	22.7
	Fairly Often	20	30.3
	Very Often	13	19.7
In the last month, how often have you felt nervous and stressed because of hemodialysis?	Never	0	0.0
	Almost Never	4	6.1
	Sometimes	11	16.7
	Fairly Often	21	31.8
	Very Often	30	45.5
In the last month, how often have you felt confident about your ability to handle your hemodialysis problems?	Never	0	0.0
	Almost Never	31	47.0
	Sometimes	18	27.3
	Fairly Often	11	16.7
	Very Often	6	9.1
In the last month, how often have you felt that things were going your way?	Never	10	15.2
	Almost Never	21	31.8
	Sometimes	24	36.4
	Fairly Often	5	7.6
	Very Often	6	9.1
In the last month, how often have you found that you could not cope with hemodialysis sessions?	Never	0	0.0
	Almost Never	4	6.1
	Sometimes	11	16.7
	Fairly Often	43	65.2
	Very Often	8	12.1
In the last month, how often have you been able to control irritations as a result of hemodialysis?	Never	0	0.0
	Almost Never	23	34.8
	Sometimes	17	25.8
	Fairly Often	11	16.7
	Very Often	15	22.7
In the last month, how often have you felt that you were on top of things?	Never	31	47.0
	Almost Never	14	21.2
	Sometimes	13	19.7
	Fairly Often	6	9.1
	Very Often	2	3.0
In the last month, how often have you been angered because of hemodialysis sessions?	Never	0	0.0
	Almost Never	5	7.6
	Sometimes	15	22.7
	Fairly Often	36	54.5
	Very Often	10	15.2
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them because of hemodialysis?	Never	2	3.0
	Almost Never	7	10.6
	Sometimes	18	27.3
	Fairly Often	3	4.5
	Very Often	36	54.5

Table (4): Showed that the highest percentages of the studied children respond fairly often regarding items: in the last month, how often have you found that you could not cope with hemodialysis sessions?, in the last month, how often have you been upset because of something that happened unexpectedly as a result of hemodialysis?, and in the last month, how often have you been angered because of hemodialysis sessions? 65.2%, 54.5%& 54.5% respectively.

Figure (2): Percentage distribution of total stress level among studied children

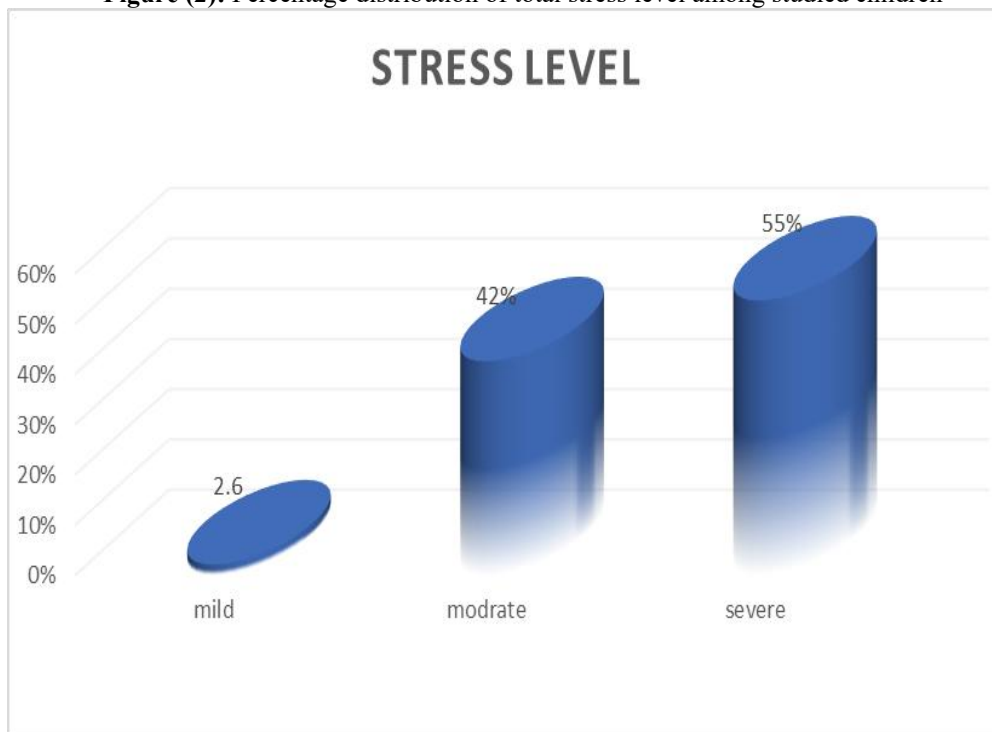


Figure (2): Revealed that 55% of the studied children had high level of stress. While 42% of them had moderate level of stress, and 2.6% had mild level of stress.

Table (5): The relationship between children anxiety level related to their sociodemographic characteristics and medical history.

Sociodemographic Characteristics and medical history		Total anxiety level
		P value
Age	Pearson Correlation	-.067
	Sig. (2-tailed)	.590
Level of child's education	Pearson Correlation	-.058
	Sig. (2-tailed)	.641
Duration of the disease	Pearson Correlation	.081
	Sig. (2-tailed)	.520
Gender	Pearson Correlation	.206
	Sig. (2-tailed)	.097(*)
Residence	Pearson Correlation	-.271
	Sig. (2-tailed)	.028(*)
Ranking	Pearson Correlation	-.077
	Sig. (2-tailed)	.537
Duration of hemodialysis	Pearson Correlation	-.030
	Sig. (2-tailed)	.810
Number of sessions per week	Pearson Correlation	.215
	Sig. (2-tailed)	.083(*)
Duration of the hemodialysis session	Pearson Correlation	-.063
	Sig. (2-tailed)	.617

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed).

Table (5): Proved that, there is a statistically significant relation between children' total level of anxiety and their gender, residence and number of hemodialysis sessions per week. While there is no statistically significant relation between children' total level of anxiety and their age, level of education, ranking and duration of the disease and hemodialysis.

Table (6): The relationship between children stress level related to their sociodemographic characteristics and medical history

Sociodemographic Characteristics and medical history		Total stress level
		P value
Age	Pearson Correlation	-.079
	Sig. (2-tailed)	.534
Level of child's education	Pearson Correlation	.051
	Sig. (2-tailed)	.688
Duration of the disease	Pearson Correlation	.061
	Sig. (2-tailed)	.630
Gender	Pearson Correlation	.278
	Sig. (2-tailed)	.025(*)
Residence	Pearson Correlation	-.052
	Sig. (2-tailed)	.679
Birth order	Pearson Correlation	.092
	Sig. (2-tailed)	.464
Duration of hemodialysis	Pearson Correlation	.125
	Sig. (2-tailed)	.321
Number of sessions per week	Pearson Correlation	.110
	Sig. (2-tailed)	.382
Duration of the hemodialysis session	Pearson Correlation	-.046
	Sig. (2-tailed)	.718

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table (6): Illustrated that, there is a statistically significant relation between children' total level of stress and their gender.

Table (7): Correlations between anxiety, stress and knowledge level among children undergoing hemodialysis

		Total anxiety	Total Stress	Total knowledge
Total anxiety	Pearson Correlation	1	.458(**)	.000
	Sig. (2-tailed)		.000	1.000
	N	66	65	60
Total stress	Pearson Correlation	.458(**)	1	-.274(*)
	Sig. (2-tailed)	.000		.036
	N	65	65	59
Total knowledge	Pearson Correlation	.000	-.274(*)	1
	Sig. (2-tailed)	1.000	.036	
	N	60	59	60

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table (7): Indicated that, there is a highly statistically significant correlation between children' total level of anxiety and their total level of stress. While there is a statistically significant correlation between children' total level of stress and their total level of knowledge.

Discussion

Chronic kidney disease (CKD) is a debilitating condition that significantly impacts the physical and psychosocial well-being of children. Children with CKD and undergoing hemodialysis face various lifestyle restrictions, including dietary and fluid limitations, to manage their condition. These restrictions have a profound effect on their social and psychosocial functioning. Such restrictions can disrupt children' beliefs about their illness and their sense of personal control, resulting in stress, anxiety, and depression, which hinder their ability to cope and adjust to the challenges of CKD (Aljuaid et al., 2020).

The primary focus of nursing care for pediatric patients with CKD revolves around primary prevention, early detection, and proactive management. Pediatric nurses play vital roles in stress and anxiety reduction among children undergoing hemodialysis. Through their provision of physical comfort, emotional support, education, and facilitation of coping

strategies, nurses contribute to enhancing the overall well-being of these children. Multidisciplinary collaboration and ongoing professional development in pediatric nephrology are essential to ensure optimal care for children on hemodialysis (Mardhiyah et al., 2022).

This Study aimed to assess anxiety and stress levels in children undergoing hemodialysis. Regarding to the characteristics of the studied children the present study revealed that more than two thirds of the studied nurses were in the age group 11- <15 years. This finding was in agreement with(Ghata, et al, 2020),who conducted a study at at Zagazig, Egypt which entitled (Psychosocial Status of Children under Hemodialysis and Their Quality Of Life) and found that more than half of studied children were in the age group from 11 years to less than 15 years. From the researcher's point of view, this may be due to that an unhealthy lifestyle and the delayed treatment of pre-existing comorbidities have had detrimental effects on the renal system's integrity in children.

In addition, the current study denoted that more than half of the studied children were female. This finding is consistent with **(Abdelsamie et al., 2022)**, who conducted a study at Alexandria, Egypt which entitled (Effect of Acupressure on Thirst among Children Undergoing Hemodialysis), who found that more than half of studied children were female. Otherwise this finding was disagreed with **(Farrag et al., 2022)**, who conducted a study at Sohag, Egypt which entitled (Non-pharmacological Strategies to Mitigate Pain and Anxiety among Children on Dialysis) who found that more than half studied children were male. From the researcher's point of view, this may be due to the hormonal profiles differences of males and females which potentially influencing kidney function.

As regard residence, the current study indicated that more than two third of studied children were from rural areas. This finding was in agreement with **(Darwish et al., 2021)**, who conducted a study at Assiut, Egypt which entitled (Health-related quality of life in children with chronic kidney disease in Assiut, Egypt), who found that three quarters of studied children were from rural area. From the researcher's point of view, this can be explaining in the light of many factors as rural areas often have limited access to healthcare facilities, poor sanitation and hygiene, certain environmental factors prevalent in rural areas, such as exposure to toxins, pollutants, and agricultural chemicals, may increase the risk of kidney damage.

Regarding level of children` educational level, the current study denoted that more than half of the studied children were in primary school. This finding was in the same line with **(Salama et al., 2022)**, who conducted a study at Menofia, Egypt which entitled (Effect of Intradialytic Exercise on Fatigue, Psychological Distress, and Biochemical Findings among Hemodialysis Children), who found that more than half of studied children had primary educational level.

Also this finding was in agreement with **(Mohamed et al., 2021)**, who conducted a study at Minia, Egypt which entitled (Effect of Foot Reflexology on Hemodialysis School Age Children on Fatigue and Sleep Quality) who found that two third of studied children had primary educational level.

As shown in the present study regarding the ranking of the studied children, it was observed that nearly half of the studied children were ranked as second children in their families. This result is congruent with **(Mokbel et al., 2022)**, who conducted a study at El Beheira, Egypt which entitled (Effect of Immersive Virtual Reality during Arteriovenous Fistula Puncture on Pain Intensity among Children Undergoing Hemodialysis in El Beheira Governorate), who found that half of studied children were ranked as second children in their families.

As regard duration of the disease, the current study revealed that more than one third of studied children had a renal failure from 1up to 3 years. This finding was in accordance with **(Hasan et al., 2021)**, who conducted a study at Cairo, Egypt which entitled (Neurophysiologic Study in Children with End Stage Renal Disease on Regular Pediatric Hemodialysis) who mentioned that nearly half of the studied children had a renal failure for less than 4 years. Furthermore, this finding was in agreement with **(Ali et al., 2023)**, who conducted a study at Minia, Egypt which entitled (Empowerment Program for Mothers to Improve the Quality of Life of Their Children undergoing Hemodialysis on Arteriovenous Fistula Care) who mentioned that nearly one third of the studied children had a renal failure for less than 3 years.

As regard duration of hemodialysis, the current study revealed that more than half of the studied children were on regular hemodialysis for 3 to 6 years. This finding was in agreement with **(Elalfy et al., 2023)**, who conducted a study at Ain

Shams, Egypt which entitled (Iron status in chronic kidney disease pediatric patients on hemodialysis) who mentioned that more than two thirds of studied children with dialysis duration of 3 to 6 years.

Also, the current study revealed that more than one third of the studied children received 3 hemodialysis sessions per week; and more than half of them their hemodialysis session duration was 4 hours. This finding was in agreement with **(Fadel et al., 2022)** who conducted a study at Cairo, Egypt which entitled (Cardiovascular Complications and Indoxyl Sulfate Are Related to Longer Duration of End Stage Renal Disease in Children) who revealed that more than two thirds of the studied children received hemodialysis on regular basis (3 sessions per week, 3-4 hours each session).

As regard children' knowledge regarding methods of renal failure treatment, the current study revealed that most of the studied children had average knowledge regarding methods of renal failure treatment. This finding was in agreement with **(Adnan et al., 2022)** who conducted a study at Lahore, Pakistan which entitled (Echocardiographic Abnormalities in Children with Chronic Kidney Disease on Maintenance Hemodialysis) who demonstrated that the more than three quarters of the studied children had average knowledge regarding methods of renal failure treatment.

As regard children' knowledge regarding symptoms of renal failure, the current study indicated that majority of the studied children had a good knowledge regarding symptoms of renal failure. This finding was in agreement with **(Xu et al., 2023)** who conducted a study at Nanjing, China, which entitled (Knowledge, attitude, and practice of patients receiving maintenance hemodialysis regarding hemodialysis and its complications: a single-center, cross-sectional study in Nanjing) who

demonstrated that three quarters of the studied children had a good knowledge regarding clinical manifestation of renal failure.

As regard children' knowledge regarding complication of hemodialysis, the current study revealed that more than two third of children had a good knowledge regarding complication of hemodialysis. This finding was in agreement with **(Fadlalmola & Elkareem, 2020)** who conducted a study Khartoum, the capital of Sudan, which entitled (Impact of an educational program on knowledge and quality of life among hemodialysis patients in Khartoum state) who mentioned that more than half had a good knowledge regarding complication of hemodialysis. From the researcher's point of view, this finding is due to that hemodialysis complications are more common to occur among hemodialysis patients.

Concerning the total level of anxiety of the studied children, the current study indicated that the most of the studied children had a sever anxiety. This finding was approved with **(Farrag et al., 2022)**, who conducted a study at Sohag, Egypt which entitled (Non-pharmacological Strategies to Mitigate Pain and Anxiety among Children on Dialysis) who found that more than three quarters of studied children were had sever anxiety. Also, this finding was in agreement with **(Elzakzouk et al., 2020)** who conducted a study at Benha, Egypt which entitled (Psychological Assessment in Children with Chronic Kidney Disease on Regular Hemodialysis) concluded that, more than half of the studied children had a sever anxiety. From the researcher's point of view, increased level of anxiety may be explained by the specificity of HD therapy. The hemodialysis sessions in themselves are commonly associated with acute feelings of anxiety. Anxiety among hemodialyzed children was triggered when children heard alarm and machine

sound or when new staff connected the child to dialysis machine. Also, increased fatigue, uremia, failure of family support restrictions in daily life, non-compliance to therapeutic regimen including restrictions in diet and fluids, and dependency upon treatment and health professionals are seem to trigger anxiety in hemodialyzed children.

Concerning the total level of stress of the studied children, the current study revealed that more than half of the studied children had a high stress level. This result was in accordance with **(khalifallah et al.,2023)** who conducted a study at Assiut, Egypt which entitled (Perceived Stress and Quality of Life for Children with Chronic Kidney Disease Undergoing Hemodialysis) who mentioned that, more than three quarters of the studied children had a high stress level. Furthermore, this result goes on line with **(Nurdina et al., 2022)** who conducted a study at Indonesia which entitled (Effect of Stress Ball on Stress and Anxiety in Hemodialysis Patients) who concluded that, two thirds of the studied children had a high stress level. From the researcher's point of view, this might be explained as the child's experience with dialysis may entail various physical and psychological strains, exacerbated by the unpredictability of the body's response to treatment, painful fistula cannulation, the need for lifelong medication, social limitations, and the uncertainty of how the body will react to unforeseen stressors, this creates apprehension and stress.

Based on the current study's findings, there was statistically significant relation between children total level of anxiety and their gender, residence and number of hemodialysis sessions. This is in accordance with **(Elzakzouk et al., 2020)** who conducted a study at Benha, Egypt which entitled (Psychological Assessment in Children with Chronic Kidney Disease on Regular Hemodialysis) who concluded that there were statistically

significant relation between children total level of anxiety and their gender, residence and number of hemodialysis sessions.

In addition, the current study revealed that was statistically significant relation between children total level of stress and their gender. This finding is consistent with **(Salama et al., 2022)** who conducted a study at Menofia, Egypt which entitled (Effect of Intradialytic Exercise on Fatigue, Psychological Distress, and Biochemical Findings among Hemodialysis Children) who demonstrated that there was statistically significant relation between children total level of stress and their gender.

The current study illustrates that, there is a statistically significant correlation between children' total level of anxiety and their total level of stress. This finding was in the same line with **(Nagar et al., 2021)** who conducted a study at Nadiad City, Gujarat which entitled (Depression, Anxiety and Stress among the Patient of Chronic Kidney Disease at Nadiad city, A Cross sectional survey) who concluded that there was a statistically significant correlation between the studied children' total level of anxiety and their total level of stress. From the researcher's point of view, this finding has several explanations may account for this observed association. For instance, an untreated anxiety may lead to stress, and may have a negative effect on interpersonal relationships, thus leading to failure in adapting to demands of this chronic treatment.

Conclusion

In the light of the present study findings, it can be concluded that, the most of the studied children had a sever anxiety, and also that more than half of the studied children had a high stress level. Meanwhile there was a statistically significant relation between children's total level of anxiety and their gender,

residence and number of hemodialysis sessions per week. And also there was a statistically significant relation between children's total level of stress and their gender. Also there was a statistically significant correlation between children's total level of anxiety and their total level of stress.

Recommendations

In the light of the study findings, the following recommendations are suggested:

- Provide hemodialysis children and their mothers with empowerment programs which include effective health education that contain knowledge about hemodialysis, healthy nutrition, fistula care, long term plan, and psychosocial and spiritual support for children and families to improve their children's quality of life.
- Dialysis centers should be prepared to cater to the amusement and entertainment needs of children, aligning with their age group. This will improve their psychological state and make dialysis sessions more enjoyable and comfortable.
- Collaboration between pediatric nephrologists, social specialists, psychotherapy specialists, and nurses is crucial in conducting child rehabilitation sessions. These sessions aid in the reintegration of children into society, enhance self-acceptance, and boost their confidence.
- Application of psychosocial counseling program for children and their families together with social and educational support groups to enable children undergoing hemodialysis to live and function independently in adulthood.
- Further studies should be conducted to devise specialized programs aimed at reduction and

managing stress and anxiety and improving quality of life.

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