



Assessment of the Quality of Life of Children Undergoing Hemodialysis and their Parents

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Abstract

Background: Assessing children's quality of life is considered an important indicator in evaluating their healthcare interventions, treatments and in understanding the burden of diseases. **Aim:** This study aimed to assess the quality of life of children undergoing hemodialysis and their parents. **Design:** A descriptive research design was utilized to conduct this study. **Setting:** The study was conducted at the hemodialysis units at Abo El-Reesh Pediatric Hospital affiliated to Cairo University Hospital, Egypt. **Sample:** A purposive sample composed of 60 children undergoing hemodialysis and their parents. **Tools:** Three tools were used for data collection, **I)** An interview questionnaire consisted of three parts include: Characteristics of the children, characteristics of the parents, and knowledge of children and their parents about renal failure and hemodialysis. **II)** Pediatric Quality of Life Inventory. **III):** Quality of life of parents having children undergoing hemodialysis. **Results:** The study results revealed that most (90.0%) of the studied children, and one-third (33.4%), of the studied parents have poor knowledge levels, a minority (8.3%) of studied children and (51.7%) of parents have a high quality of life level. Moreover, there was a statistically significant relation between the studied children's total quality of life level and their age, the period of illness, and the duration of the dialysis session. Furthermore, there was a statistically significant positive correlation between children's and their parents' total knowledge regarding renal failure, hemodialysis, and their total quality of life levels. **Conclusion:** most of the studied children and less than half of the studied parents have low quality of life levels. Most and more than half of the children and their parents had poor and average knowledge levels regarding renal failure and hemodialysis. As well, there was a highly statistically significant positive correlation between studied children's total knowledge and total quality of life level. Also, there was a statistically significant positive correlation between total studied parents' total knowledge, and total quality of life. **Recommendation:** Management of pediatric children undergoing hemodialysis must include quality of life assessment. Further studies should be conducted to develop a special program for children undergoing hemodialysis and their parents to improve their quality of life.

Keywords: Assessment, Quality of Life, Children, Parents, Hemodialysis

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Introduction

Kidney is one of the most important organs in the body, plays key roles in body function, not only filtering the blood and getting rid of waste products, but also balancing the electrolyte levels in the body, controlling blood pressure, and stimulating the production of red blood cells. The kidney gets blood supply through the renal arteries directly from the aorta and sends blood

back to the heart via the renal veins to the vena cava (*Baskin & Kongan, 2018*).

Renal failure can happen rapidly over days, weeks (acute) months or slowly over a period of years (chronic). Acute renal failure may occur due to severe infection, sudden blockage to the drainage of urine from the kidney, stone, hemolytic uremic syndrome or nephrotic syndrome, which also occurs as a side effect of

some medications and other rare conditions. Acute kidney failure is manifested by a drop in blood pressure, vomiting, diarrhea, dehydration, and anuria. Most causes of acute renal failure can be treated and function will return to normal with time (*Kukuy et al., 2021*).

Chronic kidney disease is characterized by decreased renal function, explained by a glomerular filtration rate of less than 60 ml/min and markers of renal damage lasting three months or more. Progressively, becomes a metabolic and endocrine problem that triggers inflammation and compromises immune capacity. A child affected by kidney disease has a high risk of morbidity, mortality, and lower health-related quality of life (QOL) (*Srivastava et al., 2022*).

Medical management of chronic renal failure includes dialysis to remove waste products and extra water from the blood. There are two types of dialysis; hemodialysis and peritoneal dialysis and include kidney transplantation. kidney transplant is a procedure aimed at placing a healthy kidney from a deceased or living donor into a person with severe renal impairment child started dialysis. kidney transplant lower the risk of mortality compared with dialysis and improved QOL (*Wibisono et al., 2020*).

Hemodialysis is the most common method used to treat advanced and permanent kidney failure in pediatrics. Hemodialysis is known as a medical procedure that uses a special machine to filter waste products from the blood and to restore normal constituents (*Kallenbach, 2020*).

One of the most chronic diseases which can affect the QOL of children and their families is chronic kidney disease. Quality of life is a multidimensional concept based on the subjective perception of the patient, which "non clinical" factors such as family, friends, religious beliefs, and other life circumstances (*Ruidiaz & Higuita, 2021*). World Health Organization (WHO) definition of QoL as the general perception of an individual of their position in life considering the culture and value systems

and in relation to expectations, goals, standards, and concerns (*WHO, 2020*).

Pediatric dialysis nurse plays an important role in assessing children and families, providing information, care, support and therapeutic counseling to pediatric patients and their family throughout the entire illness. Nursing management must be provided in order to reduce the complications of renal failure or disease and the stresses of dealing with a life-threatening illness (*Hockenberry & Wilson, 2018*).

Significance of the study:

Chronic kidney disease (CKD) has been recognized as a leading public health problem in worldwide the global estimated prevalence of chronic kidney disease (CKD) in children is reported to be approximately 56 to 74.7 cases per million of the age-related population (*Masalskiene et al., 2021*).

The exact incidence and prevalence of children who have chronic kidney disease (CKD) in Egypt are not well known because there is not enough record of these cases. However, reports indicate that the prevalence of chronic kidney failure in children in Egypt is 225 / million populations (*Safouh et al., 2016*).

During the clinical experience of the researcher in the pediatric nephrology unit, was noticed that children undergoing hemodialysis and their parents have a lack of knowledge regarding CKD and associated complications of CKD, interurrences during and after hemodialysis, and QOL of children and their parents. Thus, this study aims to assess the QOL of children undergoing hemodialysis and their parents.

Aim of the study:

The aim of this study was to assess the quality of life of children undergoing hemodialysis and their parents.

Research Questions:

1. What is the quality of life of children undergoing hemodialysis?
2. What is the quality of life of parents having children undergoing hemodialysis?

3. Is there a relationship between the quality life of children undergoing hemodialysis and their characteristics?
4. Is there a relationship between the quality life of parents having children undergoing hemodialysis and their characteristics?

Subjects and methods

I- Technical design:

Research design:

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

Research Setting:

This study was conducted at hemodialysis units at Abo-Elrish Child Hospital affiliated to Cairo University Hospital.

Research Subjects:

A Purposive sample composed of 60 children undergoing hemodialysis and their parents with the following inclusion criteria:

Inclusion criteria:

- Children aged from 6 to 18 years
- Children received hemodialysis regularly for more than six weeks.
- Children and their parents who were willing to participate in the study.

Tools for data collection:

Data were collected using the following tools:

Tool (I): A Structured Interviewing Questionnaire Sheet:

It was designed by the researchers after reviewing previous and recent available related literature and written in simple Arabic language and consisted of the following three parts:

Part 1: Characteristics of children as (age, gender, residence, educational level, birth order, family history of kidney failure, period of illness, number of dialysis sessions per week, duration of dialysis session, and number of emergency dialysis sessions).

Part 2: Characteristics of parents as (age, job, educational level, and family income).

Part 3: children's and their parents' knowledge about renal failure (as definition, causes, symptoms, risk factors, treatment, and

nutrition), and hemodialysis (as definition, types, psychological effects, side effects, fistula care, fistula complication).

Scoring system:

Assessment of studied children and their parent's knowledge about renal failure and hemodialysis. The total question 14 open question. The total marks 40 marks, each correct answer take score 1 and incorrect answer take score zero. The total score was converted into percentage and interpreted as follows: $\geq 75\%$ is considered a good level score (28-37), $60\% < 75\%$ is considered average score ($22 < 28$), and $< 60\%$ is considered poor level score ($0 < 22$)

Tool (II): Pediatric Quality of Life Inventory (PedsQL).

It is adopted from **Goldstein, (2009)**, to evaluate pediatric end-stage renal disease (ESRD)-specific health-related quality of life (HRQOL) in children receiving hemodialysis, ESRD tool encompasses ten subscales: Physical function includes 8 items such as (walking, running, exercise...etc.), social includes 5 items such as (getting along with other children, other children not wanting to befriend..... etc.), family and peer interaction includes 3 items such as (I feel left out of activities with my friends because of my treatment.....etc.), communication includes 5 items such as (It is hard for me to tell the doctors and nurses how I feel... etc.), emotional function includes 5 items such as (feel afraid, sad, angry... etc.), worry includes 10 items such as (worry about having surgery, stay at hospital, weight ...etc.), general fatigue include 4 items such as (feel tired, physically weak..... etc.), about my kidney disease includes 5 items such as (feeling dizzy, headaches, thirsty... etc.), treatment problems include 4 items such as (I don't like how I feel after I take my medications... etc.), schooling function includes 5 items such as (attention in class, forgetting things...etc.).

Scoring system:

The total subscale 10, and 53 items. The total scoring 212, each item had a 5-point scale (never, almost never, sometimes, often, almost always) which a rating scale ranging from (0-4) never to almost always as follows :(never a problem → 0), (almost never a problem →1),(sometimes a problem→2), (often problem →3), (almost always a problem →4). The total score was 212 points. The total scales are summed-up and converted into percentage and categorized as the following.

- Low quality level $\geq 60\%$
(128:212 grads).
- High quality level $< 60\%$
(0<128 grads).

Tool III: Quality of life of parents having children undergoing hemodialysis.

This tool used to assess the quality of life for parents having children undergoing hemodialysis. It was adopted from **WHO, (2019)**. The tool includes 4 subscales: pain and discomfort include 4 items such as (worry about child pain, difficult to face pain, suffer from physical pain and do you feel that physical discomforts are preventing you to do daily tasks), sleeping and rest include 4 items such as (problem with sleeping, difficult in sleeping, problem to getting sleeping enough during your day, worry about sleeping problem), Energy and fatigue include 3 items such as (problem with your energy to perform daily life tasks, how much fatigue affected you, are you satisfied with your life), the general question includes 8 items such as (do you feel able to carry out your duties, able to relax and have fun, income, information needs about child disease, problem in transportation, healthy environment, satisfy about quality of life, satisfied about your health).

Scoring system:

The total subscale 4, and 19 items. The total scoring 74, each item had a 5-point scale (never, almost never, sometimes, often, almost always) which rating scale ranging from (0-4) never to almost always as follows: :(never a problem → 0), (almost never a problem →1),(sometimes a

problem→2), (often problem →3), (almost always a problem →4). The total score was 76 points. The total scales are summed-up The total scales are summed-up and converted into percentage and categorized as the following .

- Low quality level $\geq 60\%$ (46:76grads).
- High quality level $< 60\%$ (0 < 45 grads).

Preparatory phase:

The preparatory phase included reviewing current and past, local and international related literature and theoretical knowledge of various aspects of the study using books, articles, periodical magazines, and the internet to modify tools for data collection. This phase also involved the construction and preparation of data collection tools. The researcher obtained a list of children and their parents, who were admitted to the hemodialysis units, and met the inclusion criteria.

Validity:

The revision of the tools was done by three panels of experts in pediatric nursing to measure the content validity of the tools and the necessary modification was done accordingly.

Reliability:

Reliability refers to the stability of the measuring instrument used and its consistency over time. Cronbach's Alpha was used to determine the internal reliability of the tools and it was for the knowledge questionnaire 0.91, the Pediatric Quality of Life Inventory (PedsQL) was 0.826 and the quality of life of parents having children undergoing hemodialysis was 0.874.

Pilot study:

A pilot study was carried out on 10% (6 children and their parents) to test the applicability, feasibility clarity of questions and time needed to complete the study tools. Based on the results, no corrections and omissions of items were performed, so the patients were included in the study sample.

Field work:

Data collection of the study was started at the beginning of October 2022 and continued until the end of December 2022. The researcher introduced himself to children and their parents explained the aim of the study and its implications and how to fill in the knowledge questionnaire and ensure their cooperation. Informed consent was obtained from the participants. Interviewing the children and their parents was carried out in the hemodialysis unit at Abu El-Rish Child Hospital. The questionnaire sheet takes about 15-20 minutes to complete answering the questions. Data was collected for 2 days (from 9 am to 2 pm) every week for 3 months. The interviewing questionnaire sheet was completed by the researcher.

III- Administrative design:

Approval to carry out this study was obtained from the Dean of the Faculty of Nursing, Helwan University and directors of governmental hospitals of Abo-Elrish Child Hospital affiliated to Cairo University Hospital.

Ethical considerations:

An official permission to conduct the proposed study was obtained from the scientific

Results:**Table (1):** Distribution of the Studied Children According to their Characteristics (N=60)

Variables	No	%
Age in years		
6 - <12	50	83.3
12 - ≤18	10	16.7
Mean ± SD	11.71 ± 1.21	
Gender		
Male	27	45.0
Female	33	55.0
Residence		
Rural	17	28.3
Urban	43	71.7
Education level		
Primary school	50	83.3
Preparatory school	10	16.7
Birth order		
First	23	38.3
Second	30	50.0
Third or more	7	11.7

Table (1): shows that the majority (83.3%) of the studied children aged from 6 <12 years with Mean ± SD 11.71 ± 1.21, more than half (55.0%) are female. Also less than three-quarters (71.7%)

research ethics committee of the faculty of Helwan University. Participation in the study is voluntary and subjects were 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 and 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 were respected.

IV-Statistical design:

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and Statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 24. Data were presented using descriptive statistics in the form of frequencies and percentages. The chi-square test (X^2) was used for comparisons between qualitative variables. Spearman correlation measures the strength and direction of association between two ranked variables. Also used Mean ± SD.

live in urban areas, majority (83.3%) are at primary school and half (50.0%) are second in arranging among their siblings.

Table (2): Distribution of the Studied Children According to their Medical Data (N=60)

Variables	No	%
Family history of kidney disease or kidney failure		
Yes	8	13.3
No	52	86.7
Period of the child's illness		
> 6 weeks - < 2 years	33	55.0
2 - < 4 years	23	38.3
4 - ≤ 6 years	4	6.7
The number of dialysis sessions per week.		
twice	2	3.3
Three	58	96.7
Duration of the dialysis session (hours)		
Two	1	1.7
Four	59	98.3
The number of emergency dialysis sessions from the beginning of kidney failure and dialysis		
Once	3	5.0
Twice	0	0.0
Three times	1	1.7
no once	56	93.3

Table (2): demonstrates that the majority (86.7%) of the studied children hasn't family history of kidney disease or kidney failure and more than half (55.0%), of them have 6 weeks to 2 years' period of illness. As well as most (96.7%) &

(98.3%) do dialysis sessions three times per week and the duration of the dialysis session is four hours respectively. Also, most (93.3%) of them hadn't emergency dialysis sessions.

Table (3): Distribution of the Studied Parents According to their Characteristics (N=60)

Variables	No	%
Age of father (years)		
20 - < 30	1	1.7
30 - < 40	31	51.7
40 - ≤ 50	28	47.0
Age of mother (years)		
20 - <30	6	10.0
30 - <40	48	80.0
40 - ≤ 50	6	10.0
Father's job		
Regular work.	47	78.3
Irregular work	13	21.7
Mother's job		
Works.	3	5.0
Housewife	57	95.0
Father's level of education		
Not read and write.	1	1.7
Reads and writes	6	10.0
Middle Certification	50	83.3
High qualified	3	5.0
Mother's level of education		
Not read and write.	1	1.7
Reads and writes	13	21.7

Middle Certification	46	76.7
High qualified	0	0.0
Family income		
Enough.	10	16.7
Not enough	50	83.3

Table (3): reveals that more than half (51.7%) of the children's fathers and majority (80.0%) of the mothers aged range from 31 to 40 years old. Furthermore, more than three-quarters (78.3%) of the children's fathers have regular work and most (95.0%) of their mothers are housewife. Also,

majority (83.3%) of the fathers and, more than three-quarters (76.6%) of mothers have middle certification. In relation to family income majority (83.3%) of studied parents haven't enough income.

Figure (1): Percentage Distribution of the Studied Children's Total Knowledge Regarding Renal Failure and Hemodialysis (N=60)

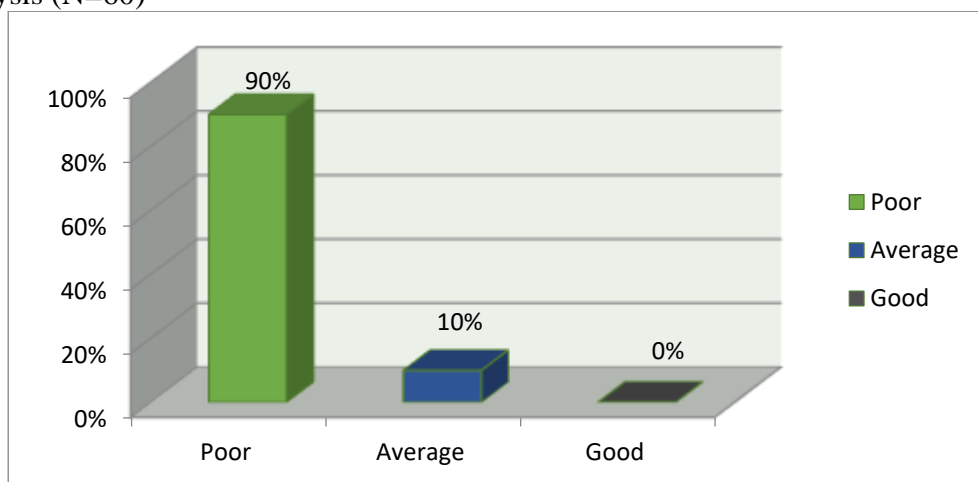


Figure (1): It was obvious from this figure that, most (90.0%) of the studied children have poor knowledge level, while minority (10.0%) of them has average knowledge level regarding renal failure and hemodialysis.

Figure (2): Percentage Distribution of the Studied Parents' Total Knowledge Level Regarding Renal Failure and Hemodialysis (N=60)

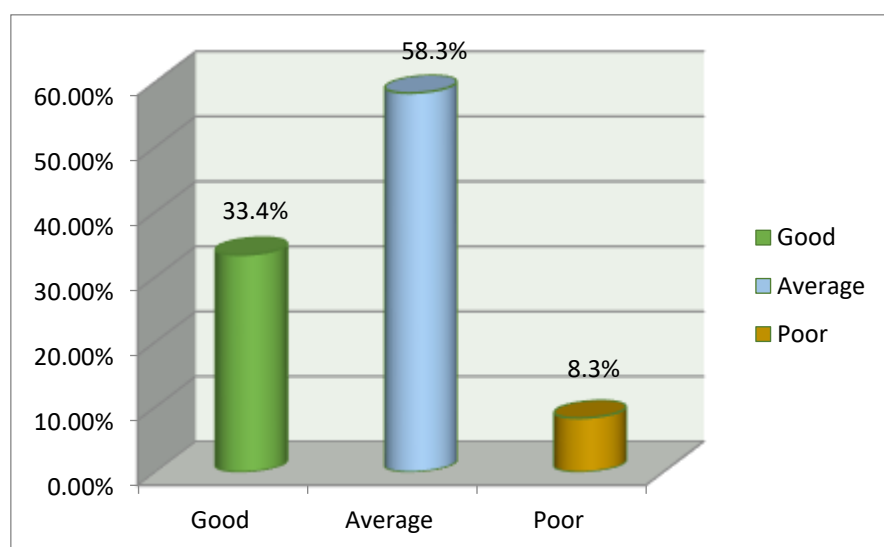


Figure (2): It was obvious from this figure that, a minority (8.3%), more than half (58.3%), and one-third (33.4%), of the studied parents have poor, average and good knowledge levels regarding renal failure and hemodialysis respectively.

Table (4): Distribution of the Studied Children Regarding the Total Quality of Life Level Subscale (N=60).

level of quality of life	High		Low	
	No	%	No	%
Physical functioning	38	63.3	22	36.7
Social functioning	25	41.7	35	58.3
Family and peering interaction	13	21.7	47	78.3
Communication	36	60.0	24	40.0
Feelings	7	11.7	53	88.3
Worry	24	40.0	36	60.0
General fatigue	25	41.7	35	58.3
Kidney disease	22	36.7	38	63.3
Treatment problems	18	30.0	42	70.0
Schooling functioning	21	35.0	39	65.0

Table (4): demonstrates that, more than three-fifths (63.3%), & (60.0%), of the studied children have a high level of quality of life regarding physical functioning and communication respectively. while more than three-quarters (78.3%) of them have a low level of quality of

life regarding family and peering and the majority (88.3%) have a low level of quality of life regarding feelings. In addition, more than three-fifths (63.3%) & (65%) of them have low levels of quality of life regarding kidney disease and schooling functioning respectively.

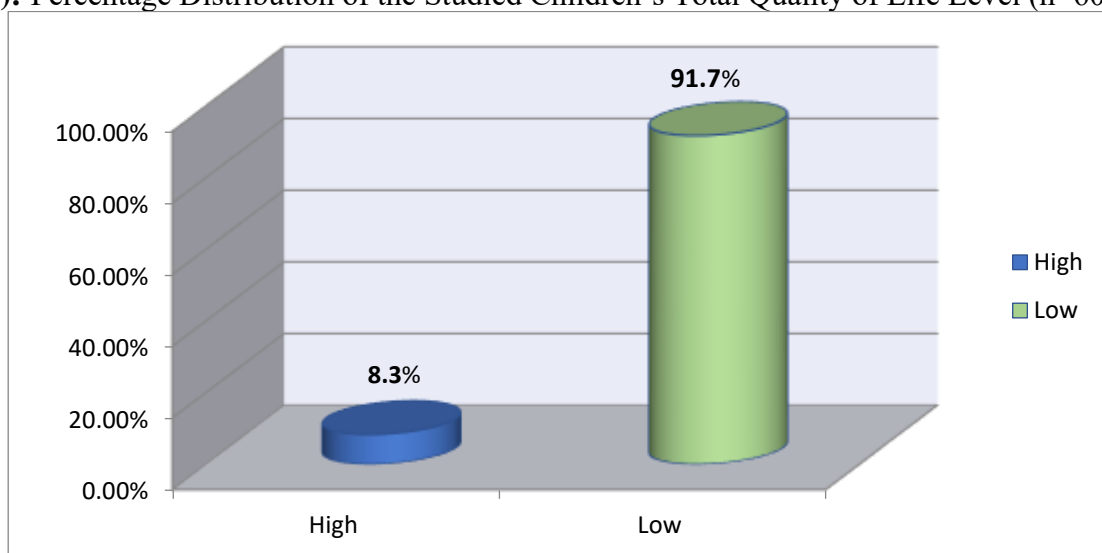
Figure (3): Percentage Distribution of the Studied Children's Total Quality of Life Level (n=60)

Figure (3): It was obvious from this figure that, most (91.7%) of the studied children have low quality of life levels. While minority (8.3%) of them has high quality of life level.

Table (5): Distribution of the Studied Parents Regarding the Total Quality of Life Level Subscale (N=60).

quality of life Level for each subscale	High		Low	
	No	%	No	%
Pain and discomfort	23	38.3	37	61.7
Rest and sleep	31	51.7	29	48.3
Energy and fatigue	34	56.7	26	43.3
General items	35	58.3	25	41.7

Table (5): demonstrates that, more than three-fifths (61.7%), and less than half (48.3%) of the studied parents have low levels of quality of life regarding “pain and discomfort” and “Rest and

sleep” respectively. While, less than three-fifths (56.7%) (58.3%) of them have high levels of quality of life regarding “energy and fatigue ” and “general items” respectively.

Figure (4): Percentage Distribution of the Studied Parents’ Total Quality of Life Level (N=60).

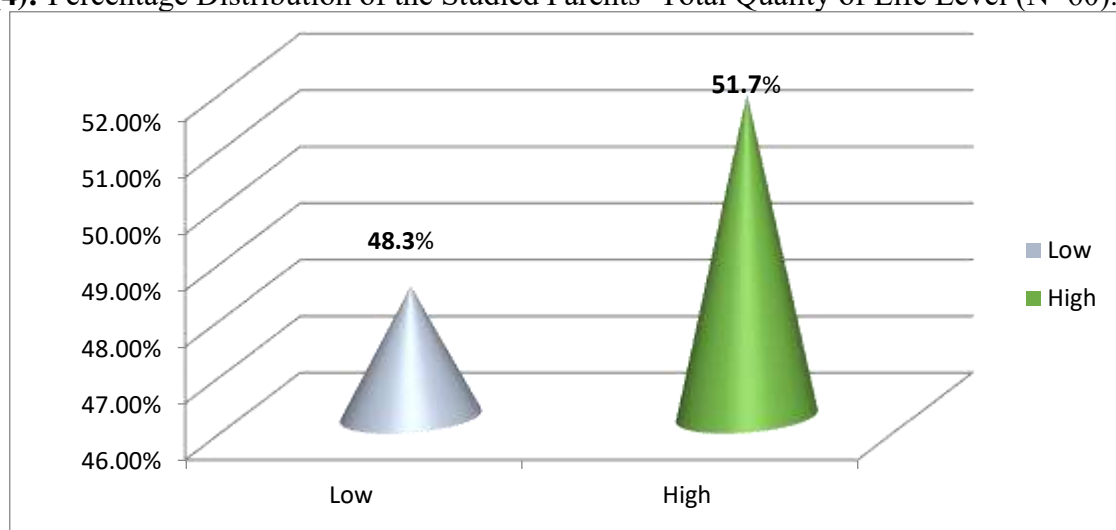


Figure (4): It was obvious from this figure that, less than half (48.3%) of the studied parents have low quality of life levels and more than half (51.7%) of them have high quality of life levels.

Table (6): Correlation between the Studied Children’s Total Knowledge about Renal Failure and Hemodialysis and Their Total Quality of Life Level (N=60).

Studied variable	Total knowledge	
	R	P
Total quality of life	0.915	0.001**

(*) Statistically significant at $p < 0.05$. (**) highly statistically significant at $p < 0.001$

Table (6): shows that there is a highly statistically significant positive correlation between studied children's total knowledge

regarding renal failure, hemodialysis and their total quality of life level as revealed by ($r = 0.915, P < 0.001$).

Table (7): Correlation between the Studied Parents’ Total Knowledge about Renal Failure and Hemodialysis and Their Total Quality of Life (N=60)

Studied variable	Total knowledge	
	R	P
Total quality of life	1.318	.0241*

(*) Statistically significant at $p < 0.05$. (**) highly statistically significant at $p < 0.001$

Table (7): illustrates that there is a statistically significant positive correlation between total studied parents’ total knowledge regarding renal

failure, hemodialysis, and their total quality of life as revealed by ($r = 1.318, P < .0241$).

Discussion:

Chronic Renal Failure (CRF) is a chronic disease, which has a negative impact on the quality of children's life, more specifically on the psychological well-being, the social and economic condition of children and parents. At the same time, the restrictions on diet, occupation, and leisure significantly affect the social life and interpersonal relationships of children (**van Haalen et al., 2020**). Nevertheless, developed useful techniques that have helped to conceptualize and measure these multiple domains (**Pershing et al., 2019**). So, the current study aimed to assess the quality of life of children undergoing hemodialysis and their parents.

Regarding children's characteristics, the present study (table1) showed that, the majority of studied children's age range from $6 < 12$ years. This result was in agreement with **El Shafei et al., (2018)** who conducted a published study in Egypt entitled "Assessment quality of Life among children with end-stage renal disease" that found the majority (85%) of participants were aged between $6 \leq 12$ years. From the researcher's point of view, this result may be due to the fact that this age group is considered to be a higher risk of developing renal failure disease.

Concerning children's gender, the current study showed that more than half of the children were female. This result was supported by **Alhusaini et al., (2019)** who conducted a published study in Saudi entitled "Comparison of quality of life in children undergoing peritoneal dialysis versus hemodialysis" and found that more than half (56%) of children were female. . Conversely, this result was disagreement with **El Shafei et al., (2018)** that found more than half of participants were male.

Concerning studied children's residence, the current study showed that more than two-thirds lived in urban areas. This result is in agreement

with **El Shafei et al., (2018)** and found that more than half (55%) of children lived in urban areas. On the other hand, this result was disagreement with a study conducted by **Darwish et al., (2021)** whose study "Health-related quality of life in children with chronic kidney disease in Assuit, Egypt" and found that more than three-quarters (76%) of participants lived in the rural area.

As regards children's level of education, the current study showed that the majority of studied children had a primary school. This result was in agreement with **Elhalafawy et al., (2020)** who conducted a published study in Egypt entitled "Effect of cryotherapy versus aromatherapy on pain of arteriovenous fistula puncture for children undergoing hemodialysis" and found that more than half (54%) of participants had a primary school. In contrast, this result was in disagreement with **Alhusaini et al., (2019)** who found that half (50%) of the participants in secondary school.

In relation to the medical data of studied children, the result study (table2) revealed that the majority of studied children hadn't family history of kidney disease or renal failure. This result was supported by **El Shafei et al., (2018)** who found that more than three-quarters (76%) of children had no family history of chronic renal failure disease.

Additionally, the study result shows that more than half of children's period of illness ranged from six weeks to two years, and most of them were done hemodialysis three times per week and the period of dialysis session is four hours for each session. This result was supported by **Elhalafawy et al., (2020)** who found that the majority of participants had three times per week of dialysis sessions and period of the dialysis session is four hours. From the researcher's point of view, the hemodialysis session three times per weeks and four hours for each session. The time of dialysis sessions also interferes with school attendance and study performance.

Regarding characteristics of studied parents, the study result (table3) showed that more than half of the fathers' age and the majority of the mothers' age between 30 to 40 years and the majority of them haven't enough income and irregular work. This is parallel to the study done by **Alhusaini et al., (2019)** who reported more than half of mothers' age between 30 to 40 years. Additionally, the majority of them haven't enough income. Also, this result agreed with the study done by **Darwish et al., (2021)** who found that two-thirds (66%) of the family haven't enough income and irregular work.

Considering children's total knowledge score about renal failure and hemodialysis, the current study (figure1) illustrated that, most of the studied children have poor knowledge level regarding renal failure and hemodialysis. This result in agreement with the study carried out by **Ghata et al., (2020)** who found (84%) of the children had poor knowledge levels regarding renal failure and hemodialysis.

From the researcher's point of view, the result might be due to poor children knowledge level regarding renal failure and hemodialysis, related absent of education program for children.

As regards parents' total knowledge score about renal failure and hemodialysis, the current study (figure 2) illustrated that, more than half had an average knowledge level, and one-third had good knowledge regarding renal failure and hemodialysis. This study result was inconsistent with **El Awady et al., (2021)** who found more than two-thirds (68%) have a good knowledge level regarding renal failure and hemodialysis.

Concerning the total quality of life level of children subscale, the current study (table 4) clarified that more than three-fifths of them had a high level of quality of life regarding physical function; this result is consistent with **Darwish et al., (2021)**, that found three-fifths (60%), of children had high-level quality of life regarding physical function. Additionally, more than half of

children have a low level of quality of life regarding social function, this result agreement with **El Shafei et al., (2018)**, whose found that more than half (55%) of children had low-level quality of life regarding social function.

Also, the current study showed that more than three-fifths of them have low levels of quality of life regarding kidney disease and schooling functioning. This result agreement with **Darwish et al., (2021)**, that found more than half (52%) of children had low level of quality of life regarding kidney disease, and Schooling functioning. From the researcher's point of view, this result may be due to the children's missing school, which affects their quality of life.

Regarding children's total quality of life level, the current study (figure 3) illustrated that, most of the studied children have a low quality of life level. This result agreement with **Darwish et al., (2021)**, that's found more than three-fifths (68%) of children had low levels of quality of life. From the researcher's point of view, children's low quality of life level related to chronic kidney disease affects the most domains of quality of life of children.

Considering parents total quality of life level of studied subscale, the current study (table 5) clarified that, more than three-fifths had a low level of quality of life regarding the pain and discomfort subscale, more than half of parents had high quality of life levels regarding energy and fatigue and general items, this result agreement with **El Shafei et al., (2018)**, who found more than half (52%) of parents had low quality of life regarding comfortable and three-fifths (60%), of parent's high level of quality of life regarding energy and fatigue.

In relation to parents' total quality of life level, the current study (figure4) illustrated that, less than half of parents had a low quality of life level, this study in agreement with **El Shafei et al., (2018)**, who found less than half (45%) of

parents have a low quality of life. From the researcher's point of view, this result may be due to the children undergoing hemodialysis affecting the quality of life of their parents.

Regarding the correlation between the studied children's total knowledge about renal failure and hemodialysis and their total quality of life, the finding of the study (table 6) showed that there was a statistically significant positive correlation between total studied children's knowledge regarding renal failure and hemodialysis and total quality of life. In the same line with **El Shafei et al., (2018)**, who found that there was a highly statistically significant positive correlation between total children's knowledge regarding hemodialysis and their total quality of life. From the researcher's point of view, this result may be due to that knowledge of children with renal failure makes children unable to improve quality of life and manage disease .

Concerning the correlation between the studied parents' total knowledge about renal failure and hemodialysis and their total quality of life. The current study (table 7) clarified that there was a highly statistically significant positive correlation between the studied parents' total knowledge regarding hemodialysis and their total quality of life. This result was in agreement with **Darwish et al., (2021)** found in their study that there was statistically significant positive correlation between total studied parents' knowledge regarding hemodialysis and total quality of life. From the researcher's point of view, this result may be due to that knowledge of parents having children with renal failure makes parents unable to manage disease and improve quality of life.

Conclusion

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

On the light of results of the current study and answers to the research questions, it concluded that, most and more than half of the

children and their parents had poor and average knowledge levels regarding renal failure and hemodialysis. As well, most of the studied children have low quality of life levels. Furthermore, less than half of the studied parents have low quality of life level. In addition, there was a statistically significant relation between the total studied children's quality of life level and their age and the arranging the child among his siblings Also, there is a statistically significant relation between the total studied parents' quality of life level and fathers' job and family income. While there is no statistically significant relation between the total studied parent's quality of life level and fathers', mothers' age, mothers' job and level of education of fathers and mothers.

Recommendations

Based on the findings of the study results, the following recommendations were suggested:

- Management of pediatric patients undergoing hemodialysis must include QoL assessment.
- Further research on a large sample and other settings is needed.
- Counseling programs should be organized in hemodialysis units to improve the quality of life of children undergoing hemodialysis and their parents, including social and recreational activities.
- Special school tutorial programs must be developed for chronic kidney disease children to improve school achievement.

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