

# Quality of Life of Children Receiving Permanent Renal Dialysis in Gaza Strip

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## Abstract

This study aims to evaluate the quality of Life in children (ages between 3- 16 years) receiving permanent renal dialysis in Gaza strip. The design of this study is case-control. All cases in Gaza strip were included in the study (15cases) and compared with the control group (45 individuals without the disease) that were selected accordance to the cases sex, age, living places, monthly income and the relationship between parents. The study sample was interviewed by the researchers and completed the developed questionnaire, which focused on quality of life and included five domains, these domains are Physical health, Psychological health, Social relationships, Environment health and Personal safety. Validity and reliability of the instrument were tested and the total instrument reliability test (Cronbach's Alpha) was 0.74, while by Split half methods was 0.94. The study revealed statistically significant difference (<0.001) between cases and control in all study domains except the environmental health domain. The educational achievement deteriorated significantly as a result of impairment of physical health, psychological health and social relationships. Also, the study revealed that the altered levels of serum electrolytes secondary to renal failure and dialysis are responsible for signs and symptoms that the patients experience. The study domains did not show statistically significant difference when compared by sex, age, living places, monthly income and the relationship between parents. The study also revealed that there was a bad need to pay more attention when caring and dealing with dialyzed patients. Special food supplementation should be available in order to improve their physical health, more psychological support from their families and the society. In addition, there is a need to provide safe environment and to enhance personal safety of these children.

**Key words:** Renal dialysis, Quality of life, Gaza strip.

## جودة حياة الأطفال الذين يخضعون للغسيل الكلوي الدائم في قطاع غزة

**ملخص:** تهدف هذه الدراسة لتقييم جودة حياة الأطفال الذين يخضعون للغسيل الكلوي الدائم في قطاع غزة. وتم إتباع نظام دراسة الحالات الإفرازية المقترنة بحالات ضابطة. و شملت الدراسة كل الحالات الموجودة في قطاع غزة والتي بلغ عددهم (15) حالة و مقارنتها بالحالات الإفرازية الضابطة والبالغ عددها 45 لمطابقة للحالات المرضية من حيث الجنس, والعمر, ومكان السكن, ومقدار الدخل الشهري للعائلة وأخيرا من حيث قرابة الوالدين. وقام الباحثان بمقابلة جميع الحالات و تعبئة استبانة طورت خصيصا لدراسة جودة حياة الأطفال التي اشتملت علي خمسة محاور أساسية هي: الصحة الجسمية, والصحة النفسية, والعلاقات الاجتماعية, وصحة البيئة وأخيرا محور الأمن الشخصي للطفل. و تم فحص مصداقية ودرجة ثبات الأداة المستعملة في هذه الدراسة التي تمتعت بدرجة ثبات 0.74 حسب مقياس ((Cronbach's Alpha)). و بطريقة التجزئة النصفية فتمتعت الأداة بدرجة (0.94).

كشفت الدراسة عن فروق ذات دلالة إحصائية ( $> 0.001$ ) بين الأطفال المرضى والأطفال الأصحاء في جميع محاور الدراسة ما عدا محور الصحي البيئي. وأثبتت الدراسة أن تدهور التحصيل الدراسي العلمي بشكل ملحوظ للأطفال المرضى كان بسبب اعتلال الصحة البدنية والصحة النفسية والعلاقات الاجتماعية. كما وأثبتت الدراسة أن الاضطرابات في المواد الكيميائية في جسم الطفل المريض كنتيجة للفشل الكلوي هي المسؤولة عن جميع علامات وأعراض المرض الذي يعاني منها المريض. كما كشفت الدراسة عن عدم وجود علاقة ذات دلالة إحصائية بين الأطفال المرضى والأصحاء عند مقارنتهم من حيث الجنس, والعمر, ومكان السكن, والدخل الشهري وكذلك العلاقة بين الأبوين.

توصي الدراسة بتوفير الاهتمام والانتباه عند العناية بالأطفال المرضى والخاضعين للغسيل الدموي باستمرار. كما توصي الدراسة بتوفير الغذاء اللازم لهؤلاء الأطفال لبناء جسمهم ليقاوم الأمراض, وتقديم الدعم النفسي للمريض من الأسرة والمجتمع, بالإضافة إلى تهيئة أجواء وظروف بيئية سليمة وتشجيع الأمن الشخصي عند المريض حتى يبقى دائما خاليا من أي أذى.

## **Introduction**

Chronic diseases currently represent a leading cause of disability and mortality more than infectious diseases. Among these diseases, renal failure that requires in most cases the process of dialysis, this requires coordinated efforts between research institutes, governments and health care providers in order for early detection and reduction of the disease and its complications [1]. The average disease incidence (per million of the population) in the Kingdom of Saudi Arabia is between 80 to 120, Egypt 225, Europe 238, the United States 975, Japan 1149 [2], while in Palestine the rate ranges from 100 to 150 cases [3].

Chronic renal failure is a disease that accompany the patients for a long period of their life, that affects the condition of the patient emotional, cognitive and psychosocial abilities especially in children, and thus this will affect general health, and children will not be able to perform their roles as usual [4]. Chronic renal failure like many chronic diseases disrupt cognitive and emotional functions [5]. Children with chronic renal disease require strict dietary and lifestyle modifications, and frequent monitoring by a medical team [6]. Their associated cardiovascular and physical complications, neuro-developmental disorders and psychosocial problems may all affect their quality of life (QOL) [7].

Quality of life of those children is adversely affected by the constantly going on process of dialysis for 3 to 4 times a week. The patient stays long hours connected to the dialysis machine, while it works as natural kidney to purify body wastes of salts and other chemical substances. Children with renal failure who are subject to continuous washing process do not have the ability to form social relationships, and show behavioral problems, such as anger, stubbornness, negative isolation, jealousy and sensitivity [8].

Quality of life involves components of happiness, satisfaction with life and how people feel about life conditions. There is a wide range of QOL domains depending on the context and scientific disciplines; in medicine, the focus is on health-related QOL [9], in philosophy, the focus is on 'the good life', in economic science is welfare and distribution, in social science is objective and subjective well-being [10], and in psychology is psychological well-being. Nonetheless, few studies have evaluated the QOL in pediatric nephrology patients [11] and in particular, performed in-group comparisons with healthy children [12].

However, there are many QOL factors that cover the wide range of life domains such as; general health, physical health, safety, social well-being and functioning, recreational opportunities, emotional functioning, cognitive functioning, surrounding environment, existential issues, compensation and finance, and freedom of expression [13,14].

The role that quotidian dialysis might have upon psychosocial variables has also not been studied rigorously [15]. Although this field of research is still in its infancy, in many ways renal failure is an excellent research paradigm for the study of the intertwined effects of psychosocial factors in chronic disease, as patients are available for assessment on a consistent basis, standard biochemical markers that are related to outcome are easily measurable and obtainable, and the patients are in great need of supportive services. Nephrologists, psychosocial researchers, and renal failure patients can collaboratively contribute to understanding of the impact of connections between psychosocial and biological variables [16].

As well as the domains of QOL of the personal life of pediatric patients with renal failure receiving dialysis are adversely affected by the process of dialysis on a regular basis, leading to personality disorders in the patient (17). The renal failure affects the mental state and the natural growth of children patients. Although medical treatment leads to longer life, it continues to makes children and their families face many difficulties as a result of the disease.[18].

Therefore, it is necessary to draw attention to the psychological aspect for pediatric patients in the dialysis unit as a key component of treatment in cases of renal failure. It is also imperative to provide a suitable environment during the process of dialysis and social support for these patients and their families [19]. As well as, the need to increase the cooperation between psychologists and health care team providers this will improve the QOL for children patients with renal failure [20].

Consequently, the researcher team became motivated to conduct this study to determine the QOL of children patients receiving renal dialysis. The QOL were assessed using 5 dimensions: physical health, mental health, social relations, environmental health and personal safety.

In this study, QOL in children patients with chronic renal disease and receiving permanent dialysis, aged 3–16 years were compared with healthy children. The researchers hypothesized that children on dialysis would have lower QOL scores than healthy children. The purpose of this study is to compare the QOL of children receiving permanent renal dialysis with healthy children in Gaza strip.

## **Methodology**

### **Place of the study**

The study was conducted in Ranteesy specialized pediatric hospital (RSPH), European hospital and Shifa hospital in Gaza strip. In these hospitals there are separate specialized units that are prepared to perform renal dialysis.

### **The sample**

All children 3 to 16 years old were included in this study. The total number of children was 17, and was: 12 from RSPH, 2 from Shifa hospital and 3 from European hospital.

### **Method of the study**

The design of this study is case-control. The cases (15) affected by the disease were compared with control group (45) who matched the cases in sex, age, living places, monthly income, educational level and the relationship between parents.

### **Study Instrument**

Interview questionnaire was used in this study. The questionnaire was developed for this study and it contained two parts. The first part included demographic personal information such as: sex, age, living places, monthly income, educational level and the relationship between parents. This part included laboratory values of electrolytes and values of some other significant chemical substances. The second part included a Likert scale of five points to explore patients' QOL, feelings and responses due to the renal disease and the process of renal dialysis. Items in this part reflected the five study's dimensions of quality of children's life which include 28 items. The researchers designed the questionnaire to assess patients' feelings and responses about QOL by ratings on a five point Likert scale (1= very little, 2 = a little amount, 3 = a moderate amount, 4 = very much, 5 = an extreme amount).

## Psychometric properties of the questionnaire

### Reliability:

The researchers used the Correlation Coefficient test (Person Correlation test) to evaluate the construct validity of each domain of the study and total degree of the instrument. All the coefficients were positive and significant at the 0.05 level, and all correlation coefficients ranged between (0.73-0.79).

The Cronbachs' Alpha value of the instrument was 0.74 which reflects a high degree of reliability of the instrument (Table 1).

**Table 1: Construction of validity and reliability of the study instrument**

Dimensions	Correlation factor	Significant level
Physical Health	0.88	0.01
Psychological Health	0.90	0.01
Social relationships	0.78	0.01
Environment healt	0.34	0.01
Personal Safety	0.64	0.01

Also, the researchers calculated the correlation factor for each dimension of the study in relation to the overall degree of the instrument, (Table 2).

**Table 2: Correlation factors for each dimension of the study and overall degree of the instrument**

Dimensions	No.of items	Cronbachs' alpha	Pearson correlation	Spearman–Brown prediction formula	Significant Level
Physical Health	4	0.84	0.97	0.99	0.01
Psychological Health	7	0.78	0.93	0.96	0.01
Social relationships	6	0.78	0.89	0.94	0.01
Environment healt	7	0.72	0.73	0.85	0.01
Personal Safety	4	0.76	0.83	0.91	0.01
Overall life quality	28	0.74	0.88	0.94	0.01

### The items loading on the five domains

The exploratory factor analysis of the questionnaire showed the items that are grouped by size of loading; two items were deleted in factor 1 and 5 as their values were under 0.3 (table 3).

**Table 3: Exploratory Factor Analysis of the QOL Questionnaire**

Domain	Item	Factor1	Factor2	Factor3	Factor4	Factor5
Physical Health	P1	0.56	-	-	-	-
	P2	0.58	-	-	-	-
	P3	0.76	-	-	-	-
	P4	0.57	-	-	-	-
Psychological Health	PS1	-	0.65	-	-	-
	PS2	-	0.32	-	-	-
	PS3	-	0.76	-	-	-
	PS4	-	0.58	-	-	-
	PS5	-	0.33	-	-	-
	PS6	-	0.72	-	-	-
	PS7	-	0.47	-	-	-
Social relationships	S1	-	-	0.63	-	-
	S2	-	-	0.73	-	-
	S3	-	-	0.54	-	-
	S4	-	-	0.32	-	-
	S5	-	-	0.52	-	-
	S6	-	-	0.68	-	-
Environment	E1	-	-	-	0.59	-
	E2	-	-	-	0.46	-
	E3	-	-	-	0.46	-
	E4	-	-	-	0.44	-
	E5	-	-	-	0.54	-
	E6	-	-	-	0.63	-
	E7	-	-	-	0.68	-
Personal safety	PE1	-	-	-	-	0.41
	PE2	-	-	-	-	0.58
	PE3	-	-	-	-	0.50
	PE4	-	-	-	-	0.54

**Internal consistency of the instrument**

**1- Construction of validity:**

The researchers calculated the correlation factor for each item in relation to the overall degree of the related dimension, and it was as follow:

**1- Physical Health:** The coefficients of this domain are positive and significant < (0.001), all correlation factor ranged between (0.89-0.96), but item No. (5) was not significant and was deleted from the final instrument (Table 4).

**Table 4: Correlation factors for each item of physical health dimension and overall degree dimension**

No.	Item	Correlation factor	Significant Level
1-	I participate in daily life activities and I play frequently in my neighborhood and school	0.96	Sig.**
2-	I feel physical pain that prevents me from playing and doing homework's	0.91	Sig.**
3-	I find difficulties in sleep	0.89	Sig.**
4-	I feel fatigue	0.91	Sig.**
5-	I eat abnormal amount of food (large or little)	0.22	Not Sig.

**2- Psychological Health:** The coefficients of this domain are positive and significant at level  $< (0.001)$ , all correlation factors ranged between (0.26-0.88), which support content validity (table 5).

**Table 5: Correlation factors for each item of psychological health dimension and overall degree dimension**

No.	item	Correlation factor	Significant level
6-	I am satisfied with my myself	0.83	Sig.**
7-	I feel happiness and pleasure	0.83	Sig.**
8-	Through the last weeks I felt fear , sadness, anxiety , and/or blue mood	0.81	Sig.**
9-	I perform my homework that needs understanding and thinking quickly	0.69	Sig.**
10-	I am forgetful and forget many things	0.26	Sig.**
11-	I feel that life is beautiful and interesting	0.88	Sig.**
12-	In the night , I have bad dreams and nightmares	0.71	Sig.**

**3- Social relationships:** The coefficients of this domain are positive and significant at level  $< (0.001)$ , all correlation factors ranged between (0.68-0.76), which support content validity (Table 6).



**Table 6 Correlation factors for each item of social relationship dimension and overall degree dimension**

No.	Item	Correlation factor	Significant level
13-	I have friends in my neighborhood and school	0.72	Sig.**
14-	I like to be with friends and colleagues	0.74	Sig.**
15-	I prefer to stay in my home	0.68	Sig.**
16-	I can easily make friendly relationships	0.76	Sig.**
17-	I prefer to be alone most the time	0.73	Sig.**
18-	I am comfortable when I am with my friends	0.68	Sig.**

**4- Environment health:** The coefficients of this domain are positive and significant at  $< (0.001)$ , all correlation factors ranged between (0.31-0.73), that supports content validity (Table 7).

**Table 7: Correlation factors for each item of environment dimension and overall degree dimension**

No.	Item	Correlation factor	Significant level
19-	All resources for comfort and playing are provided at home and school	0.59	Sig.**
20-	I have time to practice my preferred games	0.69	Sig.**
21-	I take enough money to meet my daily needs	0.61	Sig.**
22-	There is a place to play	0.73	Sig.**
23-	Special needs groceries are available in local shops	0.31	Sig.**
24-	My surrounding environment are clean	0.60	Sig.**
25-	I face difficulties in transportation when I go to the closed regions	0.32	Sig.**

**5- Personal Safety:** The coefficients of this domain are positive and significant at  $< (0.001)$ , all correlation factors ranged between (0.51-0.84), which supports content validity of the instrument, item No. (30) was not significant and was deleted from the final instrument (table 8).

**Table 8: Correlation factors for each item of personal safety dimension and overall degree dimension**

No.	Item	Correlation factor	Significant level
26-	I feel safe in my home	0.51	Sig.**
27-	I feel peace as I walk in the road	0.72	Sig.**
28-	I am frightened from loud voice	0.55	Sig.**
29-	I feel anxious when I am a lone	0.84	Sig.**
30-	I like to go out with one of my family members	0.01	Not Sig.

## 2- Content validity

The questionnaire has been prepared to have direct, clear statements and properly arranged ideas to make the questionnaire easy to comprehend and simple to understand for the children population. Content validity ratio was conducted by experts to ensure relevance, clarity and completeness. Recommendations of the experts for changes were taken into consideration.

## Eligibility criteria

The study included all the pediatric patients in Gaza strip who are between 3-16 years. Only, two patients were excluded from this study because their age was less than 3 years.

## Ethical consideration and procedures

Ethical approval from the MOH and administrative approval from the General Directorate of hospitals were obtained. Every participant gave verbal consent to participate in the study, and received an explanatory form about the study that was attached to the questionnaire. It includes statement about patients' right to participate or to refuse to participate in the study. Ethical concepts, anonymity, right to withdraw at any time, and respect for opinions and perspectives for children and their parents were taken in consideration in this study.

## Data analysis

Data analysis was carried out by a statistician and the researchers. Means have been computed for the continuous numeric variables. To illustrate the main characteristics of the respondents, frequency tables have been used. Advanced statistical analysis was conducted to explore potential relationships between variables, student t-test and one way ANOVA test to examine potential relationships between the continuous variables. P values  $\leq 0.05$  was considered statistically significant.

## Result

The study respondents (cases and controls) sociodemographic characteristics by gender, age by years, living place, monthly income and educational level are shown in table 9.

**Table 9: Sociodemographic data of the study population**

Variables	groups	Frequency		Total	Percent
		Cas.	Cont.		
Gender	Male	Cas.	8	32	53.3%
		Cont.	24		
	Female	Cas.	7	28	46.7%
		Cont.	21		
Age by years	From 3 to 8y	Cas.	4	16	26.7%
		Cont.	12		
	From 9 to 11y	Cas.	7	28	46.6%
		Cont.	21		
	From 12 to 16y	Cas.	4	16	26.7%
		Cont.	12		
Living place	Gaza G.	Cas.	8	32	53.3%
		Cont.	24		
	North G.	Cas.	3	12	20%
		Cont.	9		
	Mid. G.	Cas.	1	4	6.7%
		Cont.	3		
	Khanyounis G.	Cas.	3	12	20%
		Cont.	9		
Monthly income	Up to 1000 NIS	Cas.	9	36	60%
		Cont.	27		
	Up to 2000 NIS	Cas.	4	16	26.7%
		Cont.	12		
	More than 2000 NIS	Cas.	2	8	13.3%
		Cont.	6		
Parents relationship	From father side	Cas.	2	8	13.3%
		Cont.	6		
	From mother side	Cas.	4	16	26.7%
		Cont.	12		
	From both parents side	Cas.	3	12	20%
		Cont.	9		
	No relationship between parents	Cas.	6	24	40%
		Cont.	18		
Total respondents		Cas.	15	60	100%
		Cont.	45		

The differences between cases and controls percentages and means of QOL are shown in table 10. The overall QOL scores for cases (patients) represented 72.2% while the controls total scores were 78.1%, which means that healthy children have higher QOL scores than patients. The highest score dimension for healthy children (90.2%) when comparing them with dialysis patients (59.5%) is the physical health.

This shows that the dialysis patient children have difficulty practicing their daily activities as normal as healthy children do. In the other side the highest score dimension for patients (84.0%) when comparing them with healthy children (63.9%) was the environmental health dimension. This result means that dialysis children parents, families and the society are more protective than healthy children.

Healthy children had higher means and percentages scores than cases or patients in all dimensions of the study, which show that the QOL scores for healthy children are higher than QOL scores for dialysis children physically, psychologically, socially and in personal safety.

**Table 10: Means and percentage of QOL dimension's**

Dimensions	Total degree		Means		Percentage	
	Cas.	Cont.	Cas.	Cont.	Cas.	Cont.
Physical Health	13	20	7.7	18.0	59.5	90.2
Psychological Health	23	35	18.6	29.8	80.9	85.2
Social relationships	28	30	19.1	24.5	68.1	81.6
Environment health	27	35	22.7	22.4	84.0	63.9
Personal safety	15	17	8.7	12.2	57.8	71.9
Overall QOL	106	137	15.3	21.4	72.2	78.1

The findings were showed that there were no statistical significant differences between healthy children and affected dialysis children in all compared variables (gender, age, monthly income, living place and parents' relationship), except in educational level there were significant differences in physical, psychological and social health. This result shows that the educational level is affected by the QOL of dialysis children who are represented in these three dimensions (table 11).

**Table 11: Relationship between educational level and the study dimensions**

variable	Dimension	Mean	Statistical test " F "	Overall quality "P value"
Educational level	Physical Health	142.4	7.6	0.001**
	Psychological Health	94.9	2.9	0.04*
	Social relationships	73.9	4.0	0.01*
	Environment health	12.2	1.1	0.3
	Personal safety	15.3	1.9	0.1

In addition, the results showed that there were statistical significant differences between healthy children and affected dialysis children in all dimensions of the QOL instrument except in the environmental health dimension. This result illustrates that QOL of healthy children is significantly different than affected children in the following dimensions; physical, psychological, social and in personal safety (table 12).

**Table 12: Means (SD) of study population**

<b>Dimension</b>	<b>Type of client</b>	<b>No.</b>	<b>Mean</b>	<b>St. deviation</b>	<b>"T" value</b>	<b>Sig.</b>
Physical Health	Cas.	15	7.7	2.2	-15.72	0.001**
	Cont.	45	18.0	2.2		
Psychological Health	Cas.	15	18.6	2.7	-10.7	0.001**
	Cont.	45	29.8	3.7		
Social relationships	Cas.	15	19.1	5.1	-4.57	0.001**
	Cont.	45	24.5	3.5		
Environment health	Cas.	15	22.7	2.7	0.29	0.77
	Cont.	45	22.4	3.5		
Personal safety	Cas.	15	8.7	2.3	-4.9	0.001**
	Cont.	45	12.2	2.5		

Regarding the chemical/electrolyte substances that are normally present in the body and are affected by renal failure, the result showed that there was a significant effect of these substances (Potassium, Calcium, Urea, Uric acid and Creatinine) in the QOL dimensions of children (table 13). Based upon these results, uremia is responsible for a lot of signs and symptoms of renal failure.

**Table 13: Comparison between means of cases and controls in regard to laboratory result**

<b>Laboratory test</b>	<b>Type of client</b>	<b>No.</b>	<b>Mean</b>	<b>St. deviation</b>	<b>"T" value</b>	<b>Sig.</b>
Sodium	Cas.	15	138.7	4.7	-1.14	0.261
	Cont.	45	139.8	2.5		
Potassium	Cas.	15	6.3	1.2	7.72	0.001**
	Cont.	45	4.5	.5		
Calcium	Cas.	15	9.2	1.5	-4.18	0.001**
	Cont.	45	10.2	.3		
Urea	Cas.	15	174.6	43.7	22.45	0.001**
	Cont.	45	27.2	5.7		
Uric acid	Cas.	15	7.3	2.9	6.13	0.001**
	Cont.	45	4.5	.7		
Creatinine	Cas.	15	6.1	1.6	24.10	0.001**
	Cont.	45	0.5	0.1		

## **Discussion**

The result of the study revealed that renal failure affects the mental state, normal physical growth, social relations as well as level of personal safety for dialysis children. These findings confirmed with other study [18] that illustrated that these children and their families face many difficulties as a result of the disease, leading to disruption in behavior such as aggression and the slow progress in the study, anxiety, depression, delay in the development of physical and nervous system, cognitive, increased fear and insecurity.

The finding also go with other studies [19,20] in terms of the need for attention to the psychological care of patients at home, school, hospital. Sick children and their families need psychological and social support during the dialysis process. This was confirmed by a study [8] that conducted to identify the problems of personal, social and economic development of dialysis children, where the study found that dialysis children do not have the ability to form social relationships and suffering from some personal problems such as anger, stubbornness, negative isolation, jealousy and sensitivity.

The finding of the study showed that the quality of the patient's life have fallen for healthy children and came compatible with the study [21] that aimed to measure the QOL of dialysis patients. Previous study revealed that there are many factors that affect the QOL of dialysis patients, in addition to the disorders in physical, psychosocial and economic situation of the patient. As well as with the study [22] which showed that the QOL of dialysis patients depends on several factors including family relations, peers relationships, mental status, accept treatment and a sense of security during treatment. The dialysis patients scored lower in all domains than did healthy children. Patients who underwent kidney transplantation reported better physical and psychosocial health than did dialyzed patients [23].

The present findings revealed that the dialysis process leads to psychological and social incompatibility this result corresponded with [24] which aimed to determine the pressures and methods of compliance in dialysis patients. These findings approved that there is statistical significant relationship between the pressure of treatment and length of dialysis process with the compatibility of the dialysis patients.

The findings showed that the presence of the disease has led to delay in the physical, psyche as well as social relationships of the dialysis children, which led to delay in the progress of the school study when comparing patients with healthy children. Also our finding confirm with [25] which showed that language abilities and total IQ for dialysis children were less significantly than the control group of healthy children.

It is noteworthy, the result also revealed that patients with renal failure suffer from symptoms similar to those experienced by people with anemia including memory impairment, fatigue, loss of appetite, lack of psychosocial adjustment when comparing them with their peers from the healthy group. This study finding are similar to [26] which showed that the memory disorders represent one of the most important complications for patients with renal failure which affects the QOL of patients and increase the suffering.

In a study [27] showed that the process of dialysis causes a marked change in auditory memory in patients with renal failure, which negatively affects the QOL of these patients. This study showed that there is a decrease in educational achievement of children receiving dialysis less than healthy children, this is comparative to the study [28] that also found an increase in the decline of cognitive and emotional state of the patient.

It is also observed that the accumulation of certain chemicals in the body of patients with renal failure leads to deterioration of behavioral and psychological situation. This finding goes with [29] who concluded that renal failure patients suffer more than from cancer patients and Hepatitis C due to the effect of disturbances of body's chemical substances, the loss of hope and the difficulty to treat. It also agree with the studies [30,31] which concluded that regular dialysis sessions lead to improved cognitive disorder situation caused by cleaning urea from the patient's blood, and by pointing out that we still do not know how urea influence brain function.

Uremia is a clinical syndrome associated with fluid, electrolyte, and hormone imbalances and metabolic abnormalities, which develop in parallel with deterioration of renal function [32]. Severe complications of untreated uremia include seizure, coma, cardiac arrest, and death. Spontaneous bleeding can occur with severe uremia and may include gastrointestinal bleeding, spontaneous subdural hematomas, increased bleeding from any underlying disorder, or bleeding associated with trauma. Cardiac arrest may occur from severe, underlying electrolyte abnormalities such as hyperkalemia, metabolic acidosis, or hypocalcemia. Patients with hyperkalemia report vague symptoms including: nausea, fatigue, muscle weakness, or tingling sensations. More serious symptoms of hyperkalemia include slow heartbeat and weak pulse. Severe hyperkalemia can result in fatal cardiac standstill (heart stoppage) [33].

Hypocalcemia (low calcium in the blood) occurs when blood calcium levels in the body become deficient. Symptoms of hypocalcemia include: abdominal cramps, arrhythmia (irregular heartbeat), depression, irritability, lethargy or sluggishness, muscle spasms, and seizures [34]. Renal failure associated bone disease (renal osteodystrophy) may lead to an increased risk of osteoporosis or bone fracture with trauma.

Hyperuricemia, is an elevation in uric acid level occurs when the body either produces too much uric acid or is unable to remove sufficient quantities of the substance through normal means. Normal uric acid levels range between 3 and 7 mg/dL (milligrams per deciliter), according to Medline Plus. High uric acid itself rarely produces any symptoms, but the high level of sodium urate may lead to more serious disorders, such as gout, kidney stones and even kidney failure [35].

The symptoms of kidney dysfunction (renal insufficiency) vary widely. Some people may have an incidental finding of severe kidney disease and elevated creatinine on routine blood work without having any symptoms. In others, depending on the cause of the problem, different symptoms of kidney failure may be present including: feeling dehydrated, fatigue, swelling (edema), shortness of breath, confusion [36].

Medication clearance is decreased in persons with renal failure and may lead to untoward adverse effects, such as digoxin overdose, an increased sensitivity to narcotics, and a decreased excretion of normal medications [37]. Disturbances of these chemical substances is responsible for minimizing many of daily activities, educational achievement, social relationship, personal safety and have bad effect in body feature of these patients.

## **Recommendations**

- 1- Nurses need to pay more attention when caring and dealing with dialysis children patients.
- 2- Children need more psychological support from their families and the society.
- 3- In addition, health care professionals need to provide more in terms of safety environment and personal safety.

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