Effectiveness of Self-Care Program on the Health-RelatedQuality of Life for Children Undergoing Hemodialysis

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1.ABSTRACT

Background: Children maintained on hemodialysis struggle with their disease and are facing multiple and potentially overwhelming stressors that affect negatively their quality of life. **Aim:** the aim of this study was to evaluate the effectiveness of self-care program on the health-related quality of life for children undergoing hemodialysis. **Methods:** A quasi-experimental design was utilized on a purposive sample of 40 pediatric patients undergoing hemodialysis at the New General Hospital, Mansoura city. Three tools were used in this study. They were children`s socio-demographic characteristics and their clinical data, Orem's self-care checklist and Standardized Quality Of Life (QOL) Questionnaire. **Results:** According to the findings of this study, there was a highly statistically significant difference in the total studied children's self-care practices after the implementation of the self-care program. Furthermore, there was a highly statistically significant difference in the total studied children's health-related quality of life levels 3 months follow up after the self-care program was implemented. The median of the total studied children health related quality of life has increased 3 months follow up compared to pre and immediately post program implementation. **Conclusion:** Self-care education improves the quality of life of pediatric hemodialysis patients. **Recommendation:** More studies are needed to measure children's undergoing hemodialysis self-care practices and their quality of life among different age groups.

Keywords: Children, End stage renal disease, Hemodialysis, Quality of Life, Self-Care.

2.Introduction:

In recent years, the whole world faces with challenges of public health issues of chronic diseases such as chronic kidney disease (CKD). CKD is a costly and increasingly common illness that causes many people to have poor health outcomes **(Diamantidis et al., 2019 and Hosseinzadeh et al., 2021)**. Although CKD in children is uncommon, their treatment costs more per child than in adults **(Furth et al., 2018)**. According to one study, the global prevalence of CKD stages 1–5 is 13.4%, while another study from the same year indicated that it affects between 8% and 16% of the global population and is frequently underdiagnosed by patients and doctors **(Chen et al., 2019 and Lv & Zhang, 2019)**.

In Egypt the prevalence rate and burden of CKD in children is unknown due to the lack of a national registry. End-stage renal disease is likely the "tip of the iceberg" in underdeveloped countries with limited diagnostic resources, such as Egypt, where people are identified with renal disease after they have already reached end-stage renal failure **(El Shafei et al., 2018)**. According to the 9th Annual Report of The Egyptian Renal Registry published by the Egyptian Society of Nephrology and Transplantation (ESNT), the prevalence of ESRD in Egypt has increased to 483 patients per million **(El-Ballat et al., 2019)**. In contrast, a study in 2020 found that the incidence of ESRD has increased by 30–40% in the recent decade. The death rate for these patients is 3–8 times higher compared to the general population **(Ali et al., 2020)**.

Although dialysis is the most effective method to eliminate toxins from the body and improve a patient's quality of life, this process may aggravate the situation on its own due to its negative effects. Dialysis patients suffering from CRF may have an elevated risk of cardiovascular complications which include traditional risk factors such as hypertension, hyperlipidemia as well as non-traditional risk factors such as inflammatory factors, elevated homocysteine level in the blood, increased coagulability, anemia and increased arterial

calcification, and metabolic risk **(Vadakedath & Kandi, 2017)**.

In chronic diseases such as CKD, quality of life is a crucial factor that needs to be considered. Assessment of QOL of patients with CKD is important not only for evaluating the quality of dialysis, but also for guiding nephrologists in developing better interventions and care plans in the future **(Joshi et al., 2017)**. It is critical to educate CRF pediatric patients about disease facts, medications, dietary habits, and other necessary steps required for managing the condition and living a productive life **(Stavropoulou et al., 2017)**.

Education is a component of a program that encourages the patient to take responsibility for his or her own health. Self-care is a major concern and one of nursing's top research goals. Orem's self-care theory was proposed by the American nursing scientist Orem in **(1971)**, she states that self-care is a set of activities that people engage in to sustain their health, life, and well-being **(Fahim et al., 2019)**. According to her view, nurses can assist clients in regaining lost abilities by providing whole compensatory, partial compensatory, and educational supportive care **(Nasresabetghadam et al., 2021)**.

The extent to which self-care is practiced, self-efficacy, and physical capacity of HD patients are critical in managing their illness process and symptoms. Individuals with competent self-care and self-efficacy can meet their self-care needs on time and in the right way, take responsibility for their own health, and carry out their daily activities on their own **(El Sayed, 2018)**. As a result, the aim of this study was to evaluate the effectiveness of self-care program on the health-related quality of life for children undergoing hemodialysis.

3. Subjects and Method

3.1 Research design

This study was conducted using a quasi-experimental research design (one-group pretest-posttest).

3.2 Setting

The study was carried out at the dialysis unit affiliated to the New General Mansoura Hospital where children were moved from the pediatric dialysis unit affiliated to Mansoura University Children's Hospital (MUCH) which was under reconstruction and repair. The New General Mansoura Hospital dialysis unit was located on the ground floor. It consists of 6 rooms for dialysis session, children were undergoing hemodialysis at

4 rooms, first room consists of 7 beds, second room consists of 10 beds, and third room consists of 9 beds while the fourth room consists of 7 beds but only 2 beds were used by children that are positive for hepatitis B and C.

3. 3 Subjects

A purposive sample of 40 subjects undergoing hemodialysis at pediatric hemodialysis unit from the previously mentioned setting were included in the study, who agreed to participate in the study and met the following inclusion criteria:

- Children between the ages of 10 and 18 years old.
- Children who had been undergoing hemodialysis for at least one year.
- Children undergoing hemodialysis 2-3 times/week.
- Children did not suffer from any other chronic disease as a primary illness rather than renal failure.

3.4 Tools and Techniques of Data Collection

Tool (I): *Children`s Socio-Demographic Characteristics and their Clinical Data:*

This tool was developed by the researcher in the Arabic language after reviewing the recent related literature to assess the children's characteristics. The tool was composed of two main parts:

- **Part 1:** *Socio-Demographic Characteristics of Studied Children*, which was composed of two sub parts as the following: a) characteristics of the studied children. B) socio-economic status which was adapted from **Fahmy and EL-Sherbini, (1983)** and updated by **EL-Gilany, EL-Wehady & EL-Wasify, (2012)**.

- **Part 2:** *Clinical Data of the Studied Children* constituted of 11 items about cause of renal failure, how many years the child on hemodialysis, duration of dialysis session, …etc.

Tool (II): Self-Care checklist:

Based on **Orem's self-care theory**, the researcher created this tool after examining related literature to measure the studied sample's basic self-care skills (before, immediately post and three months follow up after implementation of the self-care program). It was composed of three categories containing 85 questions to assess the following:

A. **Universal needs**, it consisted of 18 questions about breathing ability, children's diet, fluids intake, drinking the specified amount of fluids, elimination habits,…etc.

B. **Developmental needs**, it consisted of 39 questions about pediatric patient`s knowledge regarding nutrition and physical needs of the child as sleep pattern, maintaining the child`s safety, immunization and protective measures of corona virus.

C. **Health deviation needs**, it consisted of 28 questions about pediatric patient`s reported practice about nutrition, adherence to prescribed medication, fistula care and coping with the disease.

Scoring system

For the total self-care score the points were distributed as (correct answer = 1, incorrect answer = 0), except in the part of adherence to prescribed medication (completely adhered to medication = 2, partially adhered = 1, and non-adherence or missing medication =0). The total self-care reported practice score was (27marks) that was categorized according to statistical cut of point between maximum & minimum mean score into two categories:

- Lower level of self - care reported practice $\leq$ 75% ($\leq$ 20 marks)
- Higher level of self – care reported practice >75%(> 20 marks)

Tool (III): Standardized Quality of Life (QOL) Questionnaire:

A structured interviewing questionnaire "Pediatric Quality of Life Inventory End Stage Renal Disease Module", adopted from **(Varni et al, 2008)** after getting the approved license from Mapi Research. It consisted of seven dimensions containing 34 items: 3 items for physical appearance perception, 4 items for treatment problems, 3 items for family and peer interaction, 10 items for worrying about, 4 items for general fatigue sensation and 5 items for both communication problems and problems because of kidney disease.

Scoring system

Each item was scored on a five-point Likert scale with 0 if it was "never" a problem, 1 if it was "almost never" a problem, 2 if it was "sometimes" a problem, 3 if it was "often" a problem, 4 if it was "almost always" a problem. Items are reversely scored and linearly transformed to a 0-100 scale for ease understanding; higher scores indicate a higher level of health-related quality of life. This transformation has been done as follows: the 0-4 scale items to 0-100 as the values are interpreted as: 0=100, 1=75, 2=50, 3=25 and 4=0.

II-Operational Design

Preparatory phase

This phase included a review of related literature and studies from the past and present, as well as the development of study instruments, become acquainted with the many components of the study research subjects using readily available books, periodicals, publications, and articles. The content validity of the study instruments was examined and improved by a panel of five experts in the subject. A statistician used Cronbach's alpha coefficient test in SPSS program version 24 to assess the tools' reliability. It was carried out on eight children and the results were as the following: Internal consistency reliability (Cronbach's α) for Scio-economic scale is quite reliable emerged as (0.5). While, internal consistency reliability for self-care evaluation scale (0.86). Pediatric Quality of Life Inventory Scale r = (0.95).

Pilot study:

A pilot study was conducted on 8 children from the overall sample size who were chosen randomly from the same setting to examine the clarity, feasibility, and application of the study tools.

Fieldwork:

The collected data was extended over a period of six months from the 1st of April 2021 to the end of September 2021. The researcher came to the study setting twice a week from 7.00 pm to11.00 pm. Initial screening was carried out for all children having inclusion criteria. An oral approval obtained from each child/caregiver after explaining the aim of the study.

Study framework:

I. **Assessment phase:**

Before beginning the self-care training program, each child and his parent were interviewed individually to assess and gather baseline data using study tools (I , II & III) pretest.

II. **Planning phase:**

Goals, priorities, and expected outcomes were developed based on the assessment phase's findings in order to improve pediatric patients' self-care abilities and quality of life.

III. **Development of the self-care educational program for pediatric patients undergoing hemodialysis:** taking into account the existing evidence-based literature, required knowledge, and practices, determine appropriate time for each element and identify teaching technique. In this phase,

the researcher planned **6** sessions regarding self-care for pediatric hemodialysis patients.

a) *First session (Opening session):* the aim is to help the researcher introduce herself to the participants and introduce the content and its objectives.

b) *Second session:* the researcher stated the objectives of these sessions at the beginning of this session. It covered a brief overview of the anatomy of the urinary system and functions of the kidneys, definition, causes and types of renal failure according to their developmental stage, signs and symptoms of chronic renal failure, hemodialysis definition and benefits. It took 30 minutes.

c) *Third Session:* it detailed the steps to be followed prior to starting hemodialysis, demonstration about proper hand washing technique and hygienic care. It took 15 to 20 minutes.

d) *Fourth Session:* it included information about vascular access, its care and its danger signs of malfunction, information about importance of sleep, rest and exercise, risks of missing the dialysis session and signs of infection. It took 40 minutes.

e) *Fifth Session:* it included information about food restrictions and signs of edema, the importance of the patient psychological health to adapt well with the physical disease. It took ٤٥-٦٠ minutes.

f) *Six Session (Closing):* a review of what was explained during the previous sessions. It took 10-15 minutes.

IV. **Implementation phase:**

The educational sessions started in the evening at 7 .00 pm. During the session, Lectures, group discussions, demonstrations, and re-demonstrations were among the educational approaches employed by the researcher. Various teaching media were used, such as colored posters, power point presentation, videos, colored handout and colored brochures.

V. **Evaluation and Follow up phase:**

After conducting the educational self – care program, children`s self –care ability and their health- related quality of life were evaluated using **tool (II) & (III)** (immediate post and after 3 months as follow up).

Administrative Design

The Research Ethics Committee of the Faculty of Nursing at Mansoura University gave their official authority to conduct the study. The faculty of Nursing at Mansoura University sent a letter to the necessary authorities in the chosen settings, MUCH and a New General Mansoura Hospital, requesting permission to conduct the study.

Ethical considerations

After explaining the study's aim, advantages, risks, and procedure, a verbal oral consent was obtained from each child/participant for his participation. The data was kept anonymous and secret, and it was solely utilized for research purposes. Participants were informed that participation in the study was completely voluntary and that they had the ability to leave at any moment without incurring any consequences.

Statistical analysis

The collected data was organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 26, SPSS Inc. Chicago, IL, USA). The normality distribution was tested through Shapiro-wilk test and the normality assumption was rejected ($p<0.05$). Therefore the categorical variables were represented as frequency and percentage. Whereas ordinal and non-parametric continuous variables were presented as median and interquartile range (IQR). Fired man test was used to test differences on ordinal and non-parametric continuous variables between three or more related groups.

Results

The characteristics of the studied children were shown in **Table (1)**. Children were aged from twelve to less than fourteen years constituted 40% with mean age of 13.5 years (SD 2.38). In relation to their gender, 70 % of them were boys. Concerning the educational level of children, 45% of them were in the secondary (General/ Technical) level of education.

Figure (1) showed the socio-economic levels of the studied children undergoing hemodialysis, in which 30% of them had middle socio-economic level while others had very low (27.5%), low (25%) and only 17.5% of them had high level.

Table (2) described the clinical data of children undergoing hemodialysis. The data revealed that; 55% of children had kidney failure due to congenital anomalies of kidneys/urinary system. Majority of children (95%) have a negative family history of kidney failure.

Table (3) showed that there was a highly statistically significant difference *(p= 0.00)* in the total studied children's self-care

practice in areas related to nutrition practices, fistula care, coping with Hemodialysis and compliance to medication after the application of the self- care program.

Table (4) demonstrated that the difference was statistically significant *(p=0.000)* in the median of the total studied children`s health related quality of life in both pre, immediately post and 3 months follow up after the implementation of the self- care program.

Table (1): *Distribution of studied children undergoing hemodialysis in relation to their socio-demographic characteristics*

| Children characteristics	No	%
Age (years)		
▪ 10-	6	15.0
▪ 12-	16	40.0
▪ 14-	4	10.0
▪ 16-18	14	35.0
Mean(SD)		13.5(2.38)
Gender		
▪ Male	28	70.0
▪ Female	12	30.0
Education		
▪ Primary	6	15.0
▪ Preparatory	16	40.0
▪ Secondary (General / Technical)	18	45.0
Birth Order		
▪ First	15	37.5
▪ Second	13	32.5
▪ Third	8	20.0
▪ Fourth and more	4	10.0
Residence		
▪ Rural	32	80.0
▪ Urban	8	20.0
With whom the child lives		
▪ With the family	36	90.0
▪ With the mother only	4	10.0
Child's primary caregiver		
▪ The Father	10	25.0
▪ The mother	30	75.0
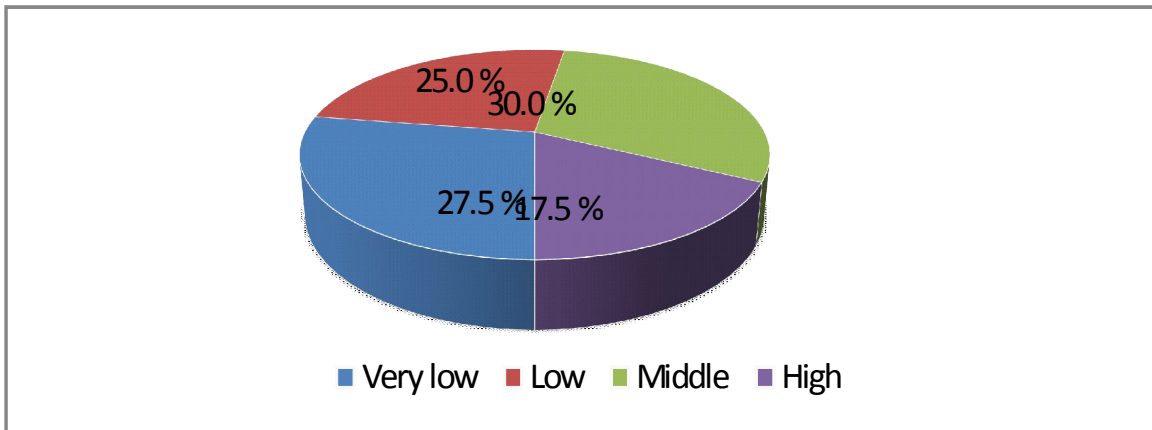
Figure (1) *Socio-economic levels of the studied children undergoing hemodialysis*

Table (2*): Distribution of children undergoing hemodialysis in relation to their clinical data*

Children's clinical data	No	%
Cause of kidney failure		
▪ Chronic kidney cell inflammation	6	15.0
▪ Congenital anomalies of the kidneys / urinary system	22	55.0
▪ Hereditary kidney disease	3	7.5
▪ Excessive use of painkillers and prescribed drugs	2	5.0
▪ Other reasons	7	17.5
Family members suffering from kidney failure		
▪ Yes (Second degree relatives)	2	5.0
▪ No	38	95.0
Hemodialysis duration (years)		
▪ 1-	14	35.0
▪ 3-	11	27.5
▪ From 5 years and more	15	37.5
Frequency of hemodialysis per week (3 or more)	40	100.0
Hours of hemodialysis per Session		
▪ 2 hours	4	10.0
▪ 3hours	28	70.0
▪ 4 hours	8	20.0
Suffering from complications of kidney failure		
▪ Yes (Hypertension)	13	32.5
▪ No	27	67.5
Child aware of prescribed medication		
▪ Yes	35	87.5
▪ No	5	12.5
Child experience medication side effects		
▪ Yes	28	70.0
▪ No	12	30.0
Experienced side effects*		
▪ Headache	11	39.2
▪ Dizziness	17	60.7
▪ Nausea and vomiting	12	42.8
▪ Muscular pain	4	14.2

*Multiple response questions

Table (3): Total median score of studied children's self-care practice pre, immediately and 3 months after self-care program

Self-care practices	Pre-program Median (IQR)	Immediate post Median(IQR)	After3 months Median(IQR)	Firedman χ^2	P
1. Nutrition practices	5.50 (5.00)	5.50 (5.00)	12.00 (1.75)	54.54	0.000**
Fistula care	5.00 (1.00)	6.00 (1.00)	6.00 (1.00)	44.77	0.000**
Coping with hemodialysis	4.00 (3.00)	4.00 (3.00)	5.00 (1.00)	13.47	0.001**
Compliance to medication	1.00 (0.00)	1.00 (1.00)	2.00 (0.00)	42.75	0.000**
Total self-care practice	16.00 (6.00)	17.00 (6.00)	25.00 (3.00)	54.91	0.000**

X^2 of Fired man test

**a highly statistically significant at p ≤ 0.01

Table (4): *Median of Health- Related quality of life among the studied children throughout different phases of self- care program*

	Health- Related quality of life	Pre-program Median (IQR)	Immediate post Median (IQR)	After 3 months Median(IQR)	Firedman χ^2	P
1.	Physical appearance	3.00 (3.00)	3.00 (3.00)	6.00 (0.75)	32.06	0.000**
2.	General functioning	8.00 (3.50)	8.00 (3.50)	8.00 (3.50)	16.13	0.000**
3.	Family and friends communication	3.00 (3.00)	3.00 (3.00)	6.00 (0.00)	21.87	0.000**
4.	Emotional status	19.0 (6.00)	19.0 (6.00)	20.00 (5.25)	28.47	0.000**
5.	Medications adherence	8.00 (2.00)	8.00 (2.00)	9.00 (1.00)	37.87	0.000**
6.	Communications	10.00 (10.00)	10.00 (10.00)	10.00 (1.00)	6.48	0.04*
7.	About kidney disease	9.00 (2.00)	9.00 (2.00)	8.50 (3.00)	3.76	0.15
Total quality of life		58.00 (13.75)	58.00 (13.75)	67.00 (10.75)	43.12	0.000**

*statistically significant at p <0.05/ ** highly statistically significant at p <0.01

Discussion

Maintenance Hemodialysis (MHD) is one of the most common forms of renal replacement therapy. Despite the fact that dialysis technology has improved MHD patients' physiological function, their survival rate and quality of life remain low due to the long-term nature of therapy and the disease's uniqueness **(Zhang & Xu, 2021).**

Participants enrolled in the current study were adolescents from 10-18 years in which more than one third of them aged from 12 to less than 14 yrs. This participant's age was consistent with previous studies conducted by **Obiagwu et al., (2018)** while studying "Health-Related Quality of Life in Children and Adolescents with End-Stage Renal Disease Receiving Dialysis in Johannesburg' and also, **Darwish et al., (2020)** who investigated "Health-Related Quality of Life in Children with Chronic Kidney Disease in Assiut, Egypt". The researcher believes that, this selection of age is critical as adolescents with CRF do not only face physiological discomfort from kidney failure, medication and treatment side effects, activity restrictions, chronically invasive procedures (e.g., dialysis), frequency of clinic visits, school absences but also, they face cognitive and psychosocial problems that can interfere with their overall sense of well-being and normalcy.

More than two thirds of studied children were boys. This finding goes in the same line with **Darwish et al., (2020)** who illustrated that 67.2 % of cases were boys. This result come in contrary with the studies of **Ghadam et al., (2016), Kilicoglu et al., (2016)** and **Poorgholami et al., (2016)** who found that the number of females was more than males. From the researcher point of view, these findings are due to differences in hormone levels since higher testosterone levels in boys may induce renal function loss, on the other hand boys kidney may not be protected by estrogen which is higher in girls until menopause. Furthermore, due to the

higher prevalence of congenital urinary tract problems in boys, they are at a higher risk for kidney failure than girls **(National Kidney Foundation, 2022).**

In relation to their socio-economic level, more than half of them had low and very low socio-economic level, which is in line with **Gaffer et al., (2021)** findings, who illustrated in the study about "Effect of Teaching Guidelines on Uremic Patients Regarding Arteriovenous Fistula Occlusion" that monthly income of more than 73% of participants is not enough. In contrast to **Sheikh et al., (2022)** who investigated "Factors Related to Treatment Adherence Behaviors among Hemodialysis Patients in Hamadan, Iran" and found that nearly half of the study participants had middle socio-economic level. The researcher rationalized this finding to the residence of the studied children as the majority of them were living in rural areas and they are forced to come to governmental hospitals that fit with their economic level, which corresponds to **Thenmozhi (2018)** who reported in the study about "Quality of Life of Patients Undergoing Hemodialysis" that 61.5% of participants were living in rural areas in contrast to **Haloob AL-Abedi et al., (2020)** who studied "Assessment Self-Care of Patients Undergoing Hemodialysis with End Stage Renal Disease" and reported that more of the sample were urban participants.

The findings of the current study revealed that, there was a highly statistically significant difference in studied children total nutritional knowledge immediately post and 3 months follow up after the application of the self-care program. This finding was consistent with **Fadlalmolaa & Elkareem's (2020)** study, which indicated that patients' knowledge of their dietary restrictions/limitations during hemodialysis therapy increased from 55.3 percent in the pretest to 78.3 percent in the posttest. The researcher justifies that to the long term of children on hemodialysis in

addition to using simple language, media to facilitate their understanding.

Concerning nutritional practice, there was an improvement in children`s nutritional practices after the self-care program implementation. This finding is in agreement with **Hamza & Hasanen's (2022)** study of "Effect of Educational Program for Hemodialysis Patients Regarding their Knowledge and Practice about Self-Care Behaviour" and **Ramezani, et al (2019) ' s** study of "Effect of Educational Intervention on Promoting Self-Care in Hemodialysis Patients," which found that mean scores of hemodialysis patient's behavior regarding adherence to dietary, fluids-intake restriction improved significantly after conducting the educational intervention on self-care program (P < 0.001).

Concerning compliance to prescribed medication, the current study showed that there was a highly statistically significance difference in the total compliance of the studied children to their medication pre, immediately post and 3 months follow up which agrees with **Shi et al. (2013)** who conducted a study about " Effectiveness of A Nurse-Led Intensive Educational Program on Chronic Kidney Failure Patients with Hyper Phosphataemia: Randomized Controlled Trial" and **Sandlin et al., (2013)** who investigated "The Impact of Nurse-Led Education on Hemodialysis Patients' Phosphate Binder Medication Adherence" and found a significant increase in the level of medication adherence following the educational intervention. In contrast to **Alikari et al., (2019)** who observed that the "Medication Adherence" score was not substantially altered in any of study groups after the intervention when studied "The impact of Education on Knowledge, Adherence and Quality of Life among Patients on Hemodialysis". The researcher justifies refusal of children to take medication prior to the self-care program because of the number of pills and the bad taste of them in addition to its side effects.

In relation to total score of children`s self-care, there was an improvement in children reported self-care practice regarding items mentioned of self-care which are consistent with the findings of **Bassiouny Whdan et al., (2019)**, who found a statistically significant difference between pre and post program self-care practices related to fluid consumption and food, medication, vascular access, and exercise. There was a highly statistically significant difference in the studied children levels of self–care practices 3 months follow up after the implementation of the self- care program which was in agreement with **Baghiani**

Moghadam et al., (2016) who investigated the "Evaluating Effect of Self-Care Behavior Training, as well as its Benefits and Barriers on Patients Undergoing Hemodialysis," and found that after the training intervention, hemodialysis self-care scores and benefits increased significantly, while self-care constraints decreased significantly in the intervention group. In contrast to the finding of **Hassan & Khalafallha, (2019)** who reported that the majority of the studied adolescents undergoing hemodialysis had lower weighted mean level in all self-care activities as well as physical, emotional, social, spiritual, and school performance.

The current study`s findings showed that, more than three quarters of the studied children had low quality of life in both pre and immediately post of the self- care program. These findings aligned with those of **Obiagwu et al., (2018)**, who discovered that HRQOL is low in children with ESRD receiving chronic dialysis, and **El Shafei et al., (2018)**, who evaluated the quality of life among children with end-stage renal disease, concluding that ESRD and its treatment modalities negatively affect all aspects of quality of life. Also, **Kilicoglu et al., (2016)** who published a study titled "Impact of End-Stage Renal Disease on Psychological Status and Quality of Life," which concluded that end-stage renal disease is associated with high morbidity and lower QOL. Also, **Arshad et al., (2019)** who concluded that Hemodialysis patients had a poor quality of life.

The current study found that after applying the self-care program for three months, the children's health-related quality of life improved. These findings were in line with those of **Hossein, (2017)**, who conducted a study titled "The Effectiveness of Self-Management Program on Quality of Life among Hemodialysis Children" and found that the children's quality of life had increased after implementing a self-care training program.

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