Effect of Educational Program regarding Self-Care Health Behavior on knowledge and practices of Hemodialysis' Adolescents

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Abstract

Background: Hemodialysis' adolescents facing unique and complex self-care activities. Enhancement of self-care activities of hemodialysis' adolescents is crucial for improving their ability to perform their daily living activities. **Aim:** Evaluate the effect of educational program regarding self-care health behavior on knowledge and practice of hemodialysis' adolescents. **Design:** A quasi-experimental design was used (one group pre and post). **Setting:** the study was conducted at hemodialysis unit in El-Tadamon hospital, El-Mabara hospital and El-Nasr Specialized hospital in Port Said City. **Subjects:** A convenience sampling of 55 hemodialysis' adolescents. **Tools**: Two tools were used to conduct this study; Tool (1) Structure interviewed questionnaire and Tool (2) Self Care Management Scale which consisted of two subscales: Sub scale (A): universal self-care factors and Sub scale (B): health-deviation self-care factors. **Results**: There were statistical significant relation between total knowledge scores of the studied adolescents and their total practices mean scores regarding universal self-care and health deviation self-care for health behavior. **Conclusion:** The educational program succeeded in improving the knowledge and practice of hemodialysis' adolescents regarding self-care health behavior on post and follow up tests than on pre-test. **Recommendations**: the study emphasized on the importance of ongoing in-service education programs regarding self-care health behavior to enhance the quality of life for hemodialysis pediatric patient.

Key Words: Hemodialysis' adolescents, Knowledge, Practice, Self-Care Health Behavior

Introduction:

Chronic Renal Failure (CRF) is a catastrophic medical, social, and economic problem for children and their families **(Ragab et al., 2021).** Renal failure, sometimes referred to as renal failure or renal insufficiency, is a medical disorder that affects kidney function and results in inadequate blood metabolic waste filtering by the kidneys **(Yared & Ichikausa, 2016).** As the condition advances to End Stage Renal Disease (ESRD), only transplantation or dialysis can sustain the human life **(Kaspar et al., 2016).**

Children's congenital kidney disorders such as reflux nephropathy and polycystic kidney disease may be the cause of CRF. Additionally, it might develop as a result of systemic conditions including diabetes mellitus and hypertension that affect renal function **(Ibrahim et al., 2019).** Chronic renal failure causes serious consequences that include renal osteodystrophy, growth retardation, hypertension, and heart dysfunction **(Ragab et al., 2021).**

Chronic renal failure forces the adolescent continuously play the role of a patient in life because of poor health status, the actual illness, and the complication of treatment **(Khazaei et al. ,2021).** In addition to preventing the development of end-stage renal disease, managing chronic renal failure in children aims to meet their physiological, social, and emotional requirements in order to provide them with the greatest quality of life possible **(Al Rafay, 2021).** Dialysis is the backbone of medical care for children with CRF because it assists in ridding the blood of waste and excess fluid. Hemodialysis and peritoneal dialysis are two types of dialysis **(Abraham & George, 2016).**

Hemodialysis is the predominant approach employed in the management of advanced and irreversible kidney failure in pediatric patients. Hemodialysis is a medical procedure wherein a specialized machine is utilized to eliminate waste products from the blood and reinstate normal components to it once more **(Kallenbach, 2015; Ashraf et al., 2019).** Chronic hemodialysis is associated with numerous complications encompassing cardiovascular, nutritional, gastrointestinal, hepatic, endocrine, Arterio-Venous Fistula (AV) complications, infections, nervous system disorders, and sleep disorders **(Webster et al., 2017).**

Self-care is currently recognized as a fundamental principle of nursing management and is considered the central philosophy that promotes the preservation and enhancement of an individual's life and health **(Hossein, 2017).** Self-care is an approach utilized to navigate the challenges and fluctuations of life, with the aim of enhancing personal autonomy and overall quality of life **(Banaye et al., 2017).** Adolescents undergoing hemodialysis often face significant challenges in practicing self-care. It is crucial for adolescents to develop the skills to effectively control and manage their symptoms, as this plays a key role in improving their self-care. Education plays a vital role in enhancing self-care behavior among adolescents **(Ramezani et al., 2019).** Even though self-care for hemodialysis' adolescents may require significant restrictions in lifestyle habits and behaviors, but engaging in self-care behaviors can serve as a means to mitigate the negative consequences associated with chronic kidney disease **(Wong et al., 2018; Kim & Kim, 2019).**

Nurses can help adolescents receiving hemodialysis take responsibility for their illness and enhance wellbeing by recognizing and controlling risk factors. Additionally, they can offer targeted education to support wellbeing and empower adolescents to take control of their illness. Thus, self-care can result in beneficial outcomes including minimal complications, decreased hospitalization, higher patient satisfaction, patient autonomy, enhanced adaptability to diseases, increased well-being and performance, higher quality of life, and improved symptom management **(Khazaei et al., 2021).**

A comprehensive approach to management is essential to minimize disruptions in the lives of hemodialysis adolescents. Whether the child is hospitalized or receiving outpatient dialysis, nurses are in an optimal position to support the medical plan and provide informed and compassionate care. As primary caregivers, nurses conduct ongoing assessments, identify health issues, and take appropriate actions to address them **(Eltantawy, 2021).** The general responsibilities of hemodialysis nurse are summarized in the accompanying display. Nurses hold a significant responsibility as primary patient advocates for both the child and their family. The implementation of a self-care program is crucial in assisting these children in preserving and attaining independence in carrying out their essential daily activities, ultimately leading to an improvement in their quality of life **(Zain Eldin et al., 2018).**

Significance of the study:

Chronic renal failure is a significant health issue affecting children under the age of 18. It is characterized by a progressive decline in kidney function that eventually culminates in end-stage renal disease **(National Kidney Foundation, 2017)**. In 2017, there were more than 30 children among every 100,000 suffering from CRF around the world **(Naritata et al., 2017).** In Egypt, Chronic renal failure in hospitalized children between births to 15 years of age has been reported to be approximately 1.36% of all hospitalized patients **(Ahmed et al, 2020)**.

The most crucial elements in managing chronic illnesses like kidney failure are seen to be self-care health behaviors. Self-care behavior may be extremely challenging to carry out, and frequently requires lifestyle adjustments that most adolescents ignore despite doctors' recommendations, which causes the issues to worsen. **(Hassan & Khalafalla, 2019).** Adolescents' adherence to self-care health behaviors is essential to reaching satisfied results. So, the present study aimed to evaluate the effect of an educational program on self-

care health behavior of hemodialysis adolescents.

Aim of the study:

Evaluate the effect of educational program regarding self-care health behavior on knowledge and practice of hemodialysis' adolescents, that aiming to improve quality of life of hemodialysis adolescents.

Objectives:

- Assess knowledge of hemodialysis adolescents regarding self-care health behavior.

- Assess practice of hemodialysis adolescents regarding self-care health behavior.

- Evaluate the effect of an educational program regarding self-care health behavior on knowledge and practice of hemodialysis' adolescents.

Research hypothesis:

H.0- There is no a significant improvement in knowledge and practice of hemodialysis adolescents regarding self-care health behavior.

H.1- Knowledge of hemodialysis adolescents regarding self-care health behavior will be improved after educational program implementation.

H.2- Practice of hemodialysis adolescents regarding self-care health behavior will be improved after educational program implementation.

Research Design:

A quasi-experimental (one group pre and post) research design was used in the present study.

Subject and method

Setting: This study was conducted at hemodialysis unit in El-Tadamon hospital, El-Mabara hospital and El-Nasr Specialized hospital in Port Said City.

Subjects: A convenience sampling of 55 adolescents; who undergoing hemodialysis in the previous mentioned setting, met the following inclusion and exclusion criteria and agree to participate in the study. They will be recruited in the study regardless of their gender (male and female will be included in the study), educational level and years of hemodialysis, plus 10% drop out of sample to be 60 adolescents.

Inclusion criteria:

1. Having a minimum three months history of hemodialysis.
2. Having the physical capacity to carry out body activities and routine self-care.
3. Adolescents had negative hepatitis B and C tests.
4. Adolescents with arterio-venous fistula.

Exclusion criteria:

1.Adolescents with other chronic diseases.

2.Adolescents at the terminal end stage of life.

3.Adolescents with history of any psychiatric illness or neurological problems as head trauma.

Tools of data collection: Two tools were used to conduct this study as the following:

Tool (I): Structure interviewed questionnaire: It composed of three parts as the following: **The First part:** Socio demographic data which developed by the researchers and involved the characteristics of the studied adolescents as age, sex, level of education, family income level and years of undergoing hemodialysis. **The second part:** Medical history data which developed by the researchers and it included data about adolescents past medical history of chronic diseases, as well as chronic renal failure family history, and taking medications as analgesics for long period and post hemodialysis session major complains. **The third part:** Knowledge assessment data which adopted from **Khamis et al. (2021)**, it

included (26) questions to assess the knowledge of hemodialysis adolescents as knowledge about kidney disease and dialysis, knowledge about prescribed medication regimen and its complication, knowledge about management of renal failure and knowledge about diet and exercises regimen related to renal failure and hemodialysis. Back translation was used to translate the questionnaire to a simple Arabic language.

Scoring system for knowledge assessment data: It was developed as one point for each correct answer and zero point for each incorrect answer. The total knowledge scores were 26 scores; the scores of the items summed up and the total divided by the number of the items, theses scores were converted into a percent score. The adolescents' knowledge was considered (Poor if < 50%, Fair if 50% - 70% and Good if >70%)

Tool 2: Self Care Management Scale: It used to measure self-care health behavior of hemodialysis adolescents. It adopted from **Shintani, (2014)**, to evaluate the degree of universal self-care requisites and health-deviation requisites. The scale was consisted of two subscales: **Sub scale (A):** universal self-care factor and **Sub scale (B):** health-deviation self-care factor. Back translation was used to translate the scale to a simple Arabic language.

Sub scale (A): The universal self-care factors: it consisted of (5) factors and (35) requisites. These factors included adolescents' self-care about the dietary regulation included (12) questions such as: do not eat late at night, keep low salt intake, stop eating when you are approximately full, keep low sugar intake, consume less-sweet foods, eat home prepared meals, drink water daily, always drink water after exercise…etc. Adolescents'' self-care about stress prevention included (9) questions such as: use methods to avoid getting angry, avoid arguing and stressful confrontations, express your opinion without offending other people....etc. Adolescents' self-care about food safety included (5) questions such as: check calories and sodium content when buying food, check the nutrition information panel when buying food, check the use-by date of food, check for the artificial ingredients in processed or kneaded food and take care to eat a balanced diet. Adolescents' self-care about exercise regulation included (5) questions such as: walk often , you do not use a car to go short distances , use stairs rather than the elevator, use stairs to climb one or two floor, exercise daily (jogging, running, walking) and use the care, bus or train rather than walk, even for short distances. Also, adolescents' self-care about habit regulation included (4) questions such as: make time for prayer or religious activities, read books or journals and watches movies.

Sub scale (B): Health deviation self-care factors: it consisted of (3) factors and (25) requisites. These factors included adolescents' self-care about shunt preservation included (10) questions such as: keeps the shunt area clean, watching out for reddening or swelling, avoid resting your head on the arm used for blood shunting, avoid rubbing the area of the blood shunt or applying hot towels….etc. Adolescents' self-care about therapeutic diet implementation included (8) questions such as: do you maintain the amount of water recommended by the physician, do you keep your salt intake within the limits recommended by the physician, keep calories to within the limits prescribed by the physician…etc. In addition to, adolescents' self-care about the observations of care instructions included (7) questions such as: preserve all urine produced during that day, avoiding heavy labor with the arm used for blood shunting, always undergo hemodialysis on the set days..etc.

Scoring system for self-care management scale:

Each item requisite was rated on 4 points scale ranging as the following: 4 points for very applicable, 3 points for somewhat applicable, 2 points for minimally applicable and 1 points for not applicable at all.

Total scoring for universal self-care was 140 points and summed and classified as fallowing: from 1: 35 was considered not applicable at all, from 36: 70 was considered minimally applicable, from 71: 105 was considered somewhat applicable and from 106: 140 was very applicable.

Total scoring for health deviation self-care was 100 points and it summed and classified as fallowing: from 1:25 was considered not applicable at all, from 26:50 was considered minimally applicable, from 51:75 was considered somewhat applicable and from 76:100 was considered very applicable.

Tool validity and reliability

Tools of the study were given to 5 experts in medical surgical and pediatric nursing field in the Faculty of Nursing to test the content validity of the tools and clarify the sentences as well as appropriateness of content. Reliability of the tools was tested by using Cronbach's Alpha to unsure the internal consistency of the tools. The self-care assessment scale had a Cronbach's alpha value of 0.77and the knowledge alpha coefficient of 0.85, indicating that the instrument was consistent and trustworthy in its results.

Pilot study

A pilot study was carried out after the development of the study tools and before starting the data collection. It conducted on 10 % of the total sample size of the studied adolescents to evaluate the clarity and the applicability of the study tools. After obtaining the result of the pilot study, necessary modifications were done according to the study subject's response and the final form was developed. Those included in the pilot study were excluded later from the sample.

Ethical Considerations

Ethical approval was obtained by the Ethical Committee of Faculty of Nursing Suez Canal University (approval number: 183/11-2022). Written informed approval was obtained from each adolescent before the study beginning, after explanation of the purpose of the study, nature of the study and its expected outcomes. The researchers emphasized on maintaining anonymity and confidentiality of the collected data throughout the study phases. The participants were informed that they have the right to withdraw from the study at any time without any responsibility and also without any effect on the level of care which provided to them.

Fieldwork

An official letter approval was obtained from the directors of hospitals and hemodialysis units of the previous mentioned hospitals to precede the study. This letter included permission to collect the necessary data and explain the purpose and nature of the study. Informed written consent was taken from each hemodialysis adolescents after explanation of the purpose and nature of the study at hemodialysis unit. The period of data collection was extended over a period of 9 months, started from beginning of November 2022 to the end of July 2023. The researchers were available in the study setting for 4 days/week. To accomplish the educational program through the following phases:

The program phases:

1. Assessment phase:

Based on the results of pretest; the researchers created the educational program aimed to improve adolescents' knowledge and self-care practice to change their lifestyle pattern after educational program implementation regarding self-care behavior.

2. Planning phase:

The program's sessions and time were decided during this phase, along with the arrangements for carrying out the programme. Other facilities were set up as the teaching space during this phase, along with instructional materials including handouts and pictures.

3. Implementation phase:

Pre-test was conducted in hemodialysis units, before implementation of the educational program to assess the adolescents' knowledge and self-care practices. The educational program included six sessions for each adolescent and each session took from 45-60 minutes. The researchers attended to the hemodialysis units in all sessions often for 4 days/week (Sunday, Monday, Tuesday and Wednesday) for 4-5 hours/day to collect data from 3 adolescents/ shift individually (6 adolescents/ day).

At the first session, before implementing the programme, the researchers introduced themselves to the participants in order to build the

essential rapport and capture their interest. The participants were then given an introduction to the programme and its goals, as well as information about the time and location of the sessions. Furthermore, the program's material was put into practice; researchers talked to participants about the concept of renal failure, different forms of it, its symptoms, its causes and risk factors, and its diagnostic procedures. After that, **the second session** contained a definition of hemodialysis, the primary role of hemodialysis. A classification of vascular connections and their types, a list of steps for caring for blood connections (Vistula, graft, and catheters), information on some health issues brought on by vascular connections and how to handle them.

Additionally, **the third session** included determining the permissible food categories, the proper serving sizes for each, food safety and addressing dietary regulations, the significance of exercise, a list of permissible exercise types, and information on how often to exercise. **The fourth session** involved identifying health problems that can arise for hemodialysis patients and discussing approaches to managing them, medication that must be taken and its complications. **The fifth session** encompassed determining habits regulation, exploring the causes of death among hemodialysis patients, discussing strategies to enhance their immunity and prevent infections, and addressing stress regulation. Finally, **the sixth session** the session covered the determination of appropriate weight or dry weight for hemodialysis patients and the methods used to determine it. Additionally, it included information about dietary sources of important vitamins and minerals. A follow-up test will be conducted after three months using the same format as the pre and posttest.

4. Evaluation phase:

Immediately after implementing the program and again after three months, the researchers evaluated the knowledge and self-care practices of the adolescents by having them complete the same assessment tools.

Statistical analysis

The collected data were coded, organized, analyzed using statistical package for social science (SPSS) version 25 and tabulated. Descriptive statistics including the frequency distribution and percentages were used for the analysis of nominal data as demographic data of the studied adolescents. Differences between variables through times of evaluation were analyzed using T-test. The statistical significance and associations were assessed using, the arithmetic means, the standard deviation (SD), (chi square test), Pearson's and Spearman's tests used to explore correlation between the variables. Significant level was identified at $p < 0.05$.

Results:

Table (1): Illustrates sociodemographic data of the studied adolescents it was found that, 50.9% of them were aged between 16 to 18 years, ($\bar{x} \pm SD$, $16.59 \pm .894$), in addition, 61.8% of the studied adolescents were males. Regarding level of education 54.5% of the studied adolescents had secondary level of education. It also, shows that 80% of them had sufficient monthly family income. Also; this table shows that 36.4% of the studied adolescents had undergone hemodialysis for 3 to less than 5 years.

Table (2): Shows that 34.5% and 21.8% of the studied adolescents had nephritic syndrome and congenital malformation of the kidney respectively. It also clarifies that 63.6% of the studied adolescents were not taking medications for long periods and 61.8% of them had family history of chronic renal failure. It was also observed that 41.8% and 27.3% of the studied adolescents mentioned that hypotension and restlessness were the major post hemodialysis sessions complain respectively.

Figure (1): Clarifies that, 89.8% of the studied adolescents had poor level of knowledge scores at pre-test while their knowledge improved at immediate post-test to good level by 69.6%, after three months of post-test their knowledge slightly declined to 40.5% for good level of knowledge. There was a statistically significant difference between total knowledge scores of the studied adolescents at pre, immediate post-test and follow up (P1=0.001 and P2=0.000) respectively.

Figure (2): Shows that total universal self-care practice mean scores of the studied adolescents was 72.62 ± 8.35 at pre-test which improved at post and follow up test to (99.14 ± 7.66 and 92.27 ± 9.67) respectively. There were highly statistically significant differences between total universal self-care practice mean scores of the studied adolescents at pre, immediate post and follow up tests at (P1=0.003 and P2=0.000) respectively.

Figure (3): Illustrates that total health deviation self-care practice mean scores of the studied adolescents was 56.22 ± 7.14 at pre-test which improved at post and follow up test to (81.52 ± 6.74 and 78.77 ± 6.45) respectively. There were highly statistically significant differences between total studied adolescents' health deviation self-care practice mean scores at pre, immediate post and follow up tests (P1=0.001 and P2=0.000) respectively.

Tables (3): Reveals that there was a statistical significant difference between total knowledge mean scores of the studied adolescents and their (age, gender, level of education and years of undergoing hemodialysis) at pretest at p= (0.034, 0.028, 0.003 and 0.0013) respectively.

Tables (4): Demonstrates that there was a statistical significant difference between studied adolescents' total universal self-care practices mean scores and their (age, level of education and years of undergoing hemodialysis) at pretest (P=0.014, 0.001 and 0.035) respectively. Also; there was a statistical significant difference between studied adolescents' total universal self-care practices mean scores and their gender at immediate post-test were p= 0.016. In addition; there was a statistical significant difference between studied adolescents' total universal self-care practices mean scores and their level of education at follow up test p=0.003.

Tables (5): Illustrates that there was a statistical significant difference between studied adolescents' practices mean scores regarding health deviation self-care for health behavior and their level of education at pre-test at P=0.045.

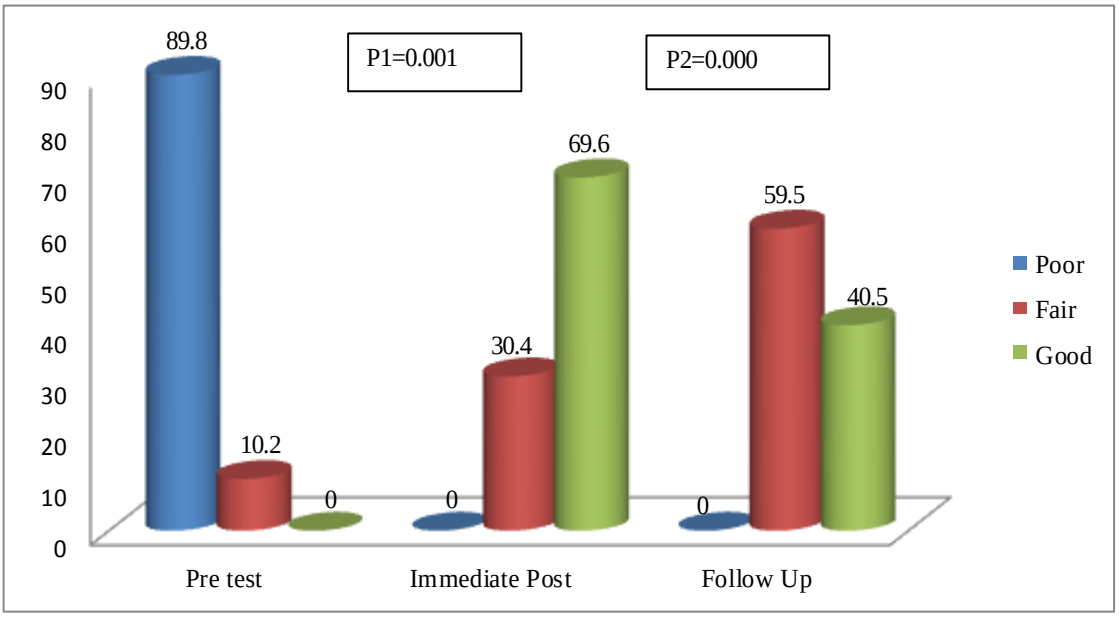
Table (1): Percentage distribution of the studied adolescents according to their sociodemographic data (n = 55)

Variable	No	%
Age in years		
12 > 14	9	16.4
14 > 16	18	32.7
16 – 18	28	50.9
$\bar{x}$ ± SD	16.59 ± .894	
Gender		
Male	34	61.8
Female	21	38.2
Level of Education		
Elementary	4	7.3
Preparatory	21	38.2
Secondary education	30	54.5
Monthly family income		
Sufficient	44	80
Insufficient	11	20
Years of undergoing hemodialysis		
< 1 year	10	18.2
1 > 3 years	16	29.1
3 > 5 years	20	36.4
5 ≥ 7 years	9	16.4

Table (2): Percentage distribution for medical history of the studied adolescents (n = 55)

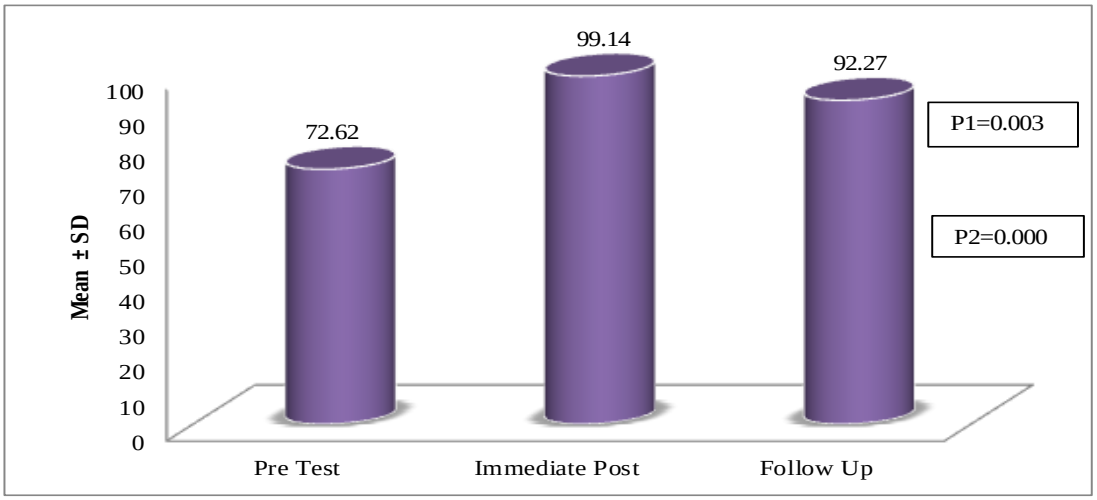
Variables	No	%
Presence of chronic diseases		
Yes	48	87.3
No	7	12.6
If yes, type of chronic diseases (n=48)		
Congenital malformation of the Kidney	12	21.8
Nephritic syndrome	19	34.5
Systemic lupus Erythematous	7	12.7
Diabetes mellitus	10	18.2
Taking medications for long periods as analgesics		
Yes	20	36.4
No	35	63.6
Presence of chronic renal failure in the family members		
Yes	34	61.8
No	21	38.2
Post hemodialysis session major complain		
Hypotension	23	41.8
Nausea	8	14.5
Vomiting	0	0
Muscle cramps	7	12.7
Restlessness	15	27.3
Headache	2	3.7

Figure (1): Total knowledge scores of the studied adolescents' at pre, immediate post and at follow up tests (n=55)



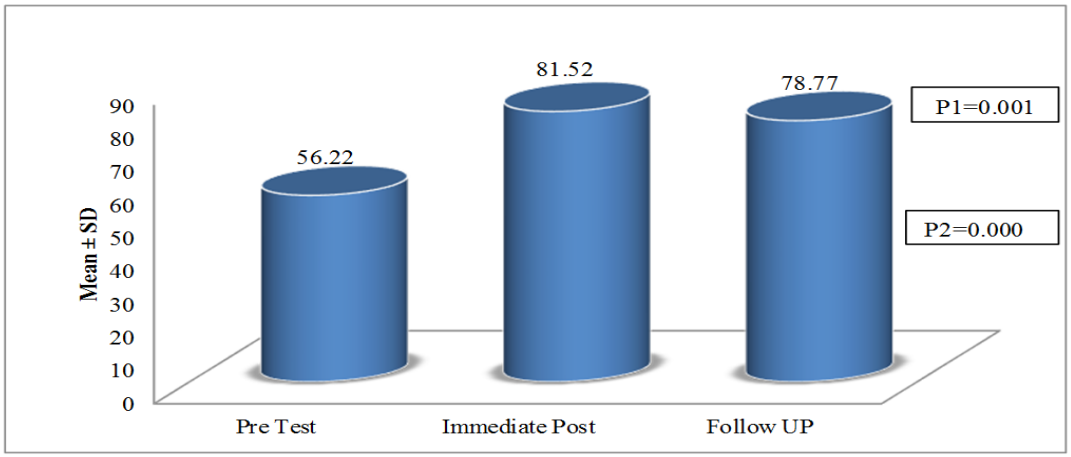
P-value statistically significant at <0.05, P1: Pretest V.s Posttest, P2 Pretest V.s Follow up test Paired sample t-test is used.

Figure (2): Total universal self-care practice mean scores of the studied adolescents at pre, immediate post and at follow up tests (n=55)



P-value statistically significant at <0.05, P1: Pretest V.s Posttest, P2 Pretest V.s Follow up test
Paired sample t-test is used.

Figure (3): Total health deviation self-care practice mean scores of the studied adolescents at pre, immediate post and at follow up tests (n=55)



P-value statistically significant at <0.05, P1: Pretest V.s Posttest, P2 Pretest V.s Follow up test
Paired sample t-test is used.

Table (3): Relationship between socio-demographic data of the studied adolescents and their total knowledge scores throughout educational program phases (n=55)

Socio-demographic data	Total knowledge Mean Scores		
	Pre Test	Immediate Post	Follow Up
	$\bar{x}$ ± SD	$\bar{x}$ ± SD	$\bar{x}$ ± SD
Age in years			
12 > 14	22.71 ± 7.52	72.13 ± 5.79	68.73 ± 5.89
14 > 16	26.79 ± 4.91	72.49 ± 5.66	68.29 ± 6.32
16 – 18	33.05 ± 8.93	74.53 ± 6.32	70.31 ± 6.38
P-Value	0.034*	0.736	0.648
Gender			
Male	33.17 ± 5.14	72.19 ± 6.93	70.37 ± 5.31
Female	26.29 ± 6.18	71.13 ± 4.18	69.23 ± 5.14
P-value	0.028*	0.754	0.273
Level of education			
Elementary	19.54 ± 7.34	72.67 ± 3.07	70.08 ± 4.17
Preparatory	27.67 ± 4.54	73.47 ± 2.15	69.39 ± 4.22
Secondary education	33.39 ± 8.07	74.59 ± 3.25	71.29 ± 5.37
P-value	0.003*	0.523	0.273
Monthly family income			
Sufficient	27.43 ± 7.42	73.42 ± 4.72	69.82 ± 5.12
Insufficient	26.00 ± 7.82	72.14 ± 5.17	69.18 ± 5.49
P-value	0.643	0.262	0.586
Years of undergoing hemodialysis			
< 1 year	22.52 ± 5.15	73.34 ± 3.18	70.42 ± 4.04
1 > 3 years	24.58 ± 6.05	73.07 ± 3.12	69.29 ± 5.27
3 > 5 years	25.86 ± 4.40	74.59 ± 2.91	70.87 ± 3.80
5 ≥ 7 years	38.67 ± 7.02	75.25 ± 3.06	71.88 ± 4.18
P-value	0.001*	0.461	0.352

P-value statistically significant at <0.05, Independent sample t test, Annova test are used

Table (4): Relationship between socio-demographic data of the studied adolescents and their universal self-care practice mean scores throughout educational program phases (n=55)

Socio-demographic data	Universal self-care practice mean scores		
	Pre Test	Immediate Post	Follow Up
	$\bar{x}$ ± SD	$\bar{x}$ ± SD	$\bar{x}$ ± SD
Age in years			
12 > 14	67.85 ± 4.82	97.65 ± 6.34	90.65 ± 6.64
14 > 16	70.94 ± 5.43	99.15 ± 7.45	93.19 ± 5.45
16 – 18	76.42 ± 7.61	101.12 ± 7.36	95.63 ± 6.33
P-Value	0.014*	0.322	0.244
Gender			
Male	72.34 ± 11.05	95.16 ± 13.24	92.45 ± 13.04
Female	74.06 ± 9.51	103.34 ± 13.23	94.22 ± 12.35
P-value	0.473	0.016*	0.532
Level of education			
Elementary	63.05 ± 3.61	94.54 ± 9.83	86.21 ± 12.05
Preparatory	72.45 ± 9.14	97.43 ± 12.24	95.00 ± 9.42
Secondary education	82.54 ± 9.78	102.00 ± 14.18	97.71 ± 10.71
P-value	0.001*	0.214	0.003*
Monthly family income			
Sufficient	76.09 ± 9.67	102.00 ± 14.86	96.00 ± 8.80
Insufficient	74.75 ± 10.06	99.59 ± 13.90	93.73 ± 12.26
P-value	0.920	0.476	0.410
Years of undergoing hemodialysis			
< 1 year	68.39 ± 8.78	97.15 ± 14.22	92.36 ± 10.81
1 > 3 years	74.34 ± 6.15	99.983 ± 15.00	94.12 ± 11.00
3 > 5 years	76.12 ± 7.65	100.56 ± 15.14	96.62 ± 8.75
5 ≥ 7 years	78.35 ± 9.12	101.25 ± 10.45	97.32 ± 12.18
P-value	0.035*	0.534	0.448

P-value statistically significant at <0.05, Independent sample t test, ANOVA test are used

Table (5): Relationship between socio-demographic data of the studied adolescents and their health deviation self-care practice mean scores throughout educational program phases (n=55)

Socio-demographic data	Health deviation self-care practice mean scores		
	Pre Test	Immediate Post	Follow Up
	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$
Age in years			
12 > 14	54.12 ± 6.15	80.15 ± 6.22	77.45 ± 4.44
14 > 16	56.23 ± 6.65	81.75 ± 7.15	78.33 ± 6.24
16 – 18	56.64 ± 5.78	81.05 ± 5.00	78.11 ± 5.34
P-value	0.540	0.653	0.645
Gender			
Male	58.56 ± 5.15	83.32 ± 5.73	79.67 ± 6.15
Female	56.33 ± 6.23	81.65 ± 6.18	80.16 ± 6.42
P-value	0.342	0.312	0.431
Level of education			
Elementary	51.55 ± 5.33	80.77 ± 6.13	77.67 ± 5.44
Preparatory	53.23 ± 5.12	81.96 ± 4.42	78.77 ± 4.15
Secondary education	59.41 ± 6.53	82.07 ± 5.22	79.32 ± 6.12
P-value	0.045*	0.435	0.312
Monthly family income			
Sufficient	57.27 ± 5.44	82.18 ± 8.12	79.05 ± 5.32
Insufficient	55.84 ± 6.14	80.55 ± 5.73	77.55 ± 4.17
P-value	0.455	0.614	0.673
Years of undergoing hemodialysis			
< 1 year	55.37 ± 4.84	79.73 ± 4.57	76.16 ± 4.82
1 > 3 years	56.21 ± 5.56	81.93 ± 5.67	78.23 ± 3.21
3 > 5 years	56.50 ± 5.33	81.45 ± 6.48	78.45 ± 4.23
5 ≥ 7 years	58.82 ± 6.45	82.38 ± 6.24	79.18 ± 5.45
P-value	0.345	0.612	0.315

P-value statistically significant at <0.05, Independent sample t test, ANOVA Test are used

Discussion:

Renal pathologies have a hard impact on children's lifestyle. Renal failure is a major health problem and it is considered as the most common chronic disease of childhood. Chronic illness interferes with the individual's ability to function fully as it affects the child interaction with their environment **(Maalej et al., 2018).** Promotion of self-care activities for children undergoing hemodialysis is crucial in enhancing their ability to perform their daily living activities **(Clavé et al., 2019).**

Self-care and adaptation to the disease can lessen children's physical problems, enhance the quality of their life and reduce dependency **(Zain Eldin et al., 2018).** Therefore, the present study aimed to evaluate the effect of an educational program regarding self-care health behavior on knowledge and practice of hemodialysis' adolescents, that aiming to improve quality of life of hemodialysis adolescents.

On assessing socio-demographic data of the studied adolescents (Table 1), the present study showed that, nearly half of them were aged between 16 to 18 years with a mean age of 16.59 ± .892. Also; more than half of them had secondary level of education. From the researchers' point of view education level plays a vital role in determining one's ability to learn and adopt healthy habits, with higher education providing greater access to knowledge and resources, while low levels of education or

illiteracy may create barriers to understanding and implementation. "These results were concurrent with **Hassan & Khalafallha, (2019)** who conducted a study about self-care activities of adolescents undergoing hemodialysis and found that the majority of the studied adolescents their age between 12 to less than 14 years and vast majority of them were in preparatory school level.

Regarding gender of the studied adolescents (Table, 1) the current finding revealed that more than half of them were male. In addition more than one third of the studied adolescents had undergone hemodialysis for 3 to less than 5 years. From the researchers point of view longer duration of hemodialysis treatment may allow adolescents to become more familiar with the process, develop necessary abilities, and gain practical experience in managing their condition. This may lead to increased self-assurance and autonomy in performing self-care tasks, including dialysis session preparation, equipment management, vital sign monitoring, and adherence to dietary and fluid restrictions. These findings go in line with a study conducted by **Hassan & Mahmoud, (2022),** about the effect of empowerment program for mothers of children undergoing hemodialysis on arteriovenous fistula care and reported that more than half of the studied children were male and also more than one third of them had undergone hemodialysis for 3 to less than 6 years.

Concerning medical history of the studied adolescents (Table, 2), the study results illustrated that more than one third of the studied adolescents had nephritic syndrome and more than one fifth had congenital malformation of the kidney. It also clarifies that more than two fifths of the studied adolescents mentioned that hypotension was the major post hemodialysis sessions complain followed by restlessness. From the researchers point of view adapting to the lifestyle changes and responsibilities associated with hemodialysis can be demanding, and adolescents may require ongoing support and guidance from healthcare professionals, caregivers, and peers. These results were in contrast with **Ahmed et al. (2020),** who reported in their study about effect of nursing intervention program on self-esteem, body image and quality of life of children undergoing hemodialysis that the majority of studied subjects complain of hepatitis and mentioned that more than half have coma as a complication of hemodialysis.

The present study finding revealed that total knowledge scores of the studied adolescents (Figure 1) were improved at immediate post-test and follow up test compared to pre-test with statistically significant differences between the three tests. From the researchers' point of view, the current finding confirms that the educational program played a vital role in educating and improving knowledge of studied hemodialysis adolescents. These results were similar to **Prema et al. (2021),** who revealed in their study about effectiveness of structured teaching programme on knowledge regarding chronic kidney disease patient undergoing hemodialysis care among caregivers that there is deference in the pre-test and post-test knowledge score on chronic kidney disease patient undergoing hemodialysis care among participants at $p<0.05$ after implementation of structured teaching programme. Furthermore, a study conducted by **Ahmed et al. (2021),** about structured teaching program's effect on knowledge and self-management behaviors for hemodialysis patients was in accordance with the current study findings and found that there was statistically significant increase of total knowledge score of studied patients about hemodialysis post implementing the teaching program.

In addition, the current study finding clarified that total universal self-care practices mean scores of the studied adolescents (Figure, 2) were also improved at immediate post-test and follow up test compared to pre-test with statistically significant differences between the three tests. From the researchers' point of view, the majority of the adolescents who participated in the study had a strong desire to lessen hemodialysis complications and was eager to carry out their daily activities in a way that was appropriate for their age. These factors may have contributed to the adolescents' remarkable improvement in self-care practices. The current finding supported by **Khazaei et al. (2021),**

who reported in their study about effectiveness of a support-training program based on the Orem's self-care deficit theory on the quality of life of children undergoing hemodialysis that there was a statistical significant difference between the total mean scores of the pretest-posttest stages after implementation of the educational program. Moreover, the present finding goes on line with **Hossein, (2017),** who conducted a study about the effectiveness of self-management program on quality of life among hemodialysis children and mentioned that self-care practices of children had been enhanced after the implementation of the training program.

Furthermore, the current study finding illustrated that total health deviation self-care practices scores of the studied adolescents (Figure, 3) were also better in the follow-up and immediate post-tests compared to the pre-test, with statistically significant differences through educational program phases. From the researchers' point of view, without hemodialysis adolescents' involvement and certain self-care tasks, treatment is ineffective in producing the intended effects. While making some lifestyle adjustments and according to doctors' and researchers' advice can assist in controlling conditions, they can also make it easier to live with a life-limiting illness and lessen its effects. The present finding is consistent with **Zain Eldin et al. (2018),** who reported in their study about effect of self-care model intervention on quality of life of children undergoing hemodialysis that children's behavior significantly improved in all dimensions of self-care in post and follow up test after implementation of the self-care model intervention.

On assessing the relationship between socio-demographic data and total knowledge scores of the studied adolescents (Table, 3), the current study showed that there were statistically significant differences between the pre-test knowledge of renal failure and the studied adolescents' age, education level, and years of hemodialysis. From the researchers point of view' these results could be attributed to the positive relationship between level of education and knowledge of the studied adolescents also years of undergoing hemodialysis had a great effect on their experience in dealing with their health condition. This result is in contrast with **Whdan, et al. (2019),** who conducted a study about home self-care for client with hemodialysis at Ashmon district Hospital and mentioned that there were no statistically significant differences between age and level of education of the participants and their total knowledge scores about renal failure. While, there was statistically significant difference between years of undergoing hemodialysis and total knowledge scores of the participant about renal failure.

Apparently, the current study findings indicated that there were a statistical significant differences between studied adolescents' total universal self-care practices mean scores and their age, level of education and years of undergoing hemodialysis at pretest results (Table, 4). Similar results were reported by **Hassan & Khalafallha, (2019),** who mentioned that there were statistically significant differences between educational level and duration of hemodialysis with total scores of self-care activities of the participant. In contrast to the current finding, **Darwish et al. (2020),** who mentioned in their study about health-related quality of life in children with chronic kidney disease that there were no statistical significant differences between studied children self-care practices scores and their level of education.

Finally, the present finding revealed that there were no statistical significant difference between studied adolescents' age and level of education and their health deviation self-care mean practices scores (Table 5). This finding came in agreement with **Zain Eldin et al. (2018),** who stated in their finding that there were no statistical significant difference between studied children' age and their health deviation self-care practice scores. Furthermore, the current finding is similar to **Ahmed et al. (2021),** who reported that there was no statistical significant difference between studied participant' level of education and their health deviation self-care mean practices scores.

Conclusion:

Based on the findings of the present study, it can be concluded that: the above-mentioned findings proved and reinforced the research hypothesis and the educational program succeeded in improving the knowledge and practice of hemodialysis' adolescents regarding self-care health behavior on post and follow up tests than on pre-test. There were statistical significant relationship between total knowledge scores of the studied adolescents and their total practices mean scores regarding universal self-care and health deviation self-care for health behavior.

Recommendations:

At the light of the current study results, the present study recommends:

- All pediatric hemodialysis units should develop and execute ongoing in-service education programs regarding self-care health behavior to enhance the quality of life for hemodialysis children.

- Self-care health behavior should be incorporated as a part of routine care for hemodialysis children.

- Advanced booklets regarding self-care health behavior should be available at each pediatric hemodialysis unit.

- Reapplication of the study on larger sample should be done to ensure generalizability of the results.

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