

## Effect of Health Educational Program on Mothers' Knowledge and Practice for Children under Hemodialysis

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### Abstract

**Background:** Due to lack of knowledge and practice of mothers in the care of their children undergoing hemodialysis, this study aimed to evaluate the effect of health educational program on improving mother's knowledge and health care practices of children undergoing hemodialysis. **Methods:** One-group pretest/posttest quasi-experimental research design was utilized to accomplish the aim of this study. The study was carried out at the dialysis units affiliated to Al-Ahrar Hospital, and Zagazig University Hospital, which was conducted on 50 mothers. **Tool:** A structured interviewing questionnaire sheet used for data collection. **Results:** Out of 50 participants, 26% of studied mothers had satisfactory knowledge about hemodialysis before the educational program implementation, compared with 86% immediately after the implementation. Furthermore, 30% of studied mothers had satisfactory reported practice about hemodialysis care before the educational program implementation, compared with 82% immediately after the implementation. **Conclusion:** Prominently, there was a highly statistically significant positive linear correlation between mother's knowledge and reported practices regarding hemodialysis care before and after the implementation of the educational programme at  $p < 0.0$ . Therefore, the educational program effectively improves mother's knowledge and home care related practices.

**Keywords:** Mothers' knowledge; Practice; Children; Under hemodialysis

### Introduction

Chronic kidney disease (CKD) is a serious public health concerns and medical issue that places a significant financial burden on health-care systems around the world. The global prevalence of CKD and the number of dialysis patients is rising (Filipska et al., 2021). kidney disease is the ninth leading cause of death in the United States and the 12<sup>th</sup> leading one globally (CDC, 2020; WHO, 2018). In comparison to 2005, it is expected that the number of patients with CRF will increase by about 60% by 2030 (Trillini et al., 2017; Machaly et al., 2020). In Egypt, the yearly incidence of end-stage renal disease (ESRD) is estimated to be about 74 per million, with a total prevalence of dialysis patients of 264 per million (El-Arbagy et al., 2016; Ibrahim et al., 2019; Ibrahim et al., 2020).

In children, hemodialysis is the most frequent treatment for severe and irreversible kidney failure. Hemodialysis is a medical technique that filters waste materials from the blood and restores normal components to it using a specific machine (Ibrahim et al., 2019;

Kallenbach, 2020; Machaly et al., 2020). Hemodialysis is a process that is done 2-4 times a week for 3-4 hours in total, depends on lots of factors (Machaly et al., 2020).

Family caregivers of patients on hemodialysis (HD) have a greater burden than the general population, because of the nature of the duties these carers must perform as part of homecare (Hovadick et al., 2021). In hemodialysis patients, skin problems and infection at vascular access sites are two typical issues (Ramezani et al., 2019). Cannulation injuries and complications are caused by a number of factors and can result in a variety of consequences. Even when correct cannulation technique and fistula home care are used, routine needle access to arteriovenous grafts (AVGs) and autologous arteriovenous fistulae (AVFs) for hemodialysis might result in material or tissue traumatic deterioration over time (Gage, & Reichert, 2020).

Most ESRD patients have poor economic position and inadequate understanding on therapeutic nutrition, thereby severely influencing their nutritional status and health

recovery. To maximize the therapeutic success, it is important to mix medicine and diet. As a result, the knowledge and practice of mothers who offer direct nutrition care for their infants is critical (Thuc et al., 2020). A type of health care service given where a patient resides is known as home care management. The goal of home care is to improve, maintain, or restore a patient's health while also reducing the negative impacts of sickness or incapacity (Hapipa, & Bhuvanewari, 2020).

Mothers with children who are on hemodialysis are finding it difficult to manage their everyday lives. Understanding disease-related changes in the afflicted family member might help them feel more confident about the future. It also aids them in dealing with the familial circumstances (Shoghi et al., 2019). People with chronic conditions might benefit from family centered empowerment by improving their quality of life, interacting with health issues, satisfaction, responding to therapy better, avoiding complications and saving money (Shahdadi et al, 2018; El Nagar et al., 2020).

Family empowerment is a technique of providing knowledge and skills to families so that they may better manage family life and, as a consequence, improve the lives and quality of life of its members (El Nagar et al., 2020). Health education is a fundamental and effective health promotion technique that uses a variety of methods to increase awareness, attitudes, and inclinations, as well as encourage people to adopt healthy behaviors and lifestyles (Eidivandi et al, 2020). Therefore, this study aimed to evaluate the effect of health educational program on mothers' knowledge and practice for children under hemodialysis.

## Methods

### Research hypothesis

- H<sub>1</sub>:** Mothers' knowledge about hemodialysis will be improved after implementing the educational program.
- H<sub>2</sub>:** Mothers' health care related practices regarding hemodialysis will be improved after implementing the educational program.

### Research design

The study used a one-group pretest/posttest quasi-experimental design. It is an empirical study that estimates an intervention's effect on a target population without randomization.

### Setting

The study was conducted at the dialysis units affiliated to Al-Ahrar Hospital (n=25), and Zagazig University Hospital (n=25) at Zagazig governorate.

### Participant

Participants were recruited using a convenience sampling technique at the Al-Ahrar Hospital (N=25), and Zagazig University Hospital (N=25) at Zagazig governorate. A total of 50 mother, from the previously mentioned setting, who accepted to share at study.

### Tools of Data Collection

Data for the current study were gathered using a structured interviewing questionnaire sheet created by the researcher in Arabic. It consists of four parts, as the following:

**Part I:** concerned with the demographic profile of the studied mothers, included sociodemographic characteristics of the studied women such as age, employment, residence, educational level, marital status.... etc.

**Part II:** concerned with the demographic profile of the studied children included age, gender, sibling .... etc.

**Part III:** concerned with mothers' knowledge about renal failure (4 items), general knowledge about hemodialysis (3 items), fistula complication (3 items), fistula care (3 items), fluid and dietary management (4 items).

**Part IV:** concerned with mothers' reported practice about vascular access care at home (5 items), daily living and supportive care (5 items), hand washing (6 items), and fistula exercise (5 items).

**Scoring system:** The total knowledge and practice score was categorized as the

following unsatisfactory (<70.0%), and satisfactory ( $\geq 70.0\%$ ).

### Operational Design

- I. Preparatory phase:** This phase involved reading up on the study research issues in books, publications, magazines, and articles. The developed tool was tested for their reliability by using Cronbach's alpha coefficient test in SPSS program version 21 by a statistician to splits all questions on instrument and computes all correlation value for them. It was carried out on 10% of studied mother ( $n=5$ ) and the results were Cronbach's  $\alpha =0.817$ .
- II. Pilot study:** A pilot study was carried out with a sample of 5 mothers of children undergoing hemodialysis. It carried out before data collection to evaluate the feasibility, time, cost, adverse events, and improve upon the study design before the performance of a full-scale research study. The necessary modifications were accordingly done. Participants in the pilot study were involved in the sample.
- III. Fieldwork:** The researchers attended at the Al-Ahrar Hospital, and Zagazig University Hospital 2 days weekly for each hospital, at the morning shift from 9.00 a.m. to 1.00 p.m. Data collection extended over a period of 6 months period from the 1<sup>st</sup> of January 2021 to the end of June 2021 for pretest, educational program session implementation, and posttest. The researcher started by introducing herself to women and simply explaining the aim of the study. Data collection was carried out through interviewing with mother. Women were interviewed individually. Time consumed for each interview was 30 minutes.

### The framework of the study was carried out through the following four phases:

- I. Assessment phase:** assess mothers' knowledge and health care practices concerning care of their children ongoing hemodialysis before the implementation of the educational program was done.
- II. Planning phase:** Goals, strategies, and intended results will be established based

on findings of the assessment phase in order to achieve mothers' knowledge and practice needs in order to provide home care for their children receiving hemodialysis.

- III. Implementation phase:** preparation of suitable media such as booklet, boosters, and brochures for teaching the mothers. Implementation of the educational program was carried out at the previously mentioned settings. The educational programme consisted of five classes held once a week for 20 to 30 minutes each. The first class included the anatomy of the renal system, kidney functions, chronic renal failure definition, forms of renal failure, causes and common signs of CRF, as well as complications and CRF management. The second class discussed hemodialysis concepts, methods of action, duration, vascular access, dialyzers, and different types of connections. The third class concerned with fistula, fistula complication, and fistula home care. the fourth class focused on home care nutrition includes adhering to a dietary regimen for renal disease, including the sorts of foods to eat, the dangers of not adhering to the kidney diet, the foods to avoid, and the fluid therapy. Finally, the fifth class focused on vascular access care, activity of daily living, hand washing, and fistula exercise
- IV. Evaluation phase:** reevaluation of mother's knowledge and health care practices regarding hemodialysis care was carried out using the same tools immediately later implementing the educational program and were compared with pretest levels.

### Ethical Considerations

The research approval was obtained from the director of Al-Ahrar Hospital, and Zagazig University Hospital. As well as oral consent was obtained from each mother after the researcher informed them about the aim of the study. Moreover mothers, who agreed to participate in the study, informed that all data gathered during the study were confidential. They also have the option to leave the study at any moment.

### Administrative design

Necessary official approval to conduct the study was obtained from Al-Ahrar Hospital, and Zagazig University Hospital. Oral permissions to conduct the study were obtained from the head of both hemodialysis units after explaining the purpose of the study.

### Statistical Analysis

Data were organized, categorized, result were presented in tables. Data were analyzed using a compatible personal computer using the SPSS Inc; version 21; IBM Corp., Armonk, NY, USA). The normality of data was first tested using the one-sample Kolmogorov–Smirnov test. Qualitative data were described using numbers and percentages. Continuous variables were presented as means  $\pm$  standard deviation. The *t*-test was used to compare two means. The results were considered significant when the probability of error is less than 5% ( $p < 0.05$ ) and highly significant when the probability of error is less than 0.1% ( $p < 0.001$ ).

### Results

Out of 50 participant mothers of children undergoing hemodialysis who responded to the questionnaire, 21 (42%) age ranged 40–50 years. Among the participants, 35(70%) were employees. Moreover, 12 (24 %) graduated from secondary school, and 7 (14%) had a bachelor's education. Of all respondents, 36 (72%) were rural residents. Also, 45 (90%) were married, 47 (94%) didn't attend training programs about hemodialysis, 30 (60%) were dependent on themselves on home care of their children and didn't receive help from others (Table 1).

Out of 50 studied children undergoing hemodialysis, 20 (40%) age ranged 6 - <9 years. About their sex 28 (56%) were females. Moreover, 19 (38%) had 1 sibling, 16 (32%) of them were marked as the first child among their siblings. Markedly, 72% of them didn't suffered from other chronic disease, 50% of them starting hemodialysis since 1 – <3 years (Table 2).

Table 3 showed that the participant mothers knowledge regarding hemodialysis

markedly increased from 24%, 30%, 22%, 20%, and 26%, respectively before implementation of the educational program compared to 84%, 86%, 90%, 80%, and 88%, respectively immediately after the study intervention regarding knowledge about renal failure, general knowledge about hemodialysis, fistula complication, fistula care, fluid and dietary management, respectively with a highly statistically significant difference at  $p < 0.01$  for all.

Figure 1 illustrated that 26%, and 74% of studied mothers had satisfactory and unsatisfactory knowledge about haemodialysis, respectively before the educational program implementation, compared with 86% (satisfactory), and 14% (unsatisfactory) immediately after the implementation.

Table 4 demonstrated that the participant mother's reported practice regarding hemodialysis health related practical care markedly increased from 30%, 26%, 34%, and 28, respectively before implementation of the educational program compared to 86%, 84%, 80%, and 82%, respectively immediately after the study intervention regarding vascular access home care, daily living and supportive care, hand washing, and fistula exercise, respectively with a highly statistically significant difference at  $p < 0.01$  for all.

Figure 2 cleared that 30%, and 70% of studied mothers had satisfactory and unsatisfactory reported practice about hemodialysis care, respectively before the educational program implementation, compared with 82% (satisfactory), and 18% (unsatisfactory) immediately after the implementation.

Table 5 reported that there was a highly statistically significant positive linear correlation between mother's knowledge and reported practices regarding haemodialysis care before the implementation of the educational programme at  $r = 0.725$  and  $p < 0.0$ .

Moreover, table 6 showed that there was a highly statistically significant positive linear correlation between mother's knowledge and reported practices regarding haemodialysis care immediately after the implementation of the educational programme at  $r = 0.699$  and  $p < 0.0$ .

**Table (1):** Distribution of studied mothers related their characteristics (n=50)

Items	N	%
<b>Age:</b>		
20 - <30	9	18
30 - <40	20	40
40 - 50	21	42
<b>Employment:</b>		
Employee	15	30
Unemployed	35	70
<b>Educational level:</b>		
Not read and write	4	8
Read and write	10	20
Primary school	8	16
Preparatory school	9	18
Secondary school	12	24
Bachelor education	7	14
<b>Residence:</b>		
Rural	36	72
Urban	14	28
<b>Marital status:</b>		
Married	45	90
Divorced	3	6
Widow	2	4
<b>Training courses about hemodialysis:</b>		
Yes	3	6
No	47	94
<b>Someone helps you care for your child</b>		
Yes	20	40
No	30	60

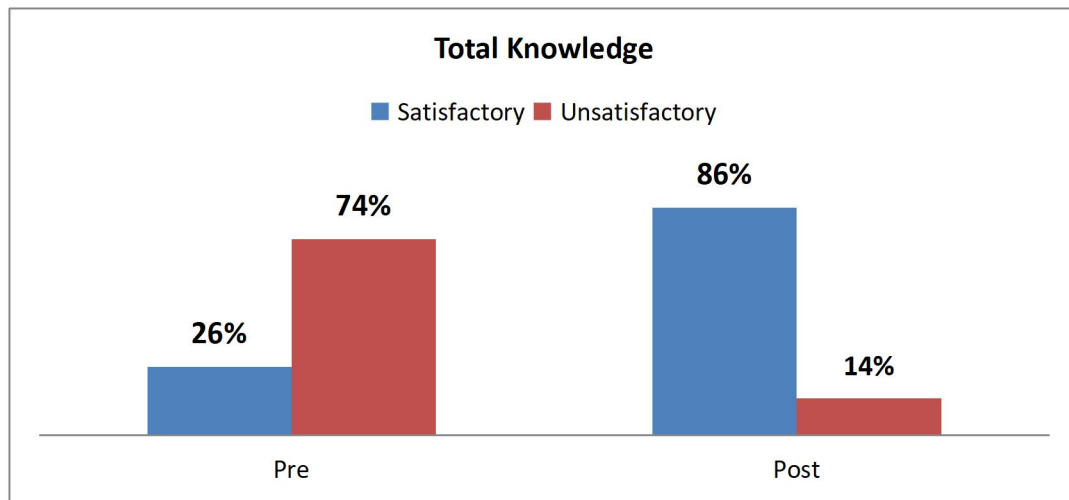
**Table (2):** Distribution of studied children related their characteristics (n=50)

Items	N	%
<b>Age:</b>		
3 - <6	14	28
6 - <9	20	40
9 - 12	16	32
<b>Gender:</b>		
Male	22	44
Female	28	56
<b>Number of siblings:</b>		
1	19	38
2	18	36
3	9	18
4	4	8
<b>Child rank:</b>		
First	16	32
Second	15	30
Third	10	20
Last	9	18
<b>Suffered from other chronic disease:</b>		
Yes	14	28
No	36	72
<b>Starting hemodialysis since:</b>		
< 1 year	11	22
1 - <3 years	25	50
3 - 6 years	14	28

**Table (3):** Distribution of studied mothers related their knowledge about hemodialysis pre and post (n=50)

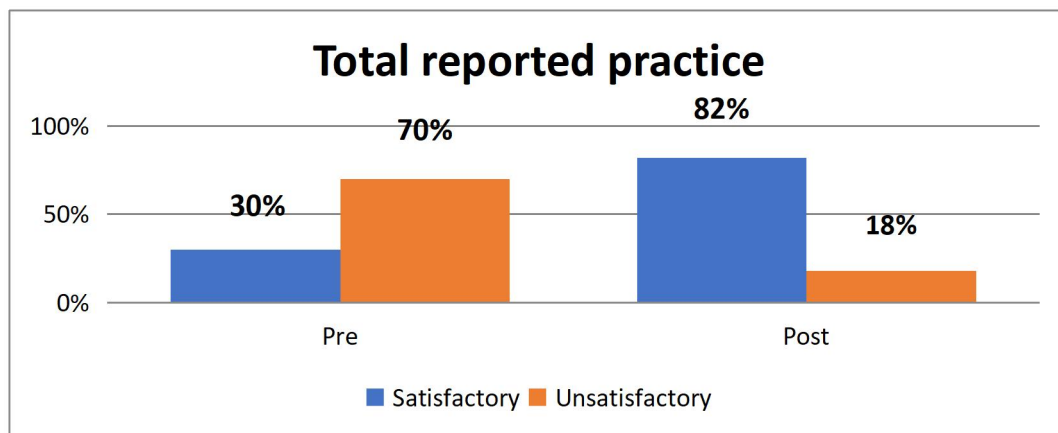
Domains	Pre		Post		T test	p value
	N	%	N	%		
General knowledge about renal failure "4 items"	12	24	42	84	9.015	<0.01**
General knowledge about hemodialysis "3 items"	15	30	43	86	13.088	<0.01**
Fistula complication "3 items"	11	22	45	90	11.471	<0.01**
Fistula care "3 items"	10	20	40	80	14.661	<0.01**
Fluid and dietary management "4 items"	13	26	44	88	12.951	<0.01**

\*\*high significant <0.01\*\*

**Figure (1):** Distribution of studied mothers related their total knowledge about hemodialysis pre and post (n=50)**Table (4):** Distribution of studied mothers related their reported practice about hemodialysis pre and post (n=50)

Domains	Pre		Post		T test	p value
	N	%	N	%		
vascular access site care at home "5 items"	15	30	43	86	11.066	<0.01**
daily living and supportive care "5 items"	13	26	44	84	14.897	<0.01**
Hand washing "6 items"	17	34	40	80	13.774	<0.01**
Fistula exercise "5 items"	14	28	41	82	15.010	<0.01**

\*\*high significant <0.01\*\*

**Figure (2)** Distribution of studied mothers related their total reported practice about hemodialysis pre and post (n=50)

**Table (5)** correlation between studied variable pre interventions

	Total knowledge	
<b>Total reported practice</b>	r.	0.725
	p	<0.01**

\*\*high significant <0.01\*\*

**Table (6)** correlation between studied variable post interventions

	Total knowledge	
<b>Total reported practice</b>	r.	0.699
	p	<0.01**

\*\*high significant <0.01\*\*

## Discussion

Children with CRF who are having hemodialysis require more frequent hospitalizations than other children with CRF. Family empowerment, particularly for moms in charge of their children's upbringing, is a critical component of maintaining health and overcoming disease. As a result, this quasi-experimental study was done to evaluate the influence of a health education programme on mothers' knowledge and practice when caring for children who were receiving hemodialysis treatment.

The current study explained that more than one-third of them were in the age group ranged 40–50 years, one-third of them were employees. Only 14% of them had a bachelor's education. More than two-thirds were rural residents, the vast majority of them were married. Results related to age was supported by **Hassan and Mahmoud (2019)** in their study entitled “The effect of empowerment program for mothers of children undergoing hemodialysis on arteriovenous fistula care”, that a relatively less than half of mothers age ranged between 40 and less than 50. However, our study contradictory to **Hassan and Mahmoud (2019)** as regards mother's education more than one-third were illiterate. Concerning mothers' occupation, the vast majority of mothers were not working (housewives), while only 10% were working.

Regarding attending previous educational programs, the current study findings revealed that the vast majority of mothers did not attend training programs about hemodialysis, and two-thirds of them were dependent on themselves on home care of their children and

didn't receive help from others. These results supported by **Hassan and Mahmoud (2019)** illustrated that all mothers did not attend any program about AVF care.

Regarding characteristics of the studied children under hemodialysis, our study revealed that, nearly half of them in the age group ranged 6 - <9 years. On the contrary, **Nicholas (2017)** who found that, the majority of the studied children were in age group 11-15 years.

Regarding to gender of the studied children with chronic kidney disease, the results of the present study exhibited that more than half of the studied children were females. This finding was supported by the study done by **John et al., (2016)**, who stated that, slightly more than half of the studied children were females. Also. **Abdalla et al. (2019)** demonstrated that about half (50.9%) of the studied children were females.

Concerning to mother's knowledge regarding hemodialysis, the current study revealed that 26% of studied mothers had satisfactory before the educational program implementation, compared with 86% immediately after the implementation. The present study's findings confirmed that there had been a statistically significant improvement in the level of knowledge among mothers about renal failure, general knowledge regarding hemodialysis, fistula complications, fistula care, fluid and dietary management, and general knowledge about hemodialysis.

The current study findings go in the same line with **Bhosale et al. (2019)** who study to assess effectiveness of structured teaching program on knowledge regarding home care

management of hemodialysis. **Bhosale's** study revealed that the mean knowledge score of caregivers of hemodialysis subjects during the pre-test was 39.48%, whereas it had risen to 82.50% during the post-test as an effectiveness of structured teaching program.

Additionally, the current study finding was in harmony with **El Nagar et al. (2020)** that at the post intervention period, compared to the pre intervention phase, there was a statistically significant difference ( $P<0.001$ ) in the mean score of mother's total knowledge and household management. Moreover, **Eidivandi et al. (2020)** reported that at  $p<0.05$ , the blended education resulted in a considerable increase in the intervention group's knowledge of CKD compared to the control group.

Also, **Abu-Ouf et al. (2016)** revealed that the family-centered care training programme enhanced the physical, mental, and quality of life of children with CKD and improved the knowledge of mothers of hemodialysis patients. The results of **Abdalla et al. (2019)** revealed that 70.9% of the studied mothers had unsatisfactory knowledge about CKD pre intervention. Meanwhile the majority (90.9%) of them had satisfactory knowledge post intervention, where  $p$  value = .001.

Furthermore, regarding their practices the present study demonstrated that 30% of studied mothers had satisfactory before the educational program implementation, compared with 82% immediately after the implementation. This supported by **Machaly et al. (2020)** showed that post applying the evidence-based nursing standards, the total knowledge and practice scores of the investigated nurses improved by a very statistically significant amount.

A similar finding also reported by **Abolwafa and Hossein (2018)** in a study entitled "Effect of educational program on knowledge and health care practices about Nephrotic Syndrome among mothers of pre-School children". Result of this study showed significant improvement in mothers health care practices about nephrotic syndrome in post/test. Additionally, the current study in agreement with **El- Sayed (2014)** who study the effect of self-learning package on caregivers of children undergoing dialysis and found that caregivers of children with chronic kidney disease had

unsatisfactory practice, while they improved after the program.

Prominently, our study reported that there was a highly statistically significant positive linear correlation between mother's knowledge and reported practices regarding hemodialysis care before and after the implementation of the educational program at  $p<0.001$ . the current study goes in same line with **Abdalla et al. (2019)**, who revealed that a statistical significance difference was observed pre/post empowerment program implementation regarding to knowledge and practice of mothers about the disease and its management. On the other hand, an opposite finding reported by **El-Karmalawy et al. (2015)** there was no statistically significant relations between caregivers' knowledges, practice and attitude.

### Conclusion

Based on our current study, it was concluded that the educational program effectively improves mother's knowledge and home care-related practices. There was a highly statistically significant positive linear correlation between the mother's knowledge and reported practices regarding hemodialysis care before and after the implementation of the educational program at  $p<0.0$ . Therefore, mother's empowerment in-home care of their children undergoing hemodialysis is recommended.

### Recommendation

Based on the previous findings we can recommend that further research needed to emphasize on the effect of educational programs' intervention on improving mother's knowledge, and practice, in other chronic diseases for a larger sample and longer period. Periodic assessment of knowledge, and practices for mothers providing home care to children undergoing hemodialysis therapy. Educational books, booklets, boosters, and brochures should be available in hemodialysis units as a reference for all mothers.

### Acknowledgement

Great thanks to all mothers who participated in this study.



**Declaration of Conflicting of Interests**

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

**Funding**

The authors received no financial support for the research, authorship, and/or publication of this article.

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