

The Effect of Blended Instruction on Improving Knowledge and Practice of Parents of Children with Chronic Kidney Disease in the Therapeutic Care of Children

Zainab Eidivandi¹, *Shahnaz Rostami², Bahman Dashtbozorghi³, Mohammad Hosein Haghhighizadeh⁴

¹Student of Nursing, Faculty of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. ²Assistant Professor of Pediatric Nursing, Nursing Care Research Center in Chronic Diseases, Faculty of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. ³Department of Nursing, Faculty of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. ⁴Department of Statistics and Epidemiology, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Abstract

Background: Due to the low knowledge and practice of parents in the therapeutic care of sick children and the importance of blended instruction in families, we aimed to determine the effect of blended instruction on improving knowledge and practice of parents of children with chronic kidney disease (CKD) in the therapeutic care of children.

Materials and Methods: In this quasi-experimental study, 42 parents of children with CKD participated, who were referred to the Nephrology Clinic of Abuzar Children's Hospital in Ahvaz, Iran were selected and randomly divided into two equal groups of interventional and control (n=21). First, both groups completed the demographic questionnaire, the parental knowledge questionnaire about CKD, and Family Assessment Device. For the intervention group, the researcher performed blended educational intervention including lecture, educational videos, and compact discs for 4 sessions of 90-minutes, whereas no educational intervention was carried out for the control group. Data were gathered one month after educational intervention and analyzed using SPSS software version 22.0.

Results: There was no significant difference in the mean scores of parental knowledge ($p = 0.38$), and in the mean scores of general family practice ($p=0.75$) between the two groups before the intervention; while after the intervention, there was an essential difference in the mean scores of the parental knowledge and general family practice between the two groups ($p<0.001$). However, there was no significant difference in the knowledge and practice domains before and after the intervention in the control group.

Conclusion: Blended Instruction can be used as an effective way to increase knowledge and practice in parents of children with CKD in the therapeutic care of children.

Key Words: Blended Instruction, Chronic Kidney Disease, Family, Knowledge.

*Please cite this article as Eidivandi Z, Rostami Sh, Dashtbozorghi B, Haghhighizadeh MH. The Effect of Blended Instruction on Improving Knowledge and Practice of Parents of Children with Chronic Kidney Disease in the Therapeutic Care of Children. *Int J Pediatr* 2020; 8(3): 11023-33. DOI: 10.22038/ijp.2019.41838.3524

*Corresponding Author:

Shahnaz Rostami, Department of Pediatric Nursing, Nursing Care Research Center in Chronic Diseases, Faculty of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Email: rostami-sh@ajums.ac.ir

Received date: Jul.17, 2019; Accepted date: Jan. 22, 2020

1- INTRODUCTION

The term kidney failure literally means the kidneys are functioning at less than 15% of normal capacity, so that many people will not be able to survive without alternative therapies and will require hemodialysis or kidney transplantation (1). This disorder is one of the major public health problems in the world, which is an irreversible and progressive disorder and eventually leads to uremia (2, 3). More than 500 million people worldwide have been diagnosed with chronic kidney disease (CKD), and more than 80% of them live in developing countries (4-7). Statistically, 5-10% of children in the United States suffer from chronic kidney disease (CKD) (8). In Iran, one in every 10 Iranian children has this health problem and 10 to 12% per annum is added to the patients with advanced chronic kidney disease (ACKD), which finally reaches 8% considering their mortality rate (9).

Regarding the reason for this disorder, it can be said that any disease that causes nephron scarring can bring about chronic kidney disease (10-12). In children under 5 years of age, kidney structural disorders such as kidney congenital obstruction are more common and early diagnosis of CKD in children slows down the progression of the disease and postpones the final stage of the failure (13). The parents of children with renal failure may face many physical, social, and economic problems in the process of care; and the marital, occupational, health, and social and family life of family caregivers are negatively affected by the difficulties of the care; so the quality of life of the patients is badly affected (14). Consequently; this disease impacts upon the lifestyle, the general health status, and individual roles of the children and their family and, in the long run leads to low standards of living; physical and psychological problems; and limitations in recreational, social, and occupational activities (15). Therefore, for

children with CKD, the best health outcomes relate to the practice of their parents. In fact, when the parents are aware of the particular needs of their children, they will work harder to fulfill these needs (16). Parents, as the most important supportive system, play an essential role in childcare. Since CKD is a chronic disease, and early and appropriate treatment depends upon several factors such as the knowledge of parents, especially mothers, about this issue the family requires adequate knowledge of the process of the disease, treatment, diet, and the control of this disease. As a result, they will be able to provide better care for their children considering all difficulties. Xue-hong et al. concluded in their investigation that parents' cognition and understanding of the complications of CKD in their children are insufficient and their knowledge of the factors affecting the relapse of the disease should be increased (17). As this disease has many problems, it is necessary to provide solutions to reduce and prevent problems.

One of these solutions is health education, which is a fundamental and successful health promotion strategy that is performed by different methods to improve awareness, opinions, and tendencies and adopt healthy behaviors and lifestyle (18). The application of educational methods is an essential part of every educational process. In the health education, programmed instruction, face-to-face training, virtual education, group discussions, lectures, questions and answers, exhibits and displays, practices, simulations, and role-playing can be considered as the educational methods for parents. In recent decades, due to the remarkable advances in educational technology, educational systems have been encouraged to use modern and client-centered methods. In addition, the application of these methods has become increasingly commonplace in various areas

such as family education. One of the educational methods in health education is Blended Instruction (19, 20), which is defined as a combination of different media (the technology of educational movies, manuals, face-to-face training, activities, and a variety of events) to create an optimal training program for specific audiences (21). Additionally, this educational technique is simple and cost-effective, and it enhances the understanding and the level of learning in patients (22). Considering the emphasis on family involvement in patient care, it is still rarely planned and performed as an official process for training the clients.

On the other hand, although the effectiveness of blended instruction of chronic patients has been confirmed, so far there has been no study on the effectiveness of blended instruction on the families of children with chronic kidney disease (CKD). Besides, considering the chronic nature of CKD, which gives rise to serious difficulties for the families such as physical, economic, social, emotional, and other problems, family education can be helpful in achieving health goals and reducing problems. Regarding the high incidence of CKD, it is necessary to control this chronic disease to improve the quality of life, promote physical and mental health, reduce the complications in patients, and reduce the financial burden on the health system.

Moreover, there is insufficient supervision on education programs, and these training programs are not continuously launched. It is also necessary to support children with CKD and their families in order to reinforce the desired health behavior. Thus, it seems that the use of this accessible educational program can be effective in improving the children's physical health. Therefore, the researcher aimed to determine the effect of blended instruction on improving the knowledge and practice of families of children with

chronic kidney disease in the therapeutic care of children.

2- MATERIALS AND METHODS

2-1. Study design and population

In this quasi-experimental study, 42 parents of children suffering from CKD who were referred to the Nephrology Clinic of Abuzar Children's Hospital in Ahvaz, Iran were selected from June to August 2018. The number of samples needed for this investigation was estimated 42, using Salehi et al. study (23), and taking into account the correlation of 0.3, error of 0.05, power of 90%, and the reduction probability of 10% according to the following formula:

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 (S_1^2 + S_2^2)}{(\bar{X}_1 - \bar{X}_2)^2}$$

2-2. Method

In this quasi-experimental investigation, 42 parents of children with CKD took part, who were referred to the Nephrology Clinic of Abuzar Children's Hospital in Ahvaz, Iran. Parents were randomly classified into two groups of intervention (21 people), and control (21 people). At the time of arrival at the hospital, the two studied groups completed the demographic questionnaire, the knowledge questionnaire, and Family Assessment Device (FAD). Then, the intervention group members were taught the educational content (lectures, educational videos, and CDs) for 4 sessions of 90-minutes while the control group subjects did not take the educational content. Next, the data were gathered and analyzed one month after the educational intervention using SPSS software version 22.0.

2-3. Measuring tools: validity and reliability

The data collection tools were baseline characteristics (age, sex, degree of

education, and duration of illness of the children, as well as information on age, sex, degree of education, and marital and occupational status of the parents), and the questionnaire assessed the parental knowledge of parents about CKD, which included the definition, cause, symptoms, complications, prognosis, treatment, and care of the disease. The answer to this questionnaire was Yes or No (two-way close-ended), and it had 36 questions, in which based on points earned, the knowledge of people was divided into three levels of weak (0-12 points), moderate (13-24 points), and good (29-36 points). The questionnaire was validated using the viewpoints of ten faculty members of the nursing and midwifery school and the content validity method with desirable CVR and CVI values. The research team included a urologist, a pediatrician, a pediatric nurse, and a nurse researcher. Moreover, the reliability of the tool was evaluated by a test-retest method within 10-day intervals and with a sample size of 20 people ($r = 0.88$).

Content validity method was used to assess the validity of the questionnaire, and 10 experts were asked to submit their comments qualitatively after reviewing the questionnaire. In order to evaluate the internal consistency of the knowledge questionnaire, Cronbach's alpha was applied, and Cronbach's alpha of 0.96 was attained, indicating a strong and desirable internal consistency. The McMaster questionnaire, which consisted 60 questions, was used to measure family practice (24). The scoring tool was in a way that it gave 1 to 4 points for each question: I totally agree: 1, I agree: 2, I oppose: 3, I totally disagree: 4. Furthermore, the reverse scores were given to the questions or phrases that described the unhealthy practice and consequently the lower scores signified healthier practice. The subscales of the questionnaire consisted of 6 questions of

problem-solving, 7 questions of relationship, 9 questions of roles, 7 questions of emotional response, 8 questions of emotional blends, 10 questions of behavioral control, and 13 questions of general family practice. The range response to the questions was between 1 (healthy) and 4 (unhealthy). The criterion validity of this questionnaire was determined using the McMaster Family Assessment Device (FAD), and the coefficient of 0.75 was obtained. Furthermore, the test-retest-reliability coefficient of family practice assessment questionnaire of 0.93 with the interval of one month between the two tests and Cronbach's alpha of 0.92 were gained (25).

The reliability of the Persian version of the FAD tool was measured by Zadehmohammadi and Malek Khosravi in 2006 (26), and Cronbach's alpha for all scales was 94%. The validity of this tool was also reported using the construct validity method, factor analysis and classification for 60 items and seven factors of this tool, 83% and 82%, respectively by Yousefi (27). In addition, the cut-off points for family practice dimensions of the family practice questionnaire based on FAD are presented in **Table.1**.

Table-1: The cut-off points for family practice dimensions of the family practice questionnaire based on FAD.

Family practice dimensions	Cut-off points
Emotional blends	≤ 2.1
Behavioral control	≤ 1.9
Relationship	≤ 2.2
Roles	≤ 2.3
Problem-solving	≤ 2.2
Emotional response	≤ 2.2
General practice	≤ 2

FAD: Family Assessment Device.

2-4. Intervention

In this research, the samples were randomly divided into two equal groups of intervention (21 people), and control (21

people) using a computerized random block design. For the intervention group, blended educational intervention including lecture, educational videos, and compact discs was performed by the researcher for 4 sessions of 90-minutes (one session a week), whereas no educational intervention was carried out for the control

group. The topics discussed in these sessions included familiarity with the disease, treatment, general care, and nursing care (**Table.2**). After a month, the post-test was performed by two groups and, via completing the questionnaire assessed the parental knowledge about CKD and its related care and the FDA.

Table-2: Educational content, time, place, target group, and instructor in the blended educational intervention.

Entry	Educational content	Time, Minute	Place	Target group	Instructor
First session	1) Introducing the members of the group to each other. 2) Introducing the group members to chronic kidney disease.	90	Training Hall of Abuzar Children's Hospital	All parents of children aged 8-12 years with chronic kidney disease	First Author
Second session	Educating the members about the diet.	90			
Third session	Educating the members about the benefits of exercise in disease control.	90			
Fourth Session	Educating the patients about acceptance and strict adherence to the drug regimen. Summary of sessions and closure.	90			

2-5. Ethical consideration

After obtaining the approval for the proposal as well as the approval of the Ethics Committee of School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences (IRAJUMS.REC.1397.323), the sampling was carried out. The researcher performed the work after introducing herself to the subjects with the criteria for entering the study; explaining the research purpose, method, and confidentiality of the information and obtaining the subjects' consent.

2-6. Inclusion and exclusion criteria

The criteria for entering the study were parents' tendency to participate in the research, parents have not already been involved in educational groups, parents have the mental capacity to complete the questionnaire and participate in an educational program, parents do not have a history of uncontrolled underlying diseases

such as epilepsy, chronic stress and anxiety, etc. that could influence the outcomes. However, the criteria for exiting the study included being hospitalized for any reason and not attending more than one session of the educational program.

2-7. Data Analyses

In this study, the data analysis was carried out using SPSS software version 22.0, and in order to investigate the descriptive characteristics of the data, indicators of central tendency such as mean and standard deviation were used. In addition, to illustrate the descriptive characteristics of the data, relative frequency, and frequency distribution charts and tables were utilized. The Chi-square test was applied in order to compare the frequency distribution of the demographic information in the two groups. Additionally, the independent t-test was used to compare the quantitative variables in two groups, and the paired t-test was

performed to compare the quantitative variables before and after the study.

3- RESULTS

In this investigation, 42 parents of children with CKD participated, whose mean and standard deviation ages were 41.95 ± 5.19 years in the intervention group and 43.42 ± 3.88 years in the control group ($p > 0.05$). In terms of education of the subjects 8 people (38.1%) in the intervention group were in middle school, and most of the subjects, (11 people) (52.4%), in the control group were in elementary school. Moreover, in the case

of parental income, 14 people (66.7%) in the intervention group and 15 people (71.4%) in the control group received a monthly income of one to 20 million Rials. Twenty mothers (95.2%) in the intervention group and all the mothers in the control group were homemakers. The results showed that there was no statistically significant difference ($p < 0.05$) between the intervention and control groups (**Tables 3 and 4**). The results of **Table.5** present the baseline characteristics of parents in the intervention and control groups.

Table-3: Comparison of the mean of the children information in the two groups.

Variables	Intervention group	Control group	P-value
	Mean \pm SD	Mean \pm SD	
Age, year	9.38 ± 1.43	9.33 ± 1.01	0.91
Number of child's hospitalizations	4.0 ± 2.0	0.25 ± 2.3	0.32
Duration of child's disease (month)	10.0 ± 6.06	10.0 ± 5.0	0.21

Intervention group: The parents of children with CKD who received the blended instruction; SD: Standard Deviation.

Table-4: Frequency distribution of the studied subjects based on the baseline and clinical characteristics of the children in the two groups.

Variables	Sub-group	Intervention group		Control group		P-value
		Frequency	Percentage	Frequency	Percentage	
Gender	Male	16	76.2	14	66.7	0.36
	Female	5	23.8	7	33.3	
Taking antihypertensive medications	Yes	20	95.2	21	100	0.58
	No	1	4.8	0	0	
Dialysis complications	Yes	3	14.3	1	4.8	0.30
	No	18	85.7	20	95.2	

Intervention group: The parents of children with CKD who received the blended instruction.

Table-5: Baseline characteristics of the studied subjects in the two groups.

Variables	Levels	Intervention group		Control group		P-value
		Frequency	Percentage	Frequency	Percentage	
Parental educational level	Illiterate	2	9.5	4	19	0.21
	Elementary school	7	33.3	11	52.4	
	Middle school	8	38.1	6	28.6	
	High school	2	9.5	0	0	
	Academic	2	9.5	0	0	
Income (monthly)	10-20 million Rials	14	66.7	15	71.4	0.73
	20-30 million Rials	7	33.3	6	28.6	
Occupation	Homemaker	20	95.2	21	100	0.31
	Employee	1	4.8	0	0	
Marital status	Married	21	100	21	100	-
Received education	No	21	100	21	100	-

Intervention group: The parents of children with CKD who received the blended instruction.

Independent t-test was used for comparison of the mean of parental knowledge about CKD before and after the intervention in the two groups of control and test, **Table.6**. According to the data in **Table.6**, there was no significant difference in the mean scores of the parental knowledge at the beginning of the study between the two groups ($p=0.38$), whereas after the intervention, there was an important difference in the mean scores

between the two groups ($p<0.001$). Additionally, in the comparison of the mean scores before and after the intervention in the two groups of control and test, using paired t-test, no substantial difference before and after the intervention in the control group ($p=0.43$) was observed, while there was a considerable difference before and after the intervention in the intervention group ($p<0.001$).

Table-6: Comparison of mean scores of parental knowledge about CKD before and after the intervention in the two groups.

Status	Intervention group	Control group	P-value	Total score
	Mean \pm SD	Mean \pm SD		
Before the intervention	20.5 \pm 0.22	18.3 \pm 80.34	0.38	36
After the intervention	33.1 \pm 66.66	19.3 \pm 52.17	< 0.001	

Intervention group: The parents of children with CKD who received the blended instruction.

Table.7 demonstrates the comparison of the mean scores of general family practice dimension before and after the intervention in the two groups, utilizing independent t-test, in which there was no significant difference in the mean scores of general family practice dimension ($p=0.75$) between the two groups at the beginning of the study, but after the intervention, a major difference between the two groups was observed ($p<0.001$). On the other hand, the paired t-test was applied in order

to compare the mean scores of general family practice dimension before and after the intervention in the two groups of test and control. Based on the results in **Table.7**, no significant difference in the mean scores before and after the intervention was revealed in the control group ($p=0.11$), however, there was a great difference in the mean scores before and after the intervention in the intervention group ($p< 0.001$).

Table-7: Comparison of mean scores of general family practice dimension based on FDA before and after the intervention in the two groups.

Status	Intervention group	Control group	P-value
	Mean \pm SD	Mean \pm SD	
Before the intervention	2.80 \pm 0.48	2.76 \pm 0.42	0.75
After the intervention	1.54 \pm 0.45	2.74 \pm 0.43	< 0.001
P-value	< 0.001	0.11	-

Intervention group: The parents of children with CKD who received the blended instruction; SD: Standard Deviation; FAD: Family Assessment Device.

4- DISCUSSION

The present study was conducted to determine the effects of blended instruction on improving parental knowledge and practice in families of children with CKD. The results in this study showed that the blended instruction resulted in a substantial increase in parents' knowledge about CKD in the intervention group compared to the control group ($p < 0.05$). Overall, these findings are in accordance with findings reported by Khorami Markani et al. (28), Ahmad (29), Pourghazneinand et al. (30), and Abu-Ouf et al. (31). The study of Khorami Markani et al. (28), showed that the family-centered care educational program improved the knowledge of the caregivers of hemodialysis patients. Moreover, family-centered care provided a basis for improving the physical and mental status of patients with CKD and led to improving the patients' quality of life. Also, Abu-Ouf et al. studied the effect of parental role education on the perceptions of parents of children with kidney disease (31).

The findings of this study showed that the providing modular and grouped parental role education increased the parental perceptions of child's illness and reduced the problems of the disease, and was a major step in the physical and mental health of these children. Furthermore, Ahmad conducted a quasi-experimental study in order to investigate the effect of the family empowerment model on the quality of life for children with chronic kidney diseases. The findings of this investigation revealed that after the application of family empowerment model for children with CKD and their parents, a considerable improvement in quality of life for them was observed (29); the present investigation is directly in line with this research. In addition, the results of this study presented that the blended instruction led to a significant increase in the general family practice in the

intervention group compared to the control group ($P < 0.05$). The results obtained in current study are consistent with the previous studies (32-40). In addition, Chien et al. investigated the effect of a needs-based educational program launched within the first 3 days of patients' hospitalization in ICU on the anxiety levels and satisfaction of psychosocial needs of their families. According to the results of this study, the patients and their families who received the educational program related to the post-hospitalization needs indicated a significant difference in the level of knowledge, attitude, and practice compared to the control group (41). In this regard, in a study, Zhang et al. showed that the family caregivers of patients with dementia in Shanghai, China had low self-efficacy and practice for care of their patients due to lack of active participation in the treatment process and therefore those patients had a poor quality of life.

Thus, the self-efficacy and practice of the family can be promoted by providing education and facilitating family participation in the patient's treatment (42); so, a healthy family practice indicates that the patterns of interaction and communication among family members are beneficial and effective in achieving family goals. In our study, during the educational sessions, in addition to increasing the mothers' knowledge about chronic kidney disease and its care; they agreed to a group contract, in which the members did not criticize and blame each other, everyone was bound to respect other members of the group, and the members were bound to support each other when needed. They also learned to gain knowledge through group discussion and communicate in a beneficial, problematic, and united way. Consequently, these improvements in raising knowledge and establishing a relationship lead to an enhancement in general family practice.

4-1. Study Limitations

There are two major limitations in this study that could be addressed in future studies. First, the respondents' perceptions of the questions in the questionnaire differed among individuals and were beyond the control of the researcher. The questionnaires that contain questions close to the public perceptions are recommended for future investigations. Second, the emotional status of the subjects during completion of the questionnaire, which was out of the researcher's control, can influence the results of the study. Further research to design new questionnaire in order to decrease the effect of the emotional status of subjects during completion of the questionnaire on the results and providing education for the subjects to maintain a stable emotional status can be helpful for obtaining more precise results in the future studies.

5- CONCLUSION

This study has focused on the blended instruction for families of children with CKD. The findings showed that the implementation of blended instruction program can increase the knowledge and practice of the families of children with CKD in the therapeutic care of children. Therefore, it can be concluded that the provision of care and health education about CKD and the effects of nutritional, sport, and medicinal care on this disease in the form of a blended method (lectures, group discussions, and educational videos) can result in increasing the knowledge and improving the practice of family members of the patients with CKD. Hence, it is recommended that blended instruction should be used as an effective way to educate patients with chronic kidney disease and their families, and as an appropriate strategy to increase their knowledge and practice about CKD.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

The studies presented in this manuscript were part of the Master's thesis in Nursing (Code of Ethics: IR.AJUMS.REC.1397.323), which was sponsored by Ahwaz Jundishapur University of Medical Sciences. In this regard, we would like to express our sincere gratitude to the Deputy of Research and Technology of Ahwaz Jundishapur University of Medical Sciences. We also sincerely thank the parents and patients who participated in this research.

8- REFERENCES

1. Singh AK, Brenner BM. Dialysis in the treatment of renal failure. In: Stone RM, Harrison TR, Editors. Harrison's principles of internal medicine. 16th ed. New York: McGraw Hill; 2015. 1664-5 p.
2. Liu B-C, Tang T-T, Lv L-L, Lan H-Y. Renal tubule injury: a driving force toward chronic kidney disease. *Kidney Int.* 2018;93(3):568-79.
3. Zendegany S. Social and civil perceived supports for kidney patients compared to normal people. *JHI.* 2019;3(01):17-9.
4. Wijewickrama ES, Gunawardena N, Jayasinghe S, Herath C. CKD of Unknown Etiology (CKDu) in Sri Lanka: A Multilevel Clinical Case Definition for Surveillance and Epidemiological Studies. *KI Reports.* 2019;4(6):781-5.
5. Hill NR, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS, et al. Global prevalence of chronic kidney disease—a systematic review and meta-analysis. *PLoS One.* 2016;11(7):e0158765.
6. Mills KT, Xu Y, Zhang W, Bundy JD, Chen C-S, Kelly TN, et al. A systematic analysis of worldwide population-based data on the global burden of chronic kidney disease in 2010. *Kidney Int.* 2015;88(5):950-7.
7. Shahdadi H, Sheyback M, Rafiemanesh H, Balouchi A, Bouya S, Mahmoudirad G. Causes of Chronic Kidney Disease in Iranian Children: A Meta-Analysis

and Systematic Review. *Annals of global health*. 2019;85(1): 34.

8. Chan JC, McEnery PT, Chinchilli VM, Abitbol CL, Boineau FG, Friedman AL, et al. A prospective double-blind study of growth failure in children with chronic renal insufficiency and the effectiveness of treatment with calcitriol versus dihydrotachysterol. *J Pediatr*. 1994;124(4):520-8.

9. Sharifian M, Jabbarpour J. Prevalence of chronic kidney disease complication in children admitted Mofid hospital in 2014–2015. *Research in Medicine*. 2016;39(4):208-12.

10. Peterson SM, Wang X, Johnson AC, Coate ID, Garrett MR, Didion SP. Estimation of Nephron Number in Whole Kidney using the Acid Maceration Method. *JoVE (Journal of Visualized Experiments)*. 2019(147):e58599.

11. Yang L, Humphreys BD, Bonventre JV. Pathophysiology of acute kidney injury to chronic kidney disease: maladaptive repair. *Controversies in acute kidney injury*. 174: Karger Publishers; 2011. pp. 149-55.

12. Camarata T, Howard A, Elsey RM, Raza S, O'Connor A, Beatty B, et al. Postembryonic nephrogenesis and persistence of Six2-expressing nephron progenitor cells in the reptilian kidney. *PLoS One*. 2016;11(5):e0153422.

13. Morales P, Loza R, Vasquez J, Baique P, Reyes M. Quality of Life of Children with Chronic Kidney Disease Undergoing Renal Replacement Therapy. *J Kidney*. 2018;4:4 .

14. Ferro MA, Boyle MH. The impact of chronic physical illness, maternal depressive symptoms, family functioning, and self-esteem on symptoms of anxiety and depression in children. *J Abnorm Child Psychol*. 2015;43(1):177-87.

15. Borhani F, Najafi MK, Rabori ED, Sabzevari S. The effect of family-centered empowerment model on quality of life of school-aged children with thalassemia major. *Iran J Nurs Midwifery Res*. 2011;16(4):292.

16. Hockenberry M, Wilson D, Rodgers C. *Wong's essentials of pediatric nursing*: Elsevier Health Sciences. 2016.

17. Xue-hong C, Sui-chun W, Ru J, Jie-qiong J, Xiao-bi R. Survey on cognition of parents of children patients with recurrent nephrotic syndrome and analysis of the related influencing factors. *NC J*. 2010;30(2):71-5.

18. Richards JC, Schmidt RW. *Longman dictionary of language teaching and applied linguistics*: Routledge; 2013.

19. Amirmohseni L, Shariati A, Baraz S, Latifi SM. Effectiveness of blended instruction on pain and requirement for analgesic after knee arthroplasty surgery. *J Clin Nurs Midwifery*. 2016;5(3):1-11.

20. Parandavar N, Rezaee R, Mosallanejad L, Mosallanejad Z. Designing a blended training program and its effects on clinical practice and clinical reasoning in midwifery students. *J Educ Health Promot*. 2019;8(1):131.

21. Tol A, Pardel Shahri M, Esmaelee Shahmirzadi S, Mohebbi B, Javadinia S. Effect of blended education program on anxiety among orthopedic patients surgery. *J Nurs Educ*. 2013;2(3):1-8.

22. Bersin J. *The blended learning book: Best practices, proven methodologies, and lessons learned*. USA: John Wiley and Sons; 2004.

23. Salehi S, Zonoori S, Tabarsi B, Ghanbarian H, Nasiri M. The effect of Cardiopulmonary Resuscitation Education Through Compound Method on Knowledge and Performance of Entourages of Patients with Cardiovascular Diseases. *JNE*. 2016;5(3):10-6.

24. Epstein NB, Baldwin LM, Bishop DS. The McMaster family assessment device. *J Marital Fam Ther*. 1983;9(2):171-80.

25. Nikzad Z, Keshvari M, Farajzadegan Z. The role of family function in locus of control of adolescent girls in Isfahan. *JPEN*. 2017;4(2):32-8.

26. Zadehmohammadi Ali, Malek Khosravi Gh. The preliminary study of psychometric properties and reliability of

family assessment device. *Journal of family research*. 2006;2(5):69-89.

27. Yousefi N. An investigation of the psychometric properties of the mcmaster clinical rating scale (MCRS). *Educational Measurement*. 2012;7(3).

28. Khorami Markani A, Khalkhali HR, Sakhaei SH, Saheli S. Assessment the effect of family centered care educational program on home care knowledge among care givers of patients with chronic renal failure under hemodialysis. *Urmia Med J*. 2015;13(5):386-94.

29. Ahamed AAF. Effects of Empowering Families on Improving Quality of Life for Children with Chronic Kidney Diseases. *Am J Nurs Sci*. 2018;7(1):14.

30. Pourghaznein T, Manzari ZS, Heydari A, Mousavi Bazaz M. Basic Needs of Mothers with Children Undergoing Hemodialysis: A Meta-synthesis of Qualitative Studies. *Evidence Based Care*. 2019;8(4):14-25.

31. Abu-Ouf NM, Abualhamyl AS, AlJahdali NF, Kari JA. Parental perceptions of their child's kidney disease. *Current Pediatric Research*. 2016;20(2).

32. Maslakkpak MH, Torabi M, Radfar M, Alinejad V. The Effect of Psycho-educational Intervention on the Caregiver burden among Caregivers of Hemodialysis Patients. *J Res Dev Nurs Midwifery*. 2019;16(1):14-25.

33. Sotoudeh R, Pahlavanzadeh S, Alavi M. The effect of a family-based training program on the care burden of family caregivers of patients undergoing hemodialysis. *Iran J Nurs Midwifery Res*. 2019;24(2):144.

34. Ramezani T, Sharifirad G, Rajati F, Rajati M, Mohebi S. Effect of educational intervention on promoting self-care in hemodialysis patients: Applying the self-

efficacy theory. *J Educ Health Promot*. 2019;8:65.

35. Rayati M, Jadid Milani M, Pishgooei A, Pakfetrat M. Evaluation of the effect of integrated trainings on nutritional status and dialysis adequacy in hemodialysis patients. *Med Surg Nurs J*. 2016;5(2):22-31.

36. Jajormaneh F, Ghazavi Z, Mehrabi T, Najafi M. The effect of stress management training program on self- efficacy mothers of children with thalassmia. *J Clin Nurs Midwifery*. 2016;5(2):84-93.

37. Salar A, Kermansaravi F, Navidian A, Taheri B. The effect of a family-centered empowerment model on quality of life in dialysis patients. *PAYESH*. 2018;17(2):179-90.

38. Pourshaban M, Parsayekta Z, Gholamnezhad M, Haghani H, Karimi N. The effect of food diet training on the quality of life among non-dialysis patients with chronic renal disease. *IJN*. 2013;26(82):11-22.

39. Baraz S, Mohammadi E, Broumand B. The effect of self-care educational program on decreasing the problems and improving the quality of life of dialysis patients. *HAYAT*. 2005;11(2):51-62.

40. Morasei F, Aghajani M. The Effect of counseling with spirituality approach on Hope in patients with chronic renal failure. *CMJA*. 2014;4(2):776-86.

41. Chien W-T, Chiu Y, Lam L-W, Ip W-Y. Effects of a needs-based education programme for family carers with a relative in an intensive care unit: a quasi-experimental study. *IJNS*. 2006;43(1):39-50.

42. Zhang S, Edwards H, Yates P, Li C, Guo Q. Self-efficacy partially mediates between social support and health-related quality of life in family caregivers for dementia patients in Shanghai. *Dement Geriatr Cogn Disord*. 2014;37(1-2):34-44.