Original Article

The effect of blended training on the quality of life of children with nephrotic syndrome

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Abstract

Background: Nephrotic syndrome is a common nephrology disorder in children that can affect the quality of health of children and adolescents significantly. Training children with nephrotic syndrome with special emphasis on the use of blended training can provide new opportunities for improving the quality of life of these subjects. The present study was conducted in order to investigate the effect of blended training on quality of life in children with nephrotic syndrome. **Materials and Methods:** The present non-randomized clinical trial was carried out, in a time period from January 2012 to June 2013, on 76 children aged 8–12 years with nephrotic syndrome; the subjects were through continuous sampling. The intervention group subjects were selected from the Ali Asghar and Pediatric Medical Centers and the control group subjects were selected from the Mofid Hospital of Tehran. The control group received only previous routine interventions, but the intervention group, in addition to previous routine interventions, received part of the training for nephrotic syndrome. The Pediatric Quality of Life Inventory™ 4.0 (generic core scales) questionnaire was implemented in the present study. Collected data were analyzed by the SPSS 21; *t*-test and paired *t*-test were used to compare the mean scores of the two groups. **Results:** There was no significant difference between the two groups in terms of quality of life before intervention; but, the quality of life of the intervention group increased to the control group after intervention (*P*-value < 0.001). **Conclusion:** Blended training can improve the quality of life of children with chronic diseases. Therefore, it is recommended to carry out educational intervention for parents of these children in order to increase their coping skills.

Keywords: Blended training, children, nephrotic syndrome, quality of life

Introduction

Nephrotic syndrome is a chronic kidney disease that occurs when an individual experiences alternate courses of clinical symptoms such as edema, proteinuria, albumin deficiency, and hyperlipidemia; this disorder affects the quality of health of children and adolescents.[1] Approximately 60–80% of patients with nephrotic syndrome are in the age group of 4–8 years, an age range which is accompanied by frequent episodes of this disease.[2] Patients with nephrotic syndrome suffer from several problems, such as severe dietary restrictions, frequent hospitalization, drug complications, and severe medical equipment dependency.[3] The annual incidence of nephrotic syndrome in most western hemisphere countries ranges from 2 to 7 new cases per 100,000 children per year, with an incidence of 16 cases per 100,000 in children. The rate of boy to girl infant s is 2 to 1.[4]

People with nephrotic syndrome face many problems that affect their quality of life directly,[5] including the side effects of medications and the high dependence on medical equipment for a large part of life, severe dietary intake, the unpredictability of relapse time, and frequent periods of need for hospitalization.[6-8] Lack of physical growth and deflection of the bones, changes in the form of the gums, hypertrichosis due to the use of corticosteroid drugs and cyclosporine and, on the other hand,

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edema are considered as the most common clinical signs of the disease, with other apparent changes in the face and other organs of the patient. This apparent change can be very annoying for the affected person and affect his quality of life.[9] Long-term use of steroidal drugs, and sometimes cytotoxic drugs, will not only weaken the immune system in the patient, but will also result in mood disorders and, consequently, impaired social function.[8,10] The results of the study have shown that children with nephrotic syndrome have shown weak social performance as well as the backwardness of psychosocial development, depression, anxiety, pain, fatigue, and low mobility.[9,11-13] School attendance, academic achievement, and contact with classmates are also affected.[8] Therefore, improvement of quality of life is considered as an important goal in therapeutic processes;[14] training parents and other family members with the aim of empowering them to take better care of the patient will help them decide on their continued care consciously.[15] On the other hand, it is the patient's right to receive accurate information from caregivers about the diagnosis, type of treatment, and prognosis of the disease.[16] Providing efficient training for the patient can improve quality of life, ensure continuity of care, relieve anxiety, and reduce the incidence of disease.[17] Therefore, considering the critical impact of growth and education on the completion of understanding potential of children and the higher efficiency of blended training, in which several methods, such as face-to-face and multimedia tools, and seminars, are combined. The present study is conducted in order to evaluate the effectiveness of blended learning.[8] Combined learning not only has the potential to transfer learning materials more efficiently, but can also be used as a more effective teaching method.[12] In this regard, the purpose of this study was to investigate the effect of blended learning on the quality of life of children with nephrotic syndrome.

Materials and Methods

The present quasi-experimental, non-randomized clinical trial was conducted in order to investigate the effect of blended training on the quality of life of 8–12 years old children with nephrotic syndrome in three main medical centers of Tehran, Iran, and the Shahid Beheshti Medical Sciences Universities.

Continuous sampling method was carried out among all the patients admitted to under study hospitals. Subjects were divided into two groups of intervention and control. After obtaining permission from the University's Ethics Committee, an educational program in four sessions of 30–45 min was performed for children with nephrotic syndrome categorized in small groups of 3–5 in a relaxed environment suitable for the presence of parents of children with nephrotic syndrome. Glomerular filtration rate (GFR) of at least 90, no kidney transplant history, lack of participation in similar previous studies, and the absence of the child's parents during the intervention were the main inclusion criteria.

In the intervention group, in addition to the usual training manual, different teaching methods (lecture, group inquiry, and response), or blending these methods and using educational tools including boards, whiteboard, educational booklet, software PowerPoint, educational CDs, playing cards, music with puppets, and pamphlets, all of which were scientifically approved by the relevant experts, were performed. Educational content was confirmed by four faculty members, one nephrologist, one pediatrician psychiatrist, a general practitioner, and three clinical nurses in the nephrology department. All trainings were provided by a researcher with the supervision of the research team. Puppets were designed by the researcher based on nephrotic syndrome and its effects on the appearance of the child and nutritional and medicinal needs; the sewing process was done by a pediatrician. The lyric related to the song and the educational film was prepared by the researcher based on the necessary training for 8–12-year-old children with nephrotic syndrome. The song was prepared by a team at the Tehran Art Activities Center and related puppetry was performed by an education specialist.

The material was designed in plain language by the researcher in order to summarize the instructional materials of each session; the researcher tried to create harmony between the illustrations and the explanations; the child was asked to express the image to receive the correct answer card after each of the five correct answers. At the end of the sessions, the cards were delivered to the child in a small bag. All these steps were conducted under the supervision of a team of research and experts education in terms of content and quality of work.

The intervention group, in addition to the routine treatment protocol, received an efficient nephrotic syndrome training program which includes knowledge and awareness of patients about their illness, training on the recognition and observance of the recommended diet, the recognition and proper use of prescription drugs, identification of drug complications, recognition of recurrence symptoms, participation in sports activities and social activities, emotional control, and participation in educational activities in four sessions of 30–45 min. The control group received the usual training section (the pamphlets in the department, the diet, and the doctor's and nurse's recommendations recorded on the patient's training sheet). The researcher contacted the children and their families once a week for 4 weeks and answered their questions regarding the probable problems of using the educational materials between the last session of the training and the second stage of the collection of questionnaires. In order to establish mutual interaction, the contact number of the researcher and the organizer of the project were provided for the participants; while expressing the readiness of the research team to answer their questions and requests, the continuation of the follow up of the treatment process was emphasized.

The questionnaire used in the present study is the Persian version of the PedsQL TM 4.0 generic core questionnaire. The reliability of the questionnaire turned out to be $\alpha = 84\%$ through Cronbach's alpha; the validity turned out to be 84%, which was determined through content validity (CVI) PedsQL;

the validity of four subscales of physical function, emotional performance, social function, and school performance were reported to be 80%, 86%, 83%, and 88%.[3] The PedsQL questionnaire has 23 grades and is scored in each order based on the Likert scale of five options. Scores ranges from 0 to 4 including never (0), almost never (1), sometimes (2), often (3), and almost always (4). The minimum score is 0 and the maximum is 96, and the higher the score, the higher the quality of life. The PedsQL questionnaire has four subscales including eight items for physical performance (walking, running, exercises, heavy lifting, bathing, doing daily tasks, pain, and low energy), emotional functioning has five items (feeling of fear, sadness, anger, sleep problems, and worries), social function has five items (communication, dislike, mockery, inability to do work, and game continuity), and school performance had five items (lack of attention in class, forgetfulness, difficulty in school assignments, lack of interest in school, and loss of school due to illness). Patients' demographic information such as age, sex, number of admission, duration of illness, birth rank, child and parental education, and physical examinations such as height, weight, and blood pressure were collected from a pre-prepared checklist. The questionnaires were then distributed among children of both the groups and they were asked to complete the questionnaire in a relaxed, stress-free environment and return it to the researcher; incomplete questionnaires were discarded and completed ones were fully analyzed.

Required data were collected using a questionnaire during two stages of pre-test and post-test (4 weeks later) in the control group. In the intervention group, the quality-of-life questionnaire was completed by children with nephrotic syndrome in two stages, before intervention and 4 weeks after the last educational session over a period of four consecutive days. To determine the required sample size at 95% confidence level and 80% test strength, and assuming that the effect of blended training on the quality of life of children with nephrotic syndrome in comparison with the control group is at least $d = 2$, the effect of the educational program is statistically significant. After applying the formula, the sample size, with a probability of 10%, turned out to be 38 in each group. Collected data were analyzed using the SPSS 18. In this study, Chi-square, independent *t*-test, and paired *t*-test were used to compare the mean scores of the two groups [Table 1].

Results

In this study, the quality of life of 76 children with nephrotic syndrome in two groups of control and intervention was assessed by general and specific PedsQL TM 4.0 generic core scales questionnaire. Demographic characteristics of children with nephrotic syndrome in the Ali Asghar Medical Center, Mofid Pedagogical Center, and Pediatric Medical Center is presented in Table 2. The number of boys turned out to be twice the number of girls and the frequency of admission in the intervention group was higher than the experimental group [Table 3].

The results obtained from the present study showed that the blended training was quite effective on the quality of life of children in all dimensions in comparison of before and after intervention. The main difference in the quality of life in the intervention group before and after the intervention was related to physical performance and the school performance. The analysis showed that in the intervention, the quality of life changed significantly before and after intervention, which indicates improvement in quality of life in the test group ($P < 0.05$).

Discussion

The results of the present study showed that nephrotic syndrome has a significant effect on all aspects of the quality of life of children; these findings are consistent with the results of a research according to which this type of children and their families face many problems due to the nature of the disease.[3] Children with chronic illnesses, such as nephrotic syndrome, experience various behavioral disorders such as bad social encounters, anxiety, violence, poor performance in school, and depression. In addition to renal insufficiency, these children will experience the retardation of neurotic and cognitive development.[18,19]

The results of the present study showed that quality of life in children with nephrotic syndrome who received blended training programs was better significantly higher, specifically in the domain of physical performance, than those individuals who did not receive such interventions.

Evaluating the results of blended training in the dimension of emotional function in children also showed that enhancing the child's awareness and strength in controlling the complications of the disease, such as swelling, fatigue, infection, and knowledge of the cause of the restriction of the use of the child's favorite substance, can mitigate the child's fear and discomfort. This could also be helpful to their parents, who experience a backbreaking bulk of stress.[8] Parents of such children are deeply responsible for providing emotional support, behavioral management, monitoring symptoms, and doing homework reports. Father have to provide out-of-home care and child care at the same time and provide emotional support for his wife, a task, the completion of which seems to be quite demanding and difficult.[20,21] Therefore, it seems that teaching children with nephrotic syndrome on how to control the complications associated with the disease can make the child somewhat independent of the family, which in turn helps decrease the role of parents in providing necessary care and help the child rely on his own for taking care of himself.

The results of the comparison of quality of life in the social dimension also showed that implementing blended training strategies enhances the quality of life of these children. In children with nephrotic syndrome, the side effects of taking different medications, not only result in reduced immune status and, as a result, frequent infections, but also there will be mood disorders, and, consequently, social function of the children will become

Table 1: The content of training sessions

Sessions	Content	Time (min)	Training method
Session 1	1. Statement of objectives and project implementation method	10	1. Group discussion
	2. Brochures regarding the function of kidneys in human bodies	10	2. Researcher-made colorful brochure and expressing the contents in plain language
	3. Kidney pamphlets	5	3. Researcher-made colorful pamphlets regarding the structure and functions of the kidneys in the body
	4. PowerPoint number 1 (nephrotic syndrome)	10	4. PowerPoint-sounded video content defining nephrotic syndrome
	5. Questions and answers 1	10	5. Stating five questions about the stated items
	6. Assignment 1		6. Presentation assignment sheet and colored figures
Session 2	1. Reviewing previous session	5	1. Group discussion and use of paper and pen
	2. PowerPoints 2 and 3 (diet, activities, tests, and care)	10	2. Sounded and colored PowerPoint related to the recommended diet in nephrotic syndrome and the use of a researcher-made puppet to transfer the concepts of reducing salt intake and controlling water intake
	3. A brochure containing diet for nephrotic syndrome	8	3. Submission of related materials in colorful brochures with related forms
	4. Low-salt diet brochure	7	4. Expression of the importance of low-salt diet in nephrotic syndrome
	5. Diet brochure to prevent osteoporosis	10	5. Drawing bone structure on paper and the role of calcium in bone formation and expression of calcium-containing food sources and the importance and cause of calcium intake in children with nephrotic syndrome
	6. Questions and answers 2	5	6. Stating related questions and re-expressing important points and answering questions
	7. Assignment 2		7. Providing a color worksheet related to the content of the session for assignment
Session 3	1. Reviewing previous session	5	1. Group discussion and use of paper and pen
	2. Educational film	10	2. Researcher-made educational film approved by a child psychologist and primary education adviser for nephrotic syndrome containing tracks and puppets; with the approval of educational needs and the use of battalion dolls, music during the transfer of concepts. Educational film featuring nephrotic syndrome, eight puppets including two kidneys/glasses of water/protein/ baby dolls with nephrotic syndrome/dolls, limiting salt intake, prednisolone drugs that were used by puppets trained by the puppet to move. The concert was performed at the same time and an old lady (the grandmother of puppets) was narrating the events, which again expressed the contents of the training program in plain language
	3. Pamphlet about recommended medications	8	3. Expressing the relevance of the substance and the cause of taking drugs for nephrotic syndrome, two dolls were used to make happy smiley pills, which told children that we are your friend and are happy and well-eaten in good time
	4. A 24-h urine collection pamphlet	7	4. A color palmetto with a 24-h urine test container and related collection points and the importance of doing so
	5. Prompt vaccination on time and pneumonia	10	5. Symptoms of pneumonia and its high prevalence in children with nephrotic syndrome and the cause of the importance of timely and preventive vaccination in these children
	6 Question and answer 3	5	6. Reviewing important concepts and answering the questions
	7. Assignment 3		7. Assigning homework
Session 4	1. Reviewing previous session	5	1. Group discussion and use of paper and pen
	2. Playing nephrotic syndrome song	5	2. Playing the relevant song for further internalization of trained materials
	3. Playing with dolls and puppets	10	3. Providing fabric dolls with standard size used in the film for kids
	4. Booklet (guidelines for parents and children on nephrotic syndrome)	15	4 Medium width booklet, translated by a reliable and approved by four educational pediatricians, kidney division head, kidney nurse, kidney psychiatrist, educational supervisor, children's hospital, general physician. Which included all the important and relevant material related to nephrotic syndrome
	5. Conclusion	10	5. Conclusion
	6. Question and Answer 4	5	6. Answering the questions
	7 Presentation of the training package (the content of the entire sessions, CD, work at home, flash video card)		7. Providing a training package for the contents of the sessions, pamphlets and educational brochures, a CD containing tracks and educational videos, a flash card package in a small, color-coded image of the diet. Medications and related points, and the same description of the same image in plain language

weaker and weaker.[2] In line with the results of this study, findings of another study, which as conducted to determine the effectiveness of a combined educational approach on the quality of life, indicated that provided training in form of dramatization and teaching pamphlet in patients with chronic obstructive pulmonary disease decreased the number of hospitalization, reduced the severity of the symptoms of the disease, and improved the dimension of social performance of quality of life in the subjects.[22,23]

Also, the results of the present study indicate that improving the quality of life in the school performance dimension in children with nephrotic syndrome seems to happen through controlling the disease, adjusting to the conditions of the disease, and accepting the fact that no one is perfect. Also, reducing school absenteeism can be one of the reasons for improving school performance in these children. Establishing appropriate conditions, planning, and coordination with educational authorities to provide the basis for the presence of children with nephrotic syndrome in educational settings while maintaining appropriate health conditions is one of the most important factors contributing to the quality of life of these children. In general, improving self-care capacity of patients would reduce dependence on others and increase autonomy in their routine activities; as a result, caregivers would have more time to deal with their own daily routine activities and affairs.[24]

One of the limitations of this study was the short-term impact of training; so, the study of long-term effects of blended training is quite recommended. To put it in a nutshell, more studies are needed on the effect of blended training on the quality of life of fathers and mothers of children with chronic diseases. The need for further training in longer intervals of 3 months and 1 year after intervention and providing training for parents and families is necessary. It should be noted that although the results of this study show the positive effect of the process of "education" on improving the overall quality of life of patients, it also refers to the importance of the quality of the curriculum; therefore, in order to achieve the desired result in educational programs, recognizing the target community in relation to illness and the development of a comprehensive educational program commensurate with the characteristics of the community is critical. Blended learning with the benefits of both traditional (face-to-face) and e-learning approaches seems to be an effective way to increase learning efficiency, ease of access to educational materials, and increase cost effectiveness. Also, due to providing different opportunities for learning, in addition to increasing the attractiveness of education, the individual differences of learners are also well considered.[25]

Table 2: Comparison of demographic information of subjects in two groups of control and intervention

Demographic information	Control	Intervention	*P*
Age (year), mean±SD	9.63±14.9	9.42±1.51	0.544***
Frequency of hospitalization	3.92±1.73	6.13±3.34	0.005***
Duration of diseases (year)	3.47±1.72	3.78±2.67	0.542***
Sex (%)			
Male	25 (65.8)	26 (68.4)	0.804*
Female	13 (34.2)	12 (31.6)	
Education of the child (%)			
Primary	33. (86.8)	20 (80)	0.054**
Secondary	5 (13.2)	0	
Rank in family (%)			
First child	18 (47.4)	17 (44.7)	0.807**
Second child	17 (44.7)	16 (42.1)	
Third child and so on	3 (7.9)	5 (13.2)	
Education of parents (%)			
Illiterate	0	2 (5.3)	0.059**
Guidance school	3 (7.9)	9 (23.7)	
College	18 (47.4)	18 (47.4)	
Academic	17 (44.7)	9 (23.7)	

***Independent *t*-test, ** Fisher exact *t*-test, *Chi-square test. SD: Standard deviation

Table 3: Numerical indicators of the quality of life domains in under study children in two groups of control and intervention before and after intervention and the results of significance test

Group Quality of life domain	Mean±SD		Independence *t*-test results
	Control Group	Intervention Group	
Physical performance (0-20)			
Before intervention	72.94±9.94	66.03±12.29	*P*=0.009
After intervention	72.69±8.7	81.41±9.6	*P*<0.001
Paired *t*-test results	*P*=0.829	*P*<0.001	
Emotional performance (0-32)			
Before intervention	60±9.72	63.28±13.52	*P*=0.227
After intervention	61.50±8.05	72.76±7.32	*P*<0.001
Paired *t*-test results	*P*=0.320	*P*<0.001	
Social performance (0-20)			
Before intervention	68.55±7.87	70.65±12.79	*P*=0.391
After intervention	68.71±8.29	80±9.44	*P*<0.001
Paired *t*-test results	*P*=0.833	*P*<0.001	
School performance (0-20)			
Before intervention	55.92±8.76	61.84±13.92	*P*=0.030
After intervention	56.57±8.31	77.89±8.74	*P*<0.001
Paired *t*-test results	*P*=0.560	*P*<0.001	
Quality of life			
Before intervention	65.47±6.32	65.53±10.54	*P*=0.977
After intervention	65.78±5.38	78.46±7.20	*P*<0.001
Paired *t*-test results	*P*=0.622	*P*<0.001	

Conclusion

Blended training can improve the quality of life of children with chronic diseases. Therefore, it is recommended to carry out educational intervention for parents of these children in order to increase their coping skills.

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Conflicts of interest

There are no conflicts of interest.

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