ORIGINAL ARTICLE

The Effect of Education by Peers and Health Personnel on the Osteoporosis Knowledge and Health Beliefs in Adolescents with Nephrotic Syndrome

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Received: 10 April 2013 **Revised:** 11 June 2013 **Accepted:** 13 June 2013

Abstract

Background

Osteoporosis is one of the consequences of chronic diseases such as nephrotic syndrome in adolescents, especially in those undergoing glucocorticoid therapies. The present study aimed to determine and compare the effect of education by peers and health personnel on the prevention of osteoporosis in the adolescents with nephrotic syndrome.

Methods

The present quasi-experimental study was conducted on 54 adolescents with nephrotic syndrome who were randomly divided into two groups of peers and health personnel. The osteoporosis education program was based on the health belief model. Two questionnaires were completed by the patients to assess their knowledge and health beliefs regarding osteoporosis before, immediately after, and 1 month after the educational intervention. The data were analyzed by SPSS-15 using independent and paired t-test and RMANOVA.

Results

The mean score of knowledge and health beliefs was significantly increased in both groups immediately after the intervention ($P<0.05$). However, the scores declined in both groups with a significant decrease in some parts one month after the intervention. No significant difference was found between the peers and health personnel regarding osteoporosis knowledge and health beliefs ($P>0.05$).

Conclusion

The results of the present study revealed the significant effect of education, carried out by both peers and health personnel, on the osteoporosis knowledge and health beliefs. Also, peer education was a cost-effective and feasible method for increasing the adolescents' osteoporosis knowledge and health beliefs.

Keywords: Osteoporosis; Nephrotic syndrome; Knowledge; Beliefs; Peers

Please cite this article as: Kargar M, Jamali Moghadam N, Moattari M, Fallah Zadeh MH, Pourahmad S. The Effect of Education by Peers and Health Personnel on the Osteoporosis Knowledge and Health Beliefs in Adolescents with Nephrotic Syndrome. IJCBNM. 2013;1(3):137-146.

Introduction

Nephrotic syndrome is a collection of clinical entities associated with a number of disorders of kidney and other body organs, mostly proteinuria of more than 3.0-3.5 grams per 1.73 square meters of body surface area in 24 hours, hypoalbuminemia, edema, hyperlipidemia, lipiduria, and hypercoagulation.[1] Approximately 90% of the cases occurs as primary nephrotic syndrome,[2] and is often detected in the adolescents especially those of the preschool age.[3,4] The prevalence of primary nephrotic syndrome in North America is approximately 2-7 cases per 100,000 adolescents per year with the boy to girl ratio being 2 to 1 and equal in adolescence. The adolescents with nephrotic syndrome requiring repeated administration of steroids are more susceptible to the risk of complications, such as osteoporosis, arising from the use of such drugs.[3] According to the investigations performed by the researchers, no statistics were available regarding nephrotic syndrome in Iran.

Furthermore, osteoporosis is one of the disasters of recent centuries and, together with heart attacks, strokes, and cancer, is announced by World Health Organization (WHO) as four human enemies.[5] In the recent years, osteoporosis is known as a health hazard that afflicts 10% of the world population.[6,7] Using prednisolone at a dose of 7.5 mg daily for 6 months can lead to osteoporosis. Besides, the adolescents with rapid bone turnover are prone to osteopenia due to steroid therapy. In fact, the adolescents are at a greater risk because glucocorticoids which hinder the development of bones prevent the formation of maximum bone mass.[8,9]

According to studies, a maximum increase of 10% in bone mass can lead to a 50% decrease in the risk of fractures due to osteoporosis in older ages.[6,10] Because health beliefs are shaped at low ages, different educational programs which aim at appropriate health beliefs must be designed and implemented. Of course, type of education is the most important mainstay of education and is considered as an essential benchmark in planning health education.

One of the training methods is recruiting the trained peers who can connect and communicate with and effectively deliver information to the people of their own age such that medical personnel are unable to achieve.[11,12]

One of the designed frames for training the preventive behaviors is the health belief model that is used to demonstrate the causes of health behaviors. Rosenstock (1974) and Becker and Maiman (1975) who proposed the health beliefs models showed a relationship between personal belief and behavior.[13] According to the present study researchers, less attention has been paid to the knowledge and health beliefs of the patients suffering from nephrotic syndrome. Moreover, no studies have been conducted on training these patients regarding osteoporosis. Therefore, the present study was carried out to compare the impact of education by peers and health personnel regarding the prevention of osteoporosis on the knowledge and health beliefs of 12-18 year-old adolescents with nephrotic syndrome referring to the clinics of Shiraz University of Medical Sciences from the beginning of 2009 to the beginning of 2011.

Materials and Methods

The present pre- post-test, quasi-experimental study was conducted on the effect of health beliefs model education regarding osteoporosis. This comparative study aimed to determine the effect of education by peers and health personnel on the knowledge and health beliefs of the adolescents with nephrotic syndrome concerning the prevention of osteoporosis. The study was conducted on a total of 54 adolescents with nephrotic syndrome (23 girls, 42.6% and 31 boys, 57.4%) referring to the clinics affiliated to Shiraz University of Medical Sciences (Imam Reza and Motahari clinics). As statistical analysis becomes limited by a small sample size, by using census and based on the clinical records, all the subjects with nephrotic syndrome

who had referred to the above-mentioned clinics from the beginning of 2009 to the beginning of 2011 were recruited into the study.

Before starting the research program, the patients and their families were briefed on the project. Then, the patients were randomly divided into two groups of peers and personnel. For random allocation, the first and second groups were determined randomly using a coin. Then, the patients were assigned to the first and the second group one by one according to their reference to the clinic. After all, 27 subjects were allocated to each group. Parental written consents for inclusion of the patients in the study were also obtained in the first session.

After the baseline assessment, 3 volunteer peer leaders were selected by the researcher based on their pretest scores, organization and oral expression ability, influence among others, and sense of responsibility. Then, the peer leaders were trained by the research staff in four 90-min sessions (Information about osteoporosis, risk factors, susceptibility to osteoporosis, benefits and barriers of calcium intake and exercise for overcoming osteoporosis). The 3 peer leaders were well trained in order to be able to successfully deliver the lessons to their classmates. In the whole training process, the peer leaders were encouraged to learn the skills in order to actively interact with and facilitate the interaction between their peers. During peer education, a teacher was also present to help maintain the classroom order. The peers group, three 9-member groups were trained by 3 trained peers in four 90-minute sessions. On the other hand, three 9-member groups in the health personnel group were trained by 3 trained nurses in four 90-minute sessions (Information about osteoporosis, risk factors, susceptibility to osteoporosis and benefits and barriers of calcium intake and exercise, for overcoming osteoporosis based on the health belief model).

In addition, the participants were provided with educational booklets at the end of each training session.

The patients participating in this study had received glucocorticoid treatment during the previous 6 months and had nephrotic syndrome confirmed by a physician.

The study data were collected by using a demographic questionnaire (Age of the adolescents and their parents, gender, financial status of the family, and duration of nephrotic syndrome) as well as two questionnaires which were completed by the adolescents with nephrotic syndrome.

The first questionnaire, healthy bone knowledge questionnaire, was a modified osteoporosis knowledge test. The osteoporosis knowledge test including 24 questions was designed by Kim et al. in 1991 and was used for the females aging 35 years old and above. It was then changed to 33 questions for the adolescents.[14] The questions related to a menopause of longer than 6 months after the surgical removal of the ovaries were excluded. Besides, the test did not include Afro-Americans because the Asians were not aware of their characteristics and there was no necessity to include this question in our study. Because of ambiguity, the question concerning the mothers who were shorter in stature than their young was also eliminated from our study. After all, the questionnaire in use included 29 questions with 4 options for each. Among these, 13 questions were related to the risk factors and 16 ones were concerned with the two major methods for prevention of osteoporosis; i.e., calcium intake and exercise knowledge.

The scores gained by the participants varied from 0-29. Pournamdar et al. reported the Cronbach's coefficient of 0.9 for the questionnaire. They also reported the Persian version of the questionnaire to have desirable validity. After removing the four above-mentioned questions, the Cronbach's α coefficient was recalculated as 0.6 which was considered acceptable for the present study.[15]

The second study questionnaire was osteoporosis health belief scale that was designed and used for the first time by Kim and colleagues in 1991. The original

questionnaire carried 42 questions. In this study, according to the views of the faculty members and review questions, the first part was reduced to 5 questions. Thus, the score of this part changed from 5 to 25. Also, the total score of the questionnaire changed from 41 to 205. Because of its repetitiveness, the question "you may have high chance of getting osteoporosis" was excluded from the questionnaire. After all, the questionnaire included 41 questions which were based on the health belief model and specifically aimed to examine the beliefs regarding calcium intake and exercise. This instrument has 7 sub-scales, including perceived susceptibility to osteoporosis and its seriousness, awareness of exercise benefits, exercise barriers, perception of calcium benefits, awareness of calcium barriers, and health motivation. This questionnaire was scored using a 5-option Likert scale ranging from 1 (completely disagree) to 5 (completely agree.[15,16] With regard to the barriers of calcium intake and exercise, the questions were designed such a way that agreement reflected approval of the barriers**.**

Based on the study by Pournamdar et al. the reliability coefficients for calcium intake and exercise were 0.52-0.84 and 0.63-0.84, respectively. The reliability coefficient of the whole test was also reported as 0.90.[15]

The study data were analyzed using the SPSS statistical software Version 15. Descriptive statistics, including frequency, frequency percentage, mean, and standard deviation, and analytical statistics were used to compare the scores of the two groups. In addition, independent and paired t-test were used to compare each group's scores before and after the interventions. Finally, repeat measures ANOVA was utilized to compare the changes in the total scores before, immediately after, and 1 month after the training.

Results

The present study was conducted on 54 adolescents with the mean age of 14.81±2.47 years suffering from nephrotic syndrome (23 girls, 42.6% and 31 boys, 57.4%) who were divided into the health personnel and peer groups. The mean age of the adolescents in the peers and health personnel groups was 14.59 and 15.04 years, respectively. No significant difference was found between the two groups regarding the demographic characteristics, such as adolescents' age, parents' age, level of education, financial status, and the amount of prednisolone.

In this study, repeated measures ANOVA was employed to compare the peers and health personnel groups regarding the trends of variation in the total scores of knowledge and health beliefs (table 1). The results showed no significant interaction effect between time and group (P>0.05). This implies that the trend of variation of the groups' total scores was not significantly different. Furthermore, regardless of the time effect, no significant difference was found between the two groups' total scores (P>0.05). However, by eliminating the group effect, a significant difference was observed among the total scores during the study period (P<0.05). In other words, the total

Table 1: Comparison the trends of variation between the two groups

Total Score	P value[a,b]		
	Time [c] effect	Group [d] effect	Time×Group [e] effect
Knowledge	0.0003	0.1	0.8
Health beliefs	0.0001	0.4	0.9

[a] P values lower than 0.05 are considered significant; [b] Repeated Measures Analysis of Variance test (RMANOVA); [c] before, immediately after, and 1 month following the education; [d] peer and health personnel groups; [e] Interaction between Time and Group effects

scores of knowledge and health beliefs were different during the study period regardless of the group effect (table 1).

To analyze the difference between the groups with more details, the two groups were compared separately in each time using independent sample t-test.

The results of independent t-test showed no significant difference between the peers and health personnel groups regarding their mean scores of knowledge and health beliefs before the training. Also, no significant difference was found between the two groups in this regard immediately and 1 month after the training. The results of paired t-test showed a significant increase in the mean scores of knowledge and health beliefs in both peers and health personnel groups immediately after the training (P<0.05). However, a reduction in the mean scores of four knowledge factors, including risk factor, exercise, calcium intake, and total knowledge, was found in both groups one month after the training (tables 2 and 3).

This reduction was statistically significant (P<0.05) in all parts, except for the risk factor knowledge in the peers group (P=0.17) and exercise knowledge in the personnel group (P=0.06) (tables 2 and 3). Moreover, the mean score of health beliefs decreased in all the dimensions 1 month after the training. In the peers group, a statistically significant reduction was observed in the perception of the severity of osteoporosis (P=0.003), exercise benefits (P=0.03), calcium intake benefits (P=0.01), health motivation (P=0.02), and total scores (P=0.02). In the health personnel group, on the other hand, the corresponding reduction was statistically significant in the perception of the susceptibility to osteoporosis (P=0.004), calcium benefits (P=0.004), and total scores (P=0.001). The results of independent sample t-test revealed no statistically significant difference between the two groups regarding the mean score of knowledge before, immediately after, and 1 month after the training (table 1). Considering the health belief dimensions also, no statistically significant difference was observed between the two groups before, immediately after, and 1 month following the training (table 3).

The knowledge mean score of the peers group was higher than that of the health personnel. However, the health personnel gained a higher health beliefs score compared to the peers group (figures 1 and 2).

Table 2: Comparison of the mean of knowledge, calcium intake, and exercise scores before, immediately after, and 1 month after peer and health personnel education between the two groups

Time	Peer group (mean±SD)			Health personnel group (mean±SD)			P value*, **		
Knowledge dimensions	Before education	Immediately after education	1 month after education	Before education	Immediately after education	1 month after education	Before education	Immediately after education	1 month after education
Risk factor knowledge	5.85±2.64	8.85±2.33	7.96±2.44	5.22±2.82	8.55±2.33	6.70±2.11	0.4	0.64	0.04
Exercise knowledge	3.48±1.55	5.48±1.25	4.63±1.73	3.07±1.57	5.29±1.49	4.52±1.53	0.34	0.62	0.80
Calcium intake knowledge	4.07±1.71	7.07±1.14	6.07±2.05	3.55±1.82	6.63±1.92	5.59±1.80	0.29	0.31	0.36
Total knowledge	13.41±4.26	21.41±2.91	18.66±4.08	11.58±4.87	20.48±4.08	16.81±4.21	0.14	0.33	0.11

*By using Independent t-test; ** P values lower than 0.05 are considered significant

Table 3: Comparison of the means of health beliefs scores of calcium intake and exercise before, immediately after, and 1 month after peer and health personnel education between the two groups

Time	Peer group (mean±SD)			Health personnel group (mean±SD)			P value*,**		
Health beliefs subscale	Before education	Immediately after education	1 month after education	Before education	Immediately after education	1 month after education	Before education	Immediately after education	1 month after education
Perceived susceptibility	16.70±4	20.03±4.36	19.89±3.90	17.81±4.18	20.74±3.77	19.04±4.26	0.32	0.52	0.45
Perceived severity	20.11±3.86	23.04±3.70	20.66±5.05	20.07±3.99	22.37±4.50	20.92±6.49	0.97	0.55	0.87
Perceived exercise benefits	24.52±5.06	26.63±4.71	25.04±4.45	24.59±3.51	26.88±2.72	26.07±3.35	0.95	0.81	0.34
Perceived calcium intake benefits	22.88±4.20	26.22±3.19	24.30±3.74	23.55±5.34	26.74±2.65	25.41±3.44	0.68	0.15	1
Perceived exercise barriers	14.92±5.16	11.11±3.83	10.93±3.12	15.26±5.52	13.22±4.48	12.15±3.49	0.61	0.52	0.26
Perceived calcium intake barriers	14.11±4.31	12.55±3.64	12.07±3.87	14.52±4.62	13.04±4.47	11.70±4.60	0.82	0.07	0.21
Health motivation	24.18±2.60	27.30±2.57	25.55±3.51	24.59±4.42	26.22±2.82	25.55±4.20	0.74	0.66	0.75
Total health beliefs	137.44± 11.07	146.89± 13.03	138.44± 14.10	140.41± 14.85	149.22± 10.39	140.85± 15.38	0.41	0.47	0.55

*By using Independent t-test; ** P values lower than 0.05 are considered significant

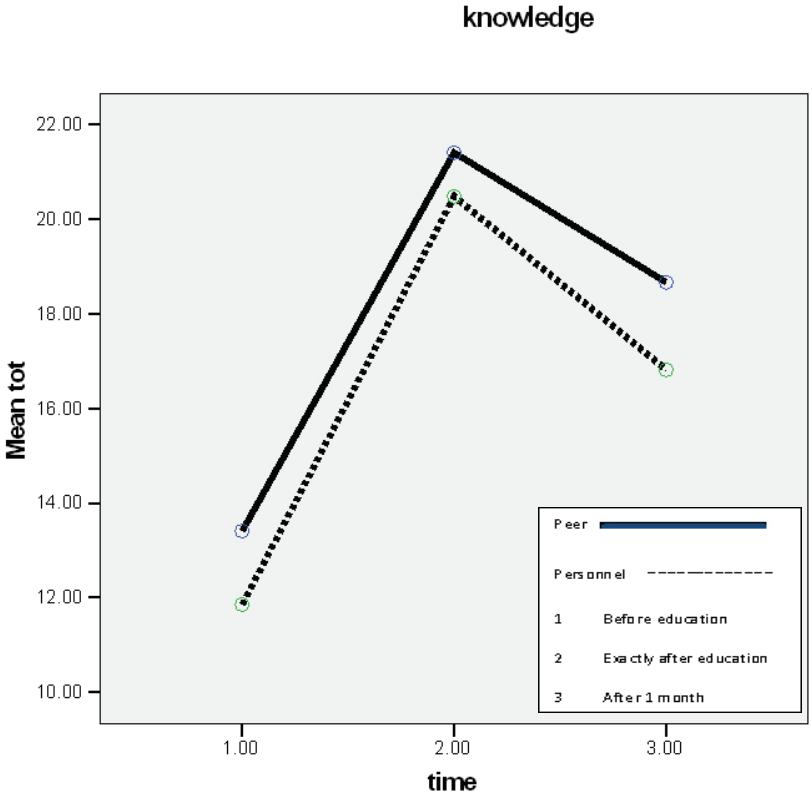

Figure 1: Comparison of the mean scores of knowledge in the peers and health personnel groups before, immediately after, and 1 month after the training.

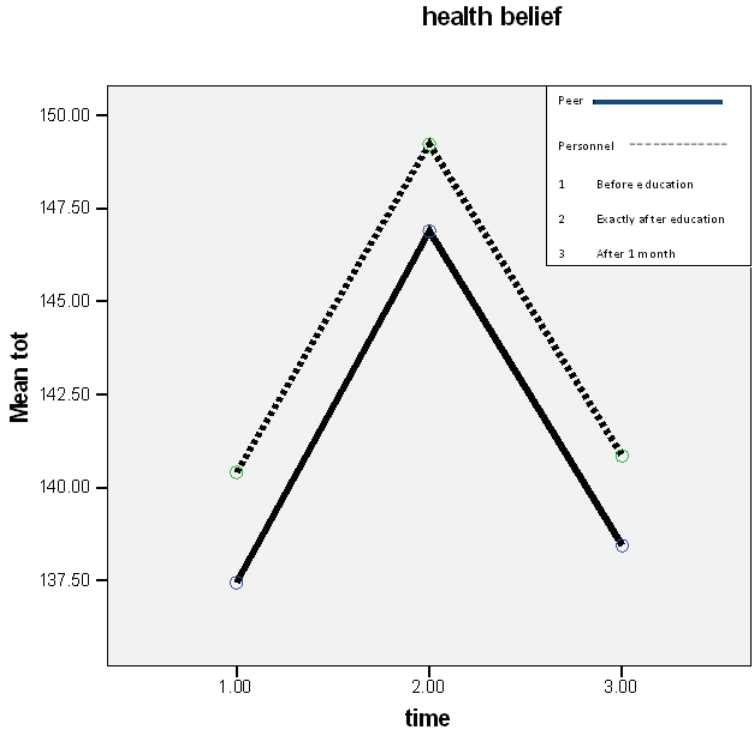

Figure 2: Comparison of osteoporosis health belief scores between the peers and health personnel groups before, immediately after, and 1 month after the training.

Discussion

As mentioned previously, the present study aimed to compare the effect of training the knowledge and health beliefs by peers and health staff on the prevention of osteoporosis in the adolescents aging 12-18 years suffering from nephrotic syndrome who had referred to the clinics of Shiraz University of Medical Sciences.

In this study, the adolescents with nephrotic syndrome were considered as the target group because they required repeated administration of steroids and were more susceptible to the risk of complications, such as osteoporosis, arising from the use of such drugs.[3]

Several studies have mentioned the important role of education in increasing the knowledge and health beliefs of osteoporosis among the adolescents.[15,17]

In our study, no significant difference was found between the two groups regarding the trend of variation of their total scores during the study period (P>0.05). Nonetheless, the total scores of knowledge and health beliefs were different during the study period regardless of the group effect, which implies that time alone was effective in knowledge and health beliefs in both study groups.

Before the training, no statistically significant difference was found between the two groups regarding the demographic characteristics (P>0.05). In addition, no statistically significant difference was observed between the trend of variation in their total scores during the study period which means that both the peers and the personnel group acted similarly (P>0.05).

Based on these results, knowledge and health beliefs increased immediately after the education in both study groups. One study showed the positive impact of education on improving knowledge, attitude, and self-efficacy of the students regarding AIDS prevention.[18] Another study also revealed the impact of education on the knowledge and attitudes of the students regarding self-breast examination.[19] Moreover, one study was performed in order to evaluate the effect of education based on the health belief model on the awareness and cooperation of the individuals at moderate risk for colorectal cancer. The results of that study showed an

increase in awareness in both control and experimental groups after the intervention; however, this increase was only significant in the experimental group.[20] In the present study, knowledge and health belief scores significantly increased immediately after the education, while significantly decreased 1 month after the intervention.

The study findings revealed a significant difference between the two groups' mean scores of the risk factors knowledge 1 month after the training (P=0.04), with the higher score being related to the peers group. Based on our findings, the mean scores declined in most parts one month after the training. This may indicate that knowledge and health beliefs are not long-lasting and repetition, regular intervention, and follow up by school health educators are necessary to ensure the sustainability for prevention of osteoporosis.

Other studies have also shown that the level of knowledge and performance decreased 1 month after the education and concluded that the effect of education declined with the passage of time.[21,22] The above-mentioned studies were done on healthy adults in an informal environment, and their extrapolation to other studies does not seem reasonable.

As the participants of our study were young and factors, such as morbidity, fatigue, and other physical and psychological problems (anxiety, depression, etc.)[23] might have affected the stability of the training outcomes, it is necessary to repeat the interventions in order to achieve desirable impacts. One study suggested the effectiveness of peer education based on the hypothesis that delicate information was exchanged more easily amongst the peers. However, according to some critics, this may only be a sheer theory and not based on any compelling evidence.[24]

Based on the present study findings, no significant difference was found between the two groups regarding the impact of education on the knowledge and health beliefs.

In one study on AIDS prevention, the mean score of knowledge about AIDS prevention was significantly increased after the education; however, no significant difference was found between the peers and the personnel group.[19]

This study was unique in the sense that it was performed on both boys and girls in an informal environment using two types of education carried out by peers and the health personnel. In this study, all the patients referring to the clinics were considered, but we could not have a control group because of the small population of the patients with nephrotic syndrome. Although acceptable results were obtained in this study, further researches with larger sample sizes and longer training periods are needed to confirm the results of the present study. Overall, the present intervention was innovative because the peer education program is theory-based and easy to run by following the peer leader's manual. These features ensure the cost-effectiveness and feasibility of the program for larger scale implementation.

Conclusion

Osteoporosis prevention programs based on the health belief model implemented by the peers and health personnel groups affected the knowledge and health beliefs of the two study groups. Overall, the findings of the present study revealed the necessity to pay more attention to the patients with nephrotic syndrome regarding the consequences of the disease. Also, considering the lack of sufficient health personnel, peers can play an important role in increasing the adolescents' knowledge and health beliefs.

Acknowledgement

This article was extracted from the thesis written by Neda Jamali Moghadam (proposal No. 89-5397). The authors would like to thank the Research Vice-chancellor of Shiraz University of Medical Sciences for approval, supervision, and funding of this research project. The authors

would also like to express their gratitude for the facilities provided by the Center for Development of Clinical Research of Motahari clinic and Research Improvement Center of Shiraz University of Medical Sciences for their cooperation. Ms. A. Keivanshekouh at Research Improvement Center of Shiraz University of Medical Sciences is also appreciated for improving the use of English in the manuscript.

Conflict of interest: None declared

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