

Effect of Educational Intervention Based on Self-Efficacy Theory on The Caring Behavior of Mothers Having Children with Cancer

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Abstract

Background

Self-efficacy, as one of the concepts of empowerment model, plays a role in increasing the caring behavior. Accordingly, the present study aimed to evaluate the effect of educational intervention based on self-efficacy theory on the caring behavior of mothers having children with cancer.

Methods

This before-after clinical trial study was conducted on all mothers (N = 86) of children with cancer undergoing chemotherapy who referred to Bandar Abbas Children's Hospital. All mothers participate in four educational intervention sessions. The Shearer's self-efficacy questionnaire and "mothers caring behavior scale" were completed at the 1st and 3rd and 6th months after intervention. Descriptive statistics, paired t-test, analysis of variance (ANOVA) with repeated measures and a linear mixed model were used to assess the effect of time and self-efficacy on the caring behavior adjusting for family size, mother's age, mother's job, mother's education, and chemo-therapy session.

Results

The results indicated a significant difference in the mean score of mothers' self-efficacy after intervention ($P < 0.001$). Besides, the two-way self-efficacy score of the first and second follow-ups was $p = 0.096$. Furthermore, the mean score of caring behavior before and after the intervention indicated a significant difference ($P < 0.001$).

Conclusion

The results of the present study indicated that an educational program for mothers increased their caring behavior and self-efficacy with the increase of self-efficacy, mothers' caring behavior was promoted. Authorities and practitioners are suggested to pay more attention to designing educational programs based on health models and theories.

Introduction

Since children with cancer receive a lot of home treatment, parents feel more responsibility including drug use control, poison control, drug side effects, and contact with the treatment team [1]. Parents, particularly mothers, as the most significant person in the child support system, are often unaware of the causes of the disease and the ways it is treated, the economic consequences of the child's disease, and the frequent hospitalization of the child, which can lead to stress and psychological problems, as well as adverse effects on the child and the treatment process [2]. Thus, family members must reorganize their

roles, interactive patterns, inside and outside relationships, and work to adapt to the new situation [3]. Thus, the performance of the whole family is influenced [4]. Increased psychological pressure on caregivers has consequences, including family isolation, loss of hope for social support, disruption of family relationships, inadequate patient care, and ultimately, abandon of the patient [5]. Since the past two decades witnessed a shift in health care from hospital to home, more than 90% of outpatient and inpatient cancer treatments are now available. One of the factors that may facilitate this transition from hospital to home is the education of the patient and his/her family members and other caregivers and their active involvement in providing care. In addition, empowerment is one of the critical actions of nursing to attract participation and education of patients and their caregivers [6]. Empowerment, as a participatory educational approach, requires looking at the family and its needs as the core of care. One of the concepts of empowerment model is self-efficacy [7]. The concept of self-efficacy was first introduced by Bandura (1993) as a probable measure of one's trust in a particular behavioral competence or a chain of specific behaviors to control and manage perceived situations. The ability to exert control over the intellectual-motivational processes present in one's behavior is one of the distinctive features of human behavior [9]. Self-efficacy has been defined as a mediating mechanism affecting the underlying, motivational, emotional, and selective processes. Perceived self-efficacy is not related to the number of skills but to what one believes and can do under certain circumstances. Skills are easily influenced by one's doubts. Effective performance requires skill coupled with self-efficacy [10]. Research has indicated that self-efficacy can predict one's performance and change it as a result of learning, experience, and feedback. At the same time, many factors like personal knowledge, physical status, self-esteem, interpersonal environment, time available, complexity of tasks, and stress can affect self-efficacy and behavioral outcomes [11, 12]. Interventions based on the Theory of Self-efficacy (TSE) have demonstrated the effectiveness of this theory in improving or acquiring skills. TSE has been used in numerous studies like women's general health status, physical activity, adopting AIDS prevention behavior, increasing women's awareness in preventing violence against women, maternal competence in women, and self-efficacy of mothers of children with autism. Because of the nature of the cancer disease and its psychological effects on the mothers as a caregiver, the present study aimed to evaluate the effect of maternal education and skill development based on the TSE on how to care for a child with cancer and its continuation.

Method

Study design and participants

This study was before-after clinical trial type. The research hypothesis was the effect of intervention based on TSE on the mothers' caring behavior. The participants were all mothers of children with cancer undergoing chemotherapy referred to Bandar Abbas Children's Hospital (No=86). Inclusion criteria were the mother of a child, at least one child undergoing chemotherapy and consent to participate in the study. Exclusion criteria were non-attendance at educational sessions (absence of more than two sessions), deterioration of the child situation and failure to complete the questionnaire.

Sampling

The present study was approved by the Committee Ethics of Bandar Abbas University of Medical Sciences (ID number HUMS.REC 1396.83). For ethical considerations, the objectives of the study were explained to the mothers during one session. In addition, they were assured that the results of the study would be briefly reported, and that they were free to refuse to participate at any time they wish.

Data collection tool

The required data were collected by Sherer's questionnaire for measuring the mothers' self-efficacy. also the researcher-made questionnaire was used for measuring the maternal caring behavior. The demographic questions included mother's age, child's age, marital status, mother's education, mother's occupation, household size, number of chemotherapy sessions, year of diagnosis, and having multiple children. The researcher-made questionnaire was designed with 30 questions to assess the parental care of children with cancer in the field of nutrition, side effects of chemotherapy and how to serve food and manage gastrointestinal disorders caused by chemotherapy and changes in appearance, especially hair loss. The questionnaire had a minimum of 30 and a maximum of 150 points. The situation during and after chemotherapy was measured on a 5-point Likert scale, I can,5; I'm sure, 4; I try to, 3; I'm not sure, 2; and I cannot, 1. Also, in order to get the most appropriate answer from the parents, the image of pupils was used so that if the parents did not understand the concept of options, they could respond through pupils according to their satisfaction with the way of care [13]. The panel of experts, who had different specialties and included education and health promotion, epidemiology, biostatistics and blood and cancer specialists in children, was used to determine the validity of the questionnaire. The questionnaires were distributed randomly to determine the reliability of the study population. Then the researcher-made questionnaire was filled out two times in 10 day interval. Its reliability was obtained as 0.89 through the test and re-test. There was no significant difference between the two times (P -value>0.05). Cronbach's alpha was used for determining the internal reliability of the questionnaire, which was obtained as $\alpha=0.87$. It is to be noted that due to the small sample size, none of the participants in the pilot study was excluded from the whole study. The Sherer's self-efficacy questionnaire, whose validity and reliability were confirmed previously in Iran (Bakhtiari Barati), included 17 items on a 5-point Likert scale (strongly disagree, 1; disagree, 2; intermediate, 3; agree, 4; and strongly agree, 5). Six of the 17 questions did not need to be changed, and the rest were reversed and varied between 17 and 85.

Intervention

Both questionnaires were completed by the researcher using verbal information for those parents who were illiterate. After collecting the first stage questionnaires and analyzing the data, educational content was designed based on the results of data analysis. Educational program, including a set of caring behavior sessions in groups of 8-9 participants (each session 45-60 min) was implemented. Ten interventional education sessions were held within one month. The educational program included lectures with questions and answers, group discussion and educational clip broadcast. Also an

instructive booklet was provided for the mothers at the end of the intervention period. Educational interventions for the mothers' caring behavior for children with cancer were based on TSE, including performance outcomes, vicarious experiences, verbal persuasion, physiological feedback, and content production according to the books on child care for cancer. The training used the infrastructure of TSE in addition to the content produced. Nurses also attended the training sessions to provide the parents with hospitalization and discharge training. In order to investigate the continuity of caring behavior in the mothers with children with cancer, the study was designed with two follow-up stages. The first stage was evaluated three months post-intervention and the second follow-up was evaluated six months post-intervention.

Data analysis

SPSS software (ver. 25) was utilized for data analysis. The normal distribution of quantitative data was examined using the Kolmogorov- Smirnov's test, indicating the normal distribution of all data. Descriptive statistics were reported as mean±SD for quantitative variables and as frequency (percent) for categorical variables. Paired t-test and analysis of repeated measurement were used. Linear mixed model was performed to assess the effect of time and self-efficacy on the caring behavior adjusting for family size, mother's age, mother's job, mother's education and chemotherapy session. The significance level was set at $P < 0.05$.

Results

In this study, 86 mothers having children with cancer were studied. 83.8% of the mothers were between 20 and 40 years old. 55.8% of children were 5 years old or younger. Other demographic information of the study population is given in Table 1.

Table 1
Demographic characteristics of mothers caring for children with cancer and undergoing chemotherapy

Variable No (%)	Variable No (%)
Mother age	Marital Status
(20–30) year 36(41.9)	Married 81(94.2)
(31–40) year 36(41.9)	Divorced 2(2.3)
More than 41 year 14(16.2)	Widow 3(3.5)
Occupation	Child ' s age
Housekeeper 78(90.7)	(0–5) year 48(55.8)
Employed 8(9.3)	More than 5 year 38(44.2)
Level of education	Number of chemotherapy sessions per month
Illiterate 16(18.6)	Less than 10 sessions 27(31.4)
Under diploma 36(41.8)	(10–20) sessions 19(22.1)
Diploma / University 34(39.6)	More than 20 sessions 40(46.5)

The results showed that the $M \pm SD$ of mothers' self-efficacy was 53.63 ± 11.41 . After intervention, the mean score of self-efficacy was 63.83 in the first follow-up and 65.56 in the second follow-up. The mean score of caring behavior before intervention was 100.73 ± 18.91 , which was increase to 125.4 in the first follow-up and 126.63 in the second follow-up post-intervention. Distribution indices for self-efficacy and mothers' caring behavior before intervention and in the first and second follow-ups are displayed as Boxplot in Fig. 1.

Distribution indices for self-efficacy and mothers' caring behavior before intervention and in the first and second follow-ups are illustrated as Boxplot in Fig. 1.

The repeated measure ANOVA test was used to investigate the effect of follow-up times on changes in mothers' self-efficacy and caring behavior. The results showed that the difference of self-efficacy score and care behavior in different stages of follow-up was statistically significant ($P < 0.001$). Therefore, it can be said that educational intervention has changed the level of mothers' self-efficacy and caring behavior.

Table 2
Comparison of the mean scores of mothers' self-efficacy and caring behavior in three stages

Variable	Time of study	Means of differences	Confidence interval 95% for means		P-value
			Low limit	High limit	
Self-efficacy	Pre-test with the first follow-up	10.1	7.1	13.2	>0.001
	Pre-test with the second follow-up	10.9	8.1	13.6	> 0.001
	First follow-up with the second follow-up	0.73	-0.13	1.5	= 0.096
Caring behavior	Pre-test with the first follow-up	24.6	20	28	>0.001
	Pre-test with the second follow-up	25.9	22	30	> 0.001
	First follow-up with the second follow-up	1.29	0.70	1.8	> 0.001

As shown in Table 2, the score of self-efficacy in the first and second follow-ups increased significantly (P-value < 0.001) in comparison with the pre-test. Also there was no significant difference between the first and second follow-ups (P = 0.096). Furthermore the score of caring behavior in the first and second follow-ups increased significantly (P-value < 0.001) in comparison with the pre-test. However there was no significant difference between the first and second follow-ups (P-value < 0.001).

The Linear Mixed Model was used to investigate the relationship between self-efficacy and caring behavior and the effect of intervention on their changes over time by adjusting the effect of family size, mother's age, mother's occupation, mother's education and number of chemotherapy sessions. The results showed that caring behavior was not related to the mothers' age, occupation and education. Increase of household size was inversely related to caring behavior. Self-efficacy and number of chemotherapy sessions were also directly related to caring behavior (Table 3). Also, based on the results of Linear Mixed Model, the effect of time was significant; therefore, it can be claimed that there was a significant change in caring behavior score in the first and second follow-ups in comparison with the baseline before intervention.

Table 3
Parameter estimate of Linear Mixed Model

Parameter	Estimate	Std. Error	P-value
Intercept	75.24	7.44	< 0.001
Time: Baseline ^a	-	-	< 0.001
Time: First follow-up	20.04	1.77	
Time: Second follow-up	20.99	1.79	
Self-efficacy	0.45	0.08	< 0.001
Family size: 2 persons ^a	-	-	0.017
Family size: 3 to 4 persons	-5.14	4.88	
Family size \geq 5 persons	-10.68	5.20	
Mother's age	0.20	0.12	0.114
Job: Housewife ^a	-	-	0.95
Job: Employed	-0.17	2.66	
Education : Illiterate ^a	-	-	0.25
Education : Under diploma	3.08	2.05	
Education : Diploma or university degree	1.22	2.65	
Chemo-therapy: under 10 sessions ^a	-	-	0.027
Chemo-therapy: 10 to 20 sessions	3.99	2.09	
Chemo-therapy: > 20 sessions	4.63	1.77	

Discussion

This study aimed to determine the effect of mothers' education and skills development according to TSE on their caring behavior for a child with cancer and its continuation in Bandar Abbas Pediatric Hospital as the only pediatric cancer center in the province. The present study enjoys innovations in the methodology and application of TSE to enhance the caregiving power of mothers' caring behavior for children with cancer in Iran.

The results indicated that there was a significant difference in the mean score of self-efficacy after the intervention because parents need to be more sensitive to their children's needs and emotions, of the fact pay full attention to their children. The ability of parents to provide adequate nutrition for their children, provide preventive and corrective health care, diagnose the signs and symptoms of illness in children,

develop habits to maintain cleanliness, and encourage children to get proper rest time and outdoor activities for their children. These are things that should be considered in children with cancer because of their special needs. This finding is in line with the results of some studies [15–18]. Also, studies aimed at investigating the effect of family-centered education on increasing parental awareness and self-efficacy in weight control and physical activity and caring for a child with asthma and epilepsy, showed that education can increase self-efficacy and improve home care effectively [19–22]. Self-efficacy is a principle that links knowledge and behavior. For this reason, a sense of self-efficacy enables individuals to do extraordinary work using skills to overcome obstacles. Performance requires both skill and belief in the ability to perform that skill. Self-efficacy is a pre-requisite to a behavior; so special attention should be paid to increasing self-efficacy [21]. In the present study, considering that the follow-up was done in two stages with the intervals of 3 and 6 months, the mean scores of self-efficacy in the first and second stage follow-up had no significant differences, which indicates the stability of self-efficacy [26]. Consistent with the results of a clinical trial conducted on the continuation of mothers' breastfeeding self-efficacy, our findings revealed that the mean scores of self-efficacy after educational intervention increased at two follow-up intervals [24]. In contrast, another study aiming to examine the impact of parental education on the self-efficacy of mothers of children with autism showed that mothers' education did not significantly increase their self-efficacy in the first and second follow-ups. The results further indicated that parental education and nurturing skills were not effective in enhancing parental self-efficacy [25]. This difference can be due to little attention to emotional problems of parents, marital problems, the lack of social support during the implementation of the program, and the compactness of the treatment and content sessions, as well as the questions that examine the general feeling of parental self-efficacy rather than measuring parental self-efficacy in managing child problems.

The difference between the mean scores of caring behavior before and after the intervention in the two stages shows the effect of educational intervention to improve mother' caring behavior, which is consistent with the results of other studies [29–31]. Another study on the effect of education of mothers of children with cancer undergoing chemotherapy on prevention of the gastrointestinal side effects of chemotherapy showed that educational intervention had a significant impact on reducing the effects of chemotherapy [6, 32]. An investigation on the effect of educational intervention on the home care behavior of parents having children with cancer undergoing chemotherapy, indicated that the intervention was effective in reducing the effects of chemotherapy [33]. In the present study, the parents received educations about caring behaviors on how to reduce the side effects of chemotherapy at home. The results showed that the educational intervention had an effect on parental caring behaviors, which included reducing the effects of chemotherapy. The second stage findings revealed, that parental caring behavior, in addition to being persistent, was also increased over time, probably due to the experiences they have gained and used during this period. In a study performed on the parents of children with diarrhea, vomiting and pneumonia, the effect of training on parents' performance and satisfaction showed that the training program had a significant effect on parental care Comparing to the control group [34]. Furthermore, in a study designed to empower parents in caring for a child with leukemia, the results indicated that the intervention could be effective in parental satisfaction (especially in the mother)

on how to care for a child with leukemia and decrease the side effects of chemotherapy [35]. The result of a study of caregivers of people undergoing bypass surgery showed that the intervention led to increased self-efficacy, improved care behavior, and thus, increased care for patients undergoing surgery [36].

The results showed that with increasing the duration of the study and even after the intervention at the time of follow-up, the mothers' caring behavior was still significantly related to self-efficacy. In other words, mothers are aware of their role in caring for their children and do consider this ability as intermittent. They are able to maintain the continuity of behavior by maintaining and promoting self-efficacy in promoting caring behavior. Bandura argued that people with high self-efficacy are more likely to face challenges that need to be controlled and threats that need to be avoided. Given this confidence, the ability to increase their ability to cope with a variety of challenges will be relatively easier. Thus, as a hypothesis, this sense of confidence for success in solving the challenge is associated with lower levels of negative emotional reactions both before and after intervention [37–39].

The Linear Mixed Model results showed that an increase in family size was inversely related with mothers' caring behavior. In fact, in families with smaller populations, the mothers caring behavior was better and the relationship became more meaningful. In other words, in larger families, the mother could not be more focused on caring for her child, and providing services. This would reduce the mother's caring behavior. In addition, she would not be able to benefit from various trainings to perform caring behavior and overcome obstacles [40, 41]. The number of chemotherapy sessions was also effective in performing caring behavior. However, there is the fact that caring behavior is very important in treatment and chemotherapy is done to reduce the invasion of cancer cells to other tissues. This will be achieved by completing the course of chemotherapy. The data analysis results also confirmed such a relationship. On the other hand, the high number of chemotherapy sessions can be attributed to the severity of the disease and that the mother would be able to accompany the child to perform chemotherapy with more ability due to understanding the severity of the disease [42, 43].

This study had some limitations, including a small sample size that may influence the attendance of all children with a single treatment center as well as the death of patients or discontinuation of treatment, and the difficulty of working with parents with special psychological conditions(including caring for a child with cancer, problems with parenting, and attending classes), as well as having too many questions and distributing questionnaires, and not having a control group to better evaluate intervention.

Conclusion

The results of this study indicated that the theory-based educational program for mothers improves their caring behavior and self-efficacy. As education is one of the main pillars of health care, it seems that authorities and practitioners should pay more attention to designing educational programs based on health care models and theories.

Declarations

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Conflicts of interest/Competing interests: No

Availability of data and material: N/A

Code availability: N/A

Authors' contributions: LH and MB originated and designed the study and coordinated the writing of the article. AGH contributed to the analysis of the data and to the drafting of the paper. MB, MAM, and LH contributed to the interpretation of the results and to the drafting of the paper. All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. All authors have seen and approved the final version.

Ethics approval: ["This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the [Bandar Abbas committee for Ethics in Biomedical Research].

Consent to participate: N/A

Consent for publication: N/A

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Figures

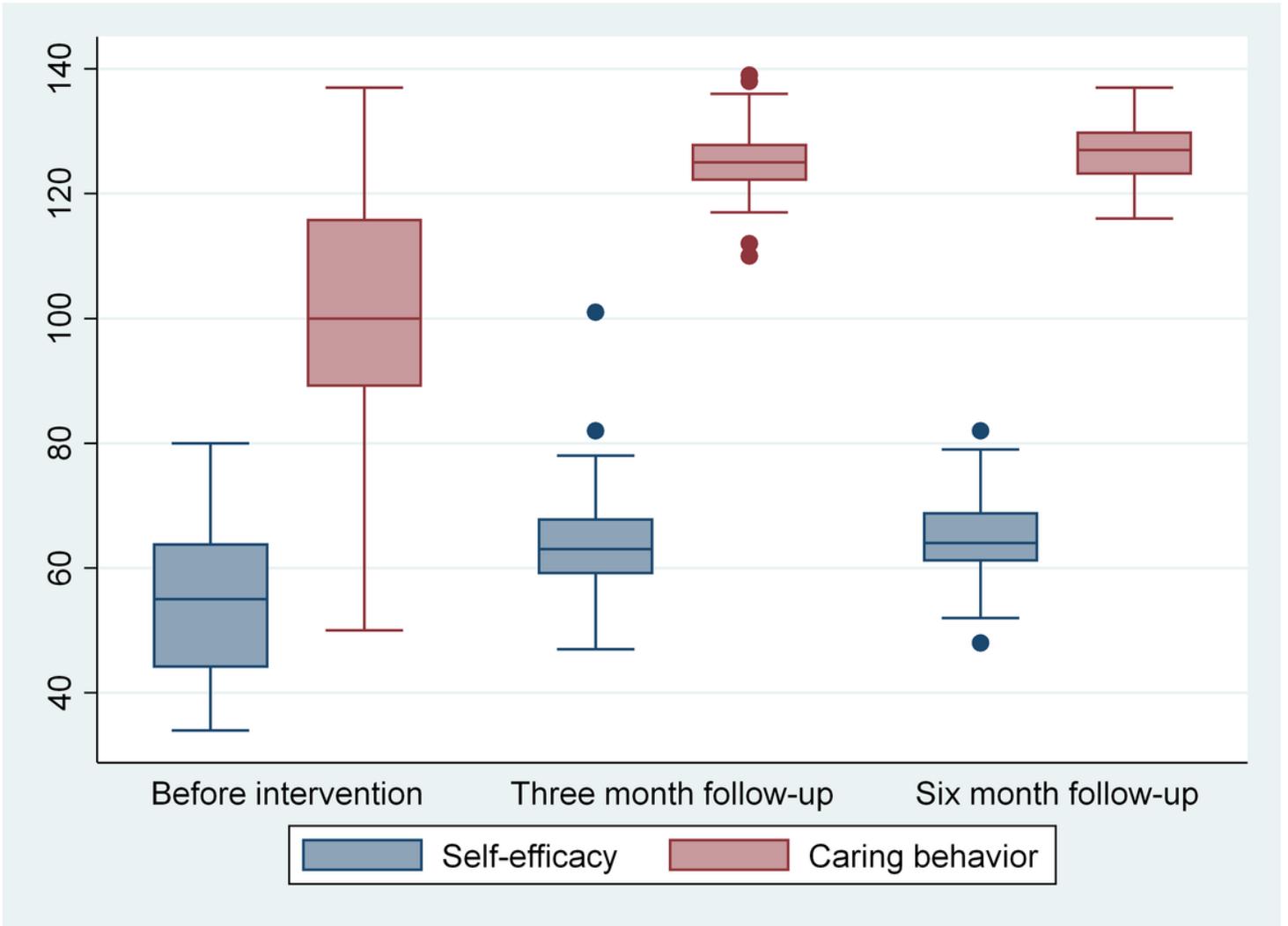


Figure 1

Boxplot and distribution of caring behavior and self-efficacy scores across the evaluation period.