



The Effect of Cognitive–Emotional Training on Post-traumatic Growth in Women with Breast Cancer in Middle East

Parvaneh Hamidian¹ · Nasrin Rezaee² · Mansour Shakiba³ · Ali Navidian^{4,5}

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Abstract

Overcoming distresses and negative consequences of serious crises such as cancers can lead to perception of positive changes in the patients. It is necessary to design and test the psychological interventions that can improve post-traumatic growth. The objective of this study was to determine the effect of cognitive–emotional training on post-traumatic growth in women with breast cancer referred to the department of chemotherapy. This is a quasi-experimental study and it was performed on 85 patients with breast cancer who referred to an educational hospital in southeastern of Iran in 2017. The eligible patients were selected through convenience method sampling among the patients and they randomly allocated into intervention and control groups. The intervention group received five sessions of emotional–cognitive training in two sessions per week. Each session lasted 60–90 min. The posttest data were collected by post-traumatic growth inventory (PTGI) 20 weeks after the end of the last intervention session. Collected data were analyzed by SPSS software version 21.00 using independent *t* test, paired *t* test, and Chi-square tests for demographic analysis. The results indicated that there is no significant difference in both groups in terms of individual variables such as age, marriage, duration of disease, and degree progression of cancer. Although the mean of PTG scores in posttest and the mean of variations in the PTG scores in the intervention group were 77.48 ± 11.18 and 25.81 ± 12.24 , respectively, and it was significantly higher than the control group, 53.95 ± 14.86 and 7.69 ± 9 , respectively (mean scores of PTG: $p < .0001$; mean changes of PTG: $p < .001$). According to the results of this study, cognitive–behavioral intervention had a positive and significant effect on post-traumatic growth in women with breast cancer. If intervention is found to be effective, cognitive and emotional strategies of such interventions could be integrated into daily clinical practice as a way to promote PTG in women who are being treated for breast cancer.

Keywords Breast cancer · Cognitive–emotional intervention · Post-traumatic growth

Introduction

More than half of the world's population have experienced a traumatic event during their lifetime (Kuester, Niemeyer, & Knaevelsrud, 2016). Cancer is among the various types of health conditions resulting in serious injuries or mortality

(Wiley, 2013). The traumatic potential of cancer has been considerable over the past decade (Cordova et al., 2007). Cancer, as a traumatic and stressful experience affecting various aspects of life, is on a growing trend (Horner et al., 2009; Jemal, Siegel, Xu, & Ward, 2010). More than half of the cancers and 60% of the deaths associated with breast

✉ Ali Navidian
alinavidian@gmail.com

Parvaneh Hamidian
p.hamidian@yahoo.com

Nasrin Rezaee
nasrin_rezaee2005@yahoo.com

Mansour Shakiba
Dr.mansoorshakiba2006@gmail.com

¹ Department of Nursing, Zahedan University of Medical Sciences, Zahedan, Iran

² Department of Nursing, Community Nursing Research Center, Zahedan University of Medical Sciences, Zahedan, Iran

³ Department of Psychiatry, Zahedan University of Medical Sciences, Zahedan, Iran

⁴ Pregnancy Health Research Center, Zahedan University of Medical Sciences, Zahedan, Iran

⁵ Department of Counseling, School of Nursing and Midwifery, Zahedan University of Medical Sciences, Mashahir Square, P. O. Box 98139-1379, Zahedan, Iran

cancer occur in the less developed countries (Ozmen et al., 2009).

Meanwhile, breast cancer is the most common type of cancer among women in both developing and developed countries. In 2012, about 1.67 million new cases of breast cancer were detected (Kabacaoglu, Oral, Balci, & Gunay, 2015). A cancer diagnosis is a major life stressor, which is accompanied by negative symptoms and consequences such as anxiety and depression, fear of cancer recurrence and its progression to other organs, fear of the future, fatigue, pain, physical limitations, and possible social isolation. Accordingly, this disease can negatively affect individuals' psychosocial condition and quality of life and result in the emergence of post-traumatic stress disorder (Banik & Gajdosova, 2014; Morris, Chambers, Campbell, Dwyer, & Dunn, 2012; Sumalla, Ochoa, & Blanco, 2009).

Psychosocial compatibility with cancer is a process, occurring as a result of encountering various changes caused by the disease and the given treatments over time. From this perspective, cancer can be considered both a major stressor and a facilitating factor for life changes which has both positive and negative outcomes (Morris, Shakespeare-Finch, & Scott, 2012). People show two opposing reactions after facing a traumatic experience. These reactions can be negative and positive, emerging in the form of post-traumatic stress symptoms and post-traumatic growth (PTG), respectively (Yonemoto, Kamibeppu, Ishii, Iwata, & Tatezaki, 2012).

An increasing interest in the positive effects of a bad incident is closely related to the positive psychology movement. According to Seligman, Steen, Park, and Peterson (2005), happiness depends to a certain extent on the ability to comprehend bad and unfortunate conditions as good ones and to feel a sense of well-being. The concept of PTG was first proposed by Tedeschi and Calhoun (1995) to refer to positive psychological changes caused by challenging conditions of life and traumatic events.

In PTG, growth does not really mean the end of pain and discomfort, a favorable perspective toward crisis, or the lack of trauma (Brooks, 2012). PTG is determined by not taking life for granted, having better interpersonal relationships, changing the priorities of life and personal strength, detecting possible new coping strategies, and promoting spiritual development (Crawford, Vallance, Holt, & Courneya, 2015). Based on the conceptual model of Tedeschi and Calhoun as the most comprehensive model, PTG is associated with changes in three areas of perception, knowledge, and skill which enable a person to recognize positive changes in his/her interpersonal relationships, self-perception, and philosophy of life (Brooks, 2012).

Some of the perceived internal changes include feeling of getting stronger, higher self-confidence, and feeling of greater as well as the ability to face future challenges

of life. Changes in interpersonal relationships include improved interaction and collaboration with others and increased expression of personal emotions. Furthermore, alterations in one's spirituality and philosophy of life entail changes in the values and priorities of life (Sumalla et al. 2009).

Over the past 20 years, there has been a significant interest in studying not only the negative effects of traumatic events, but also the positive changes occurring after dealing with trauma (Banik & Gajdosova, 2014). To date, PTG has been investigated after the incidence of cancers, spinal injuries, cerebral damage and strokes, cardiac events, thyroid diseases, multiple sclerosis, lupus, AIDS, and HIV (Gannon, 2014; Morrill, 2011). More than 83% of people surviving dangerous diseases, natural disasters, and accidents have reported at least one positive change in their life (Yonemoto et al., 2012).

Systematic reviews have demonstrated that post-traumatic stress disorder, as the most important psychopathology, leads to severe reactions, the treatment of which requires huge financial costs. Therefore, it is no surprise that this issue has been taken into consideration by many researchers (Ramos, Leal, & Tedeschi, 2016). In contrast, a limited number of interventional studies have been performed on the human capacities for maintaining personal growth and health after trauma.

PTG can be increased via proper interventions (Smith, Redd, DuHamel, Vickberg, & Ricketts, 1999). Thus, in a meta-analysis carried out by Roepke (2015), it was reported that group interventions could improve PTG. Crawford et al. (2015) investigated the effect of aerobic exercise on PTG, and Wagner, Knaevelsrud, and Maercker (2007) examined the impact of internet-based intervention on PTG in individuals with complicated grief.

However, to the best of our knowledge, no study has exclusively assessed the effect of short-term emotional interventions among females with breast cancer in developing countries such as Iran. In addition, previous studies have mostly emphasized the negative dimensions of cancer and have designed some interventions to alleviate negative outcomes, including depression, stress, anxiety, and reduced quality of life.

PTG has been recently considered in the majority of crises and incurable diseases. However, despite the remarkable advances in the studies on PTG, the fundamental processes in the perception of PTG have not been fully recognized yet. Although several effective factors have been detected, there is no experimental evidence to support them. Hence, this study was conducted to determine the effect of a multidimensional interventional program on PTG among female patients with breast cancer considering their high survival rate after breast cancer.

Methods

This quasi-experimental study, using a pretest–posttest design, was conducted with female patients having breast cancer who had been referred to the chemotherapy unit of a teaching hospital in the South East of Iran from June to August, 2017. The inclusion criteria were as follows: (1) minimum age of 20 years, (2) reading and writing literacy, (3) termination of the acute course of the disease after the initial diagnosis, (4) absence of metastasis, (5) lack of cognitive and psychiatric disorders, (6) no experience of crisis over the past few months (with the exception of breast cancer diagnosis), and (7) elapse of no more than 5 years from cancer diagnosis. On the other hand, the exclusion criteria included more than one absence from the educational program and worsening of patient's condition during the study.

The sample size was estimated at 45 individuals per group ($n = 90$ in total) according to the following equation and by considering the mean and standard deviation reported by Knaevelsrud, Liedl, and Maercker (2010). This size was determined at a confidence level of 0.095% and a test power of 0.90%, given the sample dropout. The eligible patients were selected through convenience sampling and then randomly allocated to either the intervention or control groups. During the study, two and three subjects in the intervention and control groups were eliminated, respectively, due to the severity of the disease, hospitalization, change of residence, and lack of cooperation with the researcher.

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2(S_1^2 + S_2^2)}{(\bar{X}_1 - \bar{X}_2)^2} = 39.59$$

$$Z_{1-\frac{\alpha}{2}} = 1.96 S_1 = 4.5 \bar{X}_1 = 18.8$$

$$Z_{1-\beta} = 1.27 S_2 = 5.1 \bar{X}_2 = 15.3$$

The data were collected using a demographic form and the PTG Inventory (PTGI). The demographic form covered data such as age, ethnicity, marital status, education, residence, duration of cancer diagnosis, degree of cancer progression, and family history of breast cancer. PTGI is a self-assessment tool containing 21 items, rated on a six-point Likert scale (0 = experienced no changes to 5 = experienced a significant change).

The score range of this inventory is 0–105, where the lower scores are indicative of a low level of PTG in the individuals. The main form of this instrument encompasses five subscales, including relationship with others, new facilities, personal strength, mental changes, and value of life. In a study conducted by Tedeschi and Calhoun (2004), the

validity and reliability of this inventory were confirmed, reporting Cronbach's alpha coefficient range of 0.67–0.85 for the subscales. In addition, they demonstrated that individuals with psychological trauma obtained higher scores, compared to normal people. The divergent and convergent validities of the instrument were evaluated and confirmed by Heydarzadeh et al. (2017) in Iran. Furthermore, in the current study, the reliability of the inventory was calculated at Cronbach's alpha coefficient of 0.88.

Having obtained the approval of the Research and Technology Deputy of the Zahedan University of Medical Sciences, the researcher presented at the teaching hospital. At first, eligible individuals were selected (through convenience sampling) out of female patients with breast cancer who had been admitted to the chemotherapy unit of the target hospital. Afterwards, the selected subjects were randomly assigned into either the intervention group or the control group.

To this end, some enclosed envelopes containing research groups (i.e., A for intervention and B for control) were provided for all participants. The envelopes were randomly organized. After the eligible individuals were specified, the envelopes, which determined the group of each subject, were given to the participants in order. Subsequently, using a questionnaire, the researcher performed a pretest for all participants.

In case the patient belonged to the control group, the necessary coordination was carried out. In this regard, the address and telephone number of the patient were acquired. It is noteworthy that the subjects of the control group received no education or care other than the routine hospital care during the research. Alternatively, if the patient was allocated to the intervention group, the coordination was made regarding the time and location of educational sessions in a health clinic. The location of training sessions was dependent on the patient's residence (i.e., in the healthcare center, nursing and midwifery school, or hospital near the patient's house).

The intervention group received five cognitive–emotional training sessions held 2 days a week based on predetermined contents presented in Table 1. The intervention was carried out in groups consisting of 4–8 subjects depending on variables such as patient's residence and desired time. The intervention was performed two sessions a week, and each session took 60–90 min. Posttest data were collected 20 weeks after the final training session based on the previous schedule in the chemotherapy unit or patient's house.

The contents of the applied intervention were planned and provided by studying books and articles related to the subject of interest and by focusing on the psychotherapy program proposed by Ramos et al. (2016). Subsequently, in order to increase the applicability aspect, the contents were presented to five academic experts in the areas of clinical

Table 1 Structure and educational contents of the cognitive–emotional training sessions

Session	Educational contents
1st	Introduction, expression of rules of the group, review of the disease, psychosocial outcomes and treatment course of the disease, normalization of emotional reactions in cancers
2nd	Training and practicing emotion disclosure and abreaction techniques, self-regulation of excitement
3rd	Fears and concerns related to breast cancer, facilitation, and practice of cognitive processing and conscious rumination
4th	A review of achievements and positive dimensions as well as losses and negative dimensions of cancer diagnosis, development of values and new prioritization of values, redefining the goals, and creating a new philosophy for life
5th	Spirituality, education of patience and positive thinking, conclusion

psychology, health psychology, counseling, nursing, and oncology.

After expert's opinions were collected, the educational contents were evaluated and finalized by a research team. The intervention was presented by a graduate with Master of Mental Nursing and clinical work experience in the area of mental nursing and health under the supervision of a specialized counseling doctor with many years of working experience in the domain of psychological counseling.

Data Analysis

Data analysis was performed in SPSS version 21. The frequency, percentage, mean, standard deviation, as well as minimum and maximum of data were determined using descriptive statistics. In addition, the two groups were compared through independent *t* tests. The intragroup comparison between the pre- and post-intervention stages was accomplished by using paired *t* test. Also, the obtained *p* value equal to .05 was considered statistically significant.

Ethical Considerations

This research was approved by the Deputy of Research and Technology of Zahedan University of Medical Sciences, Zahedan, Iran, with the code of IR.ZAUMS.REC.1396.21. In line with ethical considerations, participants were informed about the objectives of the study. Furthermore, they were given the right to choose the time and place of training. In addition, a written informed consent was obtained from all subjects, and they were ensured about both the probability of study withdrawal at any time and confidentiality terms of personal information.

Results

According to the results, the mean ages of participants in the intervention and control groups were 43.90 ± 8.43 and 40.30 ± 10.82 years, respectively (Table 2). Moreover, the mean durations of cancer diagnosis were, respectively,

2.34 ± 1.08 and 2.50 ± 1.21 years in the intervention and control groups. In terms of marital status, 81.4 and 73.8% of the subjects in the intervention and control groups were married, respectively.

As for the level of education, 58.1% of subjects in the intervention group had education below high school diploma, and 45.2% of the control group had high school diploma. Furthermore, majority of patients in the intervention and control groups (81.4 and 57.1%, respectively) were unemployed. Moreover, only 7 and 14.3% of women in the intervention and control groups, respectively, had a history of cancer in their families.

In terms of cancer grade, 46.5% of subjects in the intervention group had grade two cancer, and the same percentage of individuals in this group had grade three cancer. In the control group, 42.9 and 35.7% of participants had grades two and three cancer, respectively. Although the study groups were significantly different in terms of such demographic variables as occupation and level of education, no significant difference was observed between the two groups regarding the possible variables affecting PTG, including age, duration of cancer diagnosis, and family history of cancer ($p > .05$).

The results also demonstrated that in the intervention group, the mean score of PTG increased from 51.67 ± 18.19 before cognitive–emotional training to 77.48 ± 11.18 after this intervention (Table 3). Additionally, this score increased from 46.26 ± 19.53 to 53.95 ± 14.86 in the control group after the intervention. Furthermore, the mean changes of PTG were 25.81 ± 12.24 and 7.69 ± 9.39 in the intervention and control groups, respectively. The independent *t*-test revealed a significant difference between the two groups in terms of the mean PTG score after cognitive–emotional training ($p < .001$). Besides, the mean changes of PTG were significantly different in the two study groups ($p < .001$).

Discussion

As the findings of the present study indicated, cognitive–emotional training led to the enhancement of PTG in patients with breast cancer undergoing chemotherapy. This

Table 2 Demographic characteristics of the intervention and control groups

Variable	Intervention <i>N</i> (%)	Control <i>N</i> (%)	Test results
Marital			
Single	8 (18.6)	11 (26.2)	<i>p</i> = .9
Married	35 (81.4)	31 (73.8)	
Total	43 (100)	42 (100)	
Occupation			
Employed	8 (18.6)	18 (42.9)	<i>p</i> = .01
Housewife	35 (81.4)	24 (57.1)	
Total	43 (100)	42 (100)	
Family History of cancer			
Yes	3 (7)	6 (14.3)	<i>p</i> = .31
No	40 (93)	36 (85.7)	
Total	43 (100)	42 (100)	
Cancer grade			
I	3 (7)	9 (21.4)	<i>p</i> = .14
II	20 (46.5)	18 (42.9)	
III	20 (46.5)	15 (35.7)	
Total	43 (100)	42 (100)	
Education			
Lower than diploma	25 (58.1)	11 (26.2)	<i>p</i> = .002
Diploma	16 (37.2)	19 (45.2)	
Higher than diploma	2 (4.7)	12 (28.6)	
Total	43 (100)	42 (100)	
	Mean ± SD	Mean ± SD	
Age	43.90 ± 8.43	40.30 ± 10.82	<i>p</i> = .09
Duration of cancer	2.34 ± 1.08	2.50 ± 1.21	<i>p</i> = .54

Table 3 Post-traumatic growth scores in the intervention and control groups before and after the cognitive–emotional training

Variable	Before Mean ± SD	After Mean ± SD	Changes Mean ± SD	Paired <i>t</i> test (before– after)
Intervention	51.67 ± 18.19	77.48 ± 11.18	25.81 ± 12.24	0.0001
Control	46.24 ± 6.97	53.95 ± 14.86	7.69 ± 9.39	0.01
Independent <i>t</i> test	0.19	0.0001	0.0001	

research was one of the few studies (especially in Iran) which evaluated the effect of a designed short-term five-session emotional–cognitive intervention on PTG among women with breast cancer.

Group interventions improve cognitive and emotional compatibility of patients having breast cancer. This is due to the fact that group interventions, similar to the present one, provide an opportunity for group discussion, expression of personal experiences, presentation of models, review of cognitive schemes, and cognitive reconstruction of core beliefs—these being the predictive indicators of PTG. There are many studies, such as a meta-analysis carried out by

Roepke (2015), indicating the effect of participation in group interventions on the enhancement of PTG. Other studies reporting this result are those conducted by Crawford et al. (2015), Dolbier and Jaggars (2010), Garlan, Butler, Rosenbaum, Siegel, and Spiegel (2011), Pat Horenczyk et al. (2015), Ramos et al. (2016), and Tedeschi and McNally (2011) that, respectively, investigated war victims, breast cancer, non-metastatic breast cancer, students, female genital cancer, as well as cancer patients and their families.

The study by Ramos et al. (2016), entitled “Protocol for the psychotherapeutic group intervention for facilitating post-traumatic growth in non-metastatic breast cancer

patients” which was conducted on 205 patients, might be the closest study confirming the findings of the present research. The aforementioned studies have a remarkable similarity with the present study in terms of educational contents. However, they are different regarding emotional dimensions, especially highlighted in the current study, and the number of treatment sessions, which were fewer and shorter in this study. Moreover, in the study of Ramos, the posttest was held 6 months after the intervention, and the sample size was larger.

Lo et al. (2015) designed and implemented a semi-structured psychotherapy intervention among a group of patients with advanced cancers. In line with the present findings, their results revealed that the intervention led to the reduction of distress and improvement of psychosocial welfare as well as PTG in patients with advanced cancer and even in their primary care providers. The intervention applied in that study involved four dimensions: (1) management of symptoms and relationship with service providers, (2) changes in one’s self and relationship with companions, (3) a sense of meaningfulness and having a goal in life, and (4) concerns related to future and death. In contrast to the intervention used in the current study, Lo et al. paid less attention to cognitive and emotional dimensions. However, they used 3–6 sessions of individual psychotherapy implemented within 3–6 months.

Knaevelsrud et al. (2010) evaluated the effect of internet-based cognitive–emotional training on PTG, openness, and optimism. They reported significant changes in PTG among the intervention group. Accordingly, they concluded that psychotherapies could stimulate and facilitate PTG. Although their intervention was conducted on non-cancer patients in an online manner (not face to face), their results can confirm the findings of the present research due to the fact that a part of the applied intervention in the current study was psychotherapeutic.

Activation of deep cognitive processing and encouragement of conscious mental rumination were among the treatment components of the designed intervention in the present study. These factors may explain the effectiveness of the intervention and its positive impact on the facilitation of PTG. It is noteworthy that whereas Intrusive and unwanted mental rumination is associated with negative, malicious, and distressing thoughts. Conscious mental rumination includes thoughts that re-evaluate the incident logically and purposively and involves a person’s intentional endeavor to understand the incident and allocate a meaning to it. This act increases the awareness about the restoration of the positive aspects of the experience and the formation of PTG (Calhoun, Cann, Tedeschi, & McMillan, 2000; Cann et al., 2011).

Another component of the present intervention was emotional disclosure, which can improve PTG. This is mainly

owing to the fact that severe stress caused by cancer diagnosis might drive patients to seeking social support, which can result in distress disclosure. Janoff-Bulman (2004) presents the concept of assumptive world to describe a set of basic beliefs that help the individuals to perceive the world, the others, and the future. A major stressful event may shatter that framework for understanding the world, therefore leading to a cognitive restructuring of core beliefs. Emotional disclosure of stresses associated with a disease triggers both the restoration of the assumptive world, now shattered by cancer diagnosis, and cognitive reevaluation in a social relationship. Moreover, it facilitates and accelerates conscious mental rumination about the experience of breast cancer. The provision of this treatment condition is an important factor in the formation of PTG, especially in women with breast cancer (Danhauer et al., 2013; Ramos & Leal, 2013; Taku, Tedeschi, Cann, & Calhoun, 2009).

Cognitive, emotional, and behavioral treatments help cancer patients to adapt to their disease and deal with its negative dimensions. In this regard, Moghadam, Makvandi, & Pakseresht (2014) suggested that behavioral cognitive therapy exerted positive effects on the coping strategies of these patients and reduced using avoidance and emotion-focused coping strategies; conversely, it increased employment of cognitive–behavioral problem-focused coping strategies. Problem-focused coping strategy helps treat cancer patients through making them challenge automatic thoughts. Accordingly, this strategy equips patients with a greater effective compatibility. Moreover, cognitive processing promotes the possibility of semantic and conceptual processing and coding of the situation. The focus of these mechanisms will be on, first, the correction and renovation of the distorted cognitions of the situations which are reminiscent of the traumatic event and, second, facilitation of encountering the event causing post-traumatic stress disorder (Aghayousefi, Amirpour, Alipour, & Zare, 2014). Moreover, emotional regulation training includes practices that help increase artfulness, appreciation of positive emotions, and conscious engagement in enjoyable activities. These practices can have a share in the enhancement of positive emotions and PTG (Soltani, RobatMili, & Mohammadi, 2016).

The positive and significant effect of the designed intervention in this study might be partly due to the use of a posttest performed in a shorter course (i.e., 20 weeks), compared to those in similar studies. Roepke (2015) believed that the conventional interventions can slightly increase PTG, and that only interventions with short-term posttest reveal greater impacts.

Furthermore, the results of the present study indicated that the mean PTG significantly increased in the control group after 16 weeks of intervention. To explain this result, it could be expressed that as time passes from the initiation and diagnosis of the disease and its associated

challenges and symptoms appear, PTG gradually increases to some extent. In this regard, Luszczynska et al. (2012) investigated the effect of death recollection on PTG in patients with life-threatening diseases. Their results demonstrated that this act decreased PTG among patients who were recently diagnosed with cancer. Yet this growth was ameliorated with the passage of time, and the disease began to improve and performances as well as beliefs changed subsequently.

The limitations of the current study included a short 20-week interval between the pretest and posttest, small sample size, and significant difference between the study groups in terms of demographic variables (e.g., education and occupation), which must be considered in future studies. The meaning of cancer and its impact on life varies across cultures and regions. Different cultural settings affect the psychological distress of women with breast cancer; and screening for psychological distress of the sample is not available in this study. Therefore, generalization of results to other communities should cautiously be made. This is another limitation of the current study that readers may pay careful attention to.

In conclusion, as the findings of the present study indicated, the cognitive–emotional training intervention designed to enhance PTG among women with breast cancer yielded significant results. Therefore, this intervention can be combined with care programs of hospitals and daily clinical works as a complementary program. The adoption of such interventions is an interdisciplinary task, because nursing, counseling, and psychology approaches are integrated in this intervention.

Given its greater focus on cognitive, behavioral, and emotional dimensions of cancer, the results of this study might be used to facilitate PTG process. Moreover, they could be helpful in improving psychosocial compatibility with the disease, enhancing quality of life of patients and their caretakers, increasing the possibility of adherence to treatment recommendations, as well as reducing doctor visit and re-hospitalization.

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Compliance with Ethical Standards

Conflict of interest The authors Parvaneh Hamidian, Nasrin Rezaee, Mansour Shakiba, and Ali Navidian declare that they have no conflicts of interest.

Human and Animal Rights and Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, and its later amendments or comparable ethical standards. Regarding informed consent, both verbal and written informed consent were obtained from all participants being included in the study.

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