



# The effect of informational-emotional support program on illness perceptions and emotional coping of cancer patients undergoing chemotherapy

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## Abstract

**Purpose** The present study aims to assess the effect of a nurse-led informational-emotional support program on illness perceptions and emotional coping of cancer patients undergoing chemotherapy.

**Methods** We used a quasi-experimental design, pre- and post-test. A total of 80 cancer patients undergoing chemotherapy were selected by convenience sampling method and assigned to experimental ( $n = 40$ ) and control groups ( $n = 40$ ). The nurse-led informational-emotional support program included five face-to-face sessions, educational booklet, and five phone follow-ups, and was conducted for the experimental group over 10 weeks. The control group received routine cares. The outcomes were assessed at baseline and end of intervention and included illness perceptions, which were assessed using the Illness Perception Questionnaire-Revised (IPQ-R), and emotional coping as the secondary outcome using the Coping Through Emotional Approach Scale. Data were analyzed in SPSS using multivariate analysis of covariance (MANCOVA) models,  $t$  test, paired  $t$  test, and chi-square.

**Results** Between group analysis showed that the mean scores of global illness perceptions and subscales including timeline, consequences, controllability, and coherence significantly increased in the experimental group compared to the control ( $P < 0.001$ ), but no significant change was observed in two groups in the subscale of emotional representation ( $P < 0.571$ ) and in the secondary outcome including emotional coping ( $P < 0.08$ ).

**Conclusions** A 10-week nurse-led informational-emotional support program can lead to changed illness perceptions without changing emotional coping. The effect of this support program should be studied on the coping and illness perceptions over the trajectory of cancer, especially in end stages in the future.

**Keywords** Cancer · Emotions · Emotion-focused coping · Illness perceptions · Information · Supportive care

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## Introduction

Cancer patients widely suffer from several systematic side effects of chemotherapy, and as a result, their self-efficacy for fighting the disease, quality of life (QoL), and their function as well as their families' social life is disrupted [1].

Given recent advances in cancer diagnosis and management and increased number of cancer survivors [2], as well as frequent hospitalizations [1] and long-term psychological, social, and physical complications caused by chemotherapy [3], cancer patients are in need of support and information. However, such patient needs are not satisfied [2, 4].

Unmet informational and emotional needs of cancer patients are associated with inadequate perception of their illness and status [5]. According to the Common-Sense Model of Self-Regulation by Leventhal et al., people attach meaning to a health threat based on previous experience and information by developing their own cognitive representations about the illness and its treatment [6]. Receiving more disease-specific information is associated with a better understanding of the illness and more personal and treatment control [7]. Also, in cancer patients, negative illness perceptions are associated with cancer-specific stress, depressive symptoms, fatigue interference [8], and mortality rate [9].

Moreover, chemotherapy is one of the most stressful aspects of a patient's life [3]. In response to emotional distress, patients use problem-focused and emotion-focused coping mechanisms [10]. Emotion-focused coping aims at regulating the emotions linked to the stressful situation [11], and compared to anxiety and depression, it is a better predictor for determining the severity of illness [12]. Evidence shows that most cancer patients use maladaptive emotional coping strategies to manage side effects; therefore, they may experience further mood disturbance [13].

The way people perceive their illness affects their coping style, such that more passive coping styles are seen in patients who perceive their illness long-lasting, more emotionally burdening, and with more negative outcomes [6]. Hence, it is necessary to improve cancer patients' perceptions of illness to improve positive emotional coping [6, 9, 13].

In cancer patients, informational and emotional support for improved illness perceptions [14] has been highlighted as a prerequisite for handling the life situation and coping with a disease [4]. Thus, supportive interventions are recommended [13, 14].

Several studies have been conducted on the effect of supportive care program for cancer patients on outcomes such as satisfaction with information [4], mood disorders [14, 15], distress symptoms, social support, unmet supportive care needs [16], depression, QoL, uncertainty [14], and marital satisfaction [17]. Researchers from Australia, the Netherlands, USA, Turkey, China, and Sweden have reported mixed results regarding the effectiveness of educative-

supportive interventions, especially on the QoL and management of cancer symptoms [1, 18].

Many problems have been cited with regard to supportive interventions and studies in cancer patients, including low power, heterogeneous interventions, and outcome measures [19]. Moreover, in developing countries, cancer patients' supportive programs are defective [1]. Most cancer patients in Iran do not receive cares for their spiritual, social, and psychological needs, and screening is not carried out [20], while they have unmet supportive care needs, especially regarding information, understanding their status, and adaptation to illness/treatment [4, 5, 14]. Educational strategies in supportive care should be culturally sensitive and appropriate and tailored to a patient's specific setting [21].

Review suggests that an effective design of supportive interventions should be theory-based incorporating three components of information provision, behavior therapy, and emotional support [14, 16]. Given the lesser focus of studies on improving illness perception and emotional coping [13, 16], the present study was conducted to determine the effect of an informational-emotional supportive intervention program on illness perceptions and emotional coping in cancer patients undergoing chemotherapy in Iran.

## Methods

### Study design

A two-group, non-randomized, quasi-experimental, and pretest–post-test design was used.

### Sample and setting

Patients who had come to the outpatient oncology clinic of a teaching hospital affiliated to Lorestan University of Medical Sciences in the city of Khorramabad (west of Iran) to make an appointment to visit the oncologist and start their chemotherapy were recruited for participation in the study by the principal researcher after they were briefed about the study objectives. Participants were assigned to the experimental or control group on a 10-week block basis, by convenience sampling method, and the study began with the control group first. Since only one setting was used in the study, information contamination among participants in the two groups was avoided through time-based blocks [22].

Random allocation of patients into two groups or block randomization was not possible because it could have caused a contamination bias among participants. To reduce the clinician learnt bias, the control group was first recruited, and therefore, the first 10 weeks was assigned to the control group, and their data were collected from early February to mid-June 2017. Then, the experimental group patients were recruited for

10 weeks, and their data were collected from mid-August to late December 2017. An 8-week gap was maintained between recruitment of the two groups.

Around 100 new patients attend the study setting for chemotherapy every month. Twenty-five registered nurses work in this clinic. No clinical structured or personal educational-psychological intervention is provided for patients in the study setting, and should the oncology clinic nurse identify the need for psychological support in patients, they will be referred to a social worker or an out-of-clinic counselor. The study inclusion criteria were as follow: being over 18 years old, having a type of cancer of any stage (stages 1 to 4), histopathological diagnosis of cancer, awareness of the diagnosis of cancer, undergoing chemotherapy in the study setting, undergoing chemotherapy as the first line of treatment or neoadjuvant, being scheduled to receive chemotherapy for at least ten consecutive weeks, scheduled for at least five sessions of chemotherapy (biweekly), being able to attend at least four sessions of individual face-to-face supportive programs, no history of psychiatric illness, ability to read and write in Persian, ability to receive telephone follow-up interviews, and life expectancy of more than 1 year.

The exclusion criteria were as follows: stressful events during the study (death of relatives, divorce), unwillingness to take part, oncology emergencies such as tumor lysis syndrome during the study, toxicity during chemotherapy requiring urgent medical intervention, severe communication problems including speech and hearing problems, and participation in other rehabilitation programs or educational-psychological interventions during the study.

A total of 164 eligible patients were consecutively invited, of whom, 74 patients were excluded for various reasons (Fig. 1). The remaining 90 patients were selected over 11 months and included in the study, of whom, 10 patients were excluded for hospitalization or failure to follow the support program (control group = 5 and experimental/support group = 5) (Fig. 1). Power analysis confirmed the adequacy of sample size and indicated that 38 participants were needed in each group for a power level of 0.80. Furthermore, a significant alpha level of 0.05 is also needed when the standard deviation is 2.50 units and the difference between the group mean is 1.60 units (on the timeline: acute/chronic subscale). Based on an anticipated 20% dropout rate, and to ensure the adequacy of the final sample size, 45 patients were selected per group, but in the end, 40 participants completed the data collection process in each group in both phases. The control group received routine cares, and the experimental group received nurse-led informational-emotional support program. Data were collected using a structured questionnaire twice: in the first cycle of chemotherapy (pre-test) and a week after the fifth cycle of chemotherapy (post-test).

## Intervention

The intervention program offered informational and emotional support in ten sessions: five individual face-to-face informational and emotional support sessions and five telephone follow-up sessions. The ten sessions were supplemented by an educational booklet.

In the first session, the patient was thoroughly assessed through an interactive interview to provide a patient-centered support, and the next sessions were conducted according to this assessment. The support program contents, activities carried out in five face-to-face sessions and five telephone follow-ups, and the order in which they were provided are presented with further details in Table 1.

### The informational component

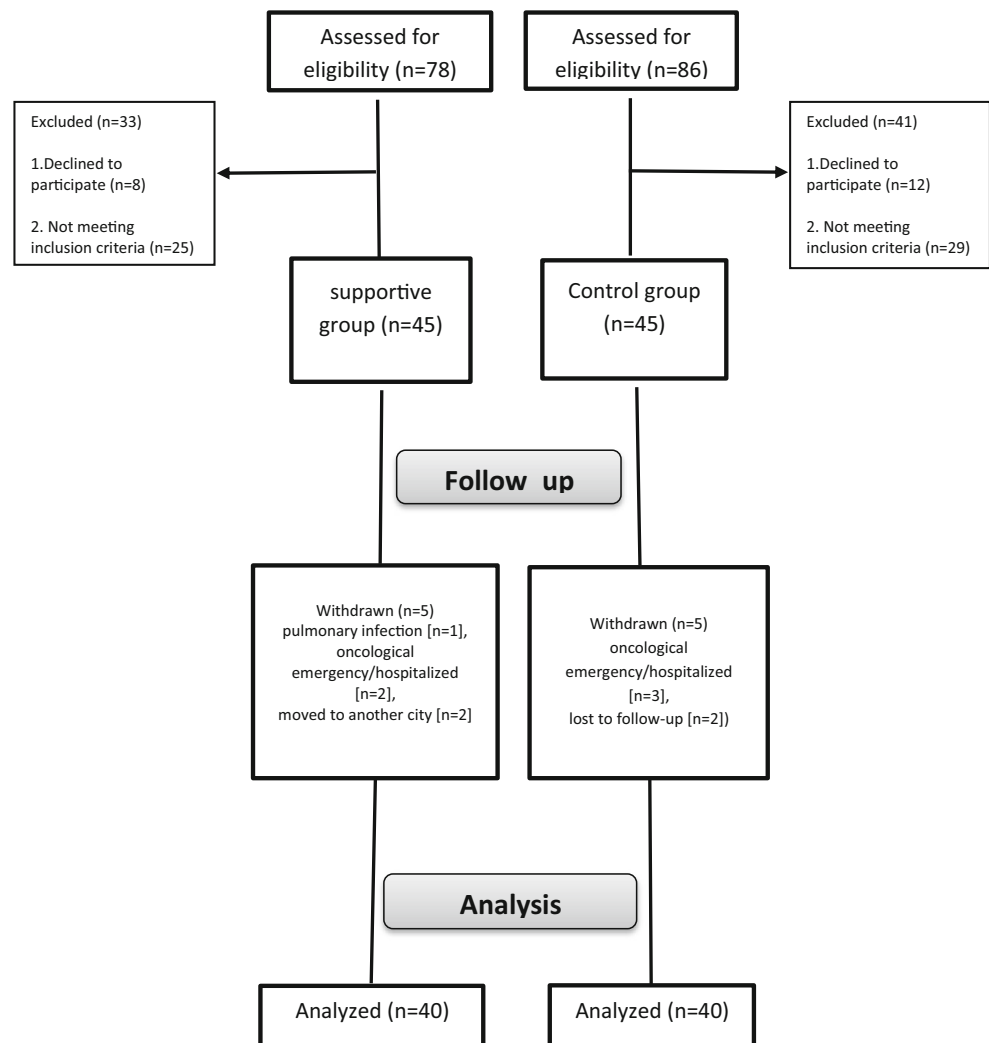
An information support program was designed to strengthen illness perception and patients' cognitive schema of the disease and its management, which included lecture and discussion about illness perception (including identity, timeline, consequences, emotional representation, personal control, and treatment control), risk factors, treatments, check-up and follow-up, sexual attractiveness, sexual function information, self-care education (including nutrition and food regimen, physical activity, sleep), management of side effects and symptoms (pain, nausea, vomiting, fatigue, numbness of the body, problems with appearance changes, gastrointestinal symptoms, hot flashes, anemia, oral mucositis, etc.), and health system information and communication with specialists.

### Emotional component

An emotional support program was designed to provide empathy and create a stress-free time and space to clarify uncertainties, express their thoughts and feelings, achieve emotional coping or modification, and receive referral services through interaction with health workers. This component also provided information about seeking help from social support resources, counseling, advice on coping with stress (methods of expressing emotions, management of emotions and stress, how to inform children about their illness, and what the family and friends can do), and emotional support about feelings and concerns of patients and their families. The authors also invited family members to take part in face-to-face sessions. Participants and family members were encouraged to express their feelings and ask questions during these sessions.

The face-to-face sessions lasted 45–60 min. The average telephone follow-up lasted 7–10 min, depending on the patient's preferences and willingness. Nurse's telephone follow-ups mainly aimed at finding out possibly new needs in each stage and to help patients in their management. The

**Fig. 1** Flow chart of participant enrollment, allocation, and data analysis



experimental group patients and their families were able to ask questions at any time by phoning the nurse. A total of 20 phone calls were made to the nurse by patients and families during the intervention, and their questions were mainly about better understanding and management of side effects, nutrition, management of negative emotions, and sensitive issues in marital relationships.

### Educational booklet

The educational booklet was prepared based on the review of literature [6, 13, 16, 23, 24] and included the meaning of cancer, duration of illness (acute/chronic), causes and risk factors, consequences of cancer, prognosis, recurrence or metastasis, diagnostic methods and treatment of cancer, treatment protocols, management of treatment side effects, survival rate, palliative care, self-care methods, nutrition and diet (probiotics, antioxidants, etc.), Iranian traditional medicine for cancer, cancer and stigma, spiritual care, intimacy with spouse or partner, emotional adaptation, tension and

depression management (music, relaxation, etc.), the role of positive emotions such as humor, social support sources and health system information, and communication with health workers. Patients received this booklet that was designed to strengthen patients' cognitive schema and summarized the information from the intervention face-to-face sessions. Also, patients were reminded to complete face-to-face sessions and read booklet content at home.

The contents and textual clarity of the cancer booklet were assessed. Its content validity was assessed by eight experts in cancer care including two oncologists, three Ph.D. nurses, one registered nurse, one health psychologist, and one nutritionist. The content validity index was measured using a 4-point Likert scale. A CVI > 82% was used as the basis for retaining contents and revising text.

All telephone follow-ups and face-to-face sessions were carried out by the registered nurse as a research assistant with 6 years' experience in clinical oncology and 2 years' teaching experience. This nurse had participated in workshops on empowerment to assess support needs of cancer patients and

**Table 1** Schedule and details of the informational-emotional support program

Session and format	Content/activity
First session: face-to-face	<ol style="list-style-type: none"> <li>1. Comprehensive assessment: anxiety, distress symptoms, coping style, social support, and supportive care needs</li> <li>2. The usual initial reactions to diagnosis and treatment, talking about diagnosis and treatment, and how to tell the family and relatives</li> <li>3. Management of chemotherapy side effects</li> <li>4. Providing an educational booklet</li> </ol>
First telephone follow-up: a week before the second cycle of chemotherapy	Review of the first session: to find potential new needs, especially about management of side effects and acceptance of the disease, and provide emotional support and correct information
Second session: face-to-face	<ol style="list-style-type: none"> <li>1. Explaining illness perception and dimensions, removing misconceptions, and risk factors</li> <li>2. Social support sources, how to seek help from the family and relatives</li> <li>3. Expressing various feelings and concerns, and eliminating tensions and negative feelings (through rhythmic breathing, yoga, etc.)</li> <li>4. Discuss problem- and emotion-focused coping skills</li> </ol>
Second telephone follow-up: a week before the third cycle of chemotherapy	Review of the second session: to find potential new needs, especially about illness perception and coping skills, and provide emotional support and correct information
Third session: face-to-face	<ol style="list-style-type: none"> <li>1. Self-care and lifestyle (nutrition and physical activity)</li> <li>2. Acceptance and coming to terms with life changes (changing the place of residence and workplace)</li> </ol>
Third telephone follow-up: a week before the fourth cycle of chemotherapy	Review of the third session: to find potential new needs, especially about self-care and social role, and provide emotional support and correct information
Fourth session: face-to-face	<ol style="list-style-type: none"> <li>1. Discuss marital life, sexual function, and practical solutions to sexual problems, and encourage the expression of feelings about sexual life</li> <li>2. Acceptance and coming to terms with changes in the family</li> <li>3. Discuss communication skills</li> </ol>
Fourth telephone follow-up: a week before the fifth cycle of chemotherapy	Review of the fourth session: to find potential new needs, especially about the family role, and provide emotional support and correct information
Fifth session: face-to-face	<ol style="list-style-type: none"> <li>1. Other treatment methods and advances in cancer treatment</li> <li>2. Contemplation and planning for the future</li> </ol>
Fifth telephone follow-up: a week after the fifth cycle of chemotherapy	Review of the fifth session: to find potential new needs, especially about future plans, and provide emotional support and correct information

interview and counseling skills. An oncologist accompanied the nurse only in the first session to teach upcoming treatment protocol in supportive intervention. The outcome measures were assessed by another well-trained research assistant who had no knowledge of experimental and control groups.

This supportive program was consistent with Iranian culture, and based on the review of literature, it was found that patients preferred information about nutrition, family life, and the health system first, then treatment effectiveness, changes relating to a happy lifestyle, keeping spirits up, and emotional care [24, 25].

To maintain the study's fidelity, some strategies such as monitoring and ongoing quality assurance of supportive program and reinforcing the patients' adherence to the supportive program were used. Each session of face-to-face supportive program was audio recorded by intervention nurse (MPF). Subsequently the content of this audio file was checked and reviewed by a health psychologist and the corresponding researcher (MG). Finally, the necessary feedback about the duration and content of face-to-face sessions was discussed with the intervention nurse. Moreover, the patients' questions were answered by

intervention nurse within 24 h to enhance the adherence to the supportive program.

### Routine care in the control group

Clinical routine care includes clinical visits by oncologist during every chemotherapy session, providing an educational pamphlet about management of common side effects at patient's request, and the possibility of patient's phoning the outpatient clinic nurse when required. The educational booklet was mailed to the control group patients 3 months after the intervention.

### Data collection

Data collection tools consisted of three parts: demographic and clinical characteristics, emotional coping, and illness perception questionnaires. The patients' demographic details included eight questions (age, gender, marital status, employment status, education, type of cancer, stage of cancer, and treatment modality), which were collected from patients' medical records.

Emotion-focused coping was measured using the Brief Cope Scale designed by Carver [26]. Problem-focused, emotion-focused, and dysfunctional coping strategies were evaluated with the Brief Cope Scale [12]. Since we focused on emotion-focused coping, two subscales (problem-focused and dysfunctional coping) were not used in the present study. Specific emotion-oriented strategies are adaptive in confronting stressful situations. Factor analytic results indicated two separate forms of emotional approach coping including emotional expression and emotional processing [27]. The Coping Through Emotional Approach Scale consists of eight items with a 4-point Likert scale divided into two subscales: emotional processing and emotional expression. Each item scored from 1 (I have not been doing this at all) to 4 (I have been doing this a lot), with an overall range score of 8–32. Higher scores indicate higher levels of emotional coping. This instrument reveals feelings and emotions of patients facing stressful life events such as cancer. Reliability of this tool has been determined in previous studies by Cronbach's alpha in populations of students 0.88 and mothers 0.9 [26]. In the present study, the reliability of this tool was determined with Cronbach's alpha of 0.82. To determine content validity, this scale was made available to eight faculty members including psychiatric nurses, oncologists, and psychologists, and its validity was confirmed with CVI = 0.9.

The illness perceptions were measured using the Illness Perception Questionnaire-Revised (IPQ-R). IPQ-R contains 38 items and 7 subscales including (a) timeline acute-chronic, (b) timeline cyclic, (c) consequences, (d) personal control, (e) treatment control, (f) illness coherence, and (g) emotional representations. IPQ-R is divided into five degrees in a 5-point

Likert scale from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate stronger beliefs in serious consequences of the disease, a chronic long-term disease, illness and/or symptoms as cyclical in nature, the patients' own ability to control symptoms, and the effectiveness of treatment in controlling the illness. Higher scores in illness coherence indicate higher degrees of the patient's feeling about having a coherent model of the illness, and higher scores in emotional representation scale indicate a stronger emotional response to the illness [28]. In previous studies, this tool was found to have a good internal reliability in all scales with Cronbach's alpha ranging from 0.6 to 0.91 [6]. In Iran, the content validity was confirmed with a qualitative method and reliability with Cronbach's alpha of 0.86 [29].

### Ethical approval

The present study was approved by the Regional Ethical Review Board of Lorestan University of Medical Sciences (LUMS.REC.1395.130). Oral and written information about the study and the ability to withdraw from the study at any time were given to participants. Written informed consent was received from all participants.

### Data analysis

In the present study, statistical analysis was carried out using a per-protocol analysis. The homogeneity test between experimental and control groups was performed using chi-square and *t* tests. The significance of score changes in each group was analyzed with paired *t* test. The two groups were compared using multivariate analysis of covariance (MANCOVA) models, and the baseline characteristics as well as timeline cyclic were considered as covariates. The reported *P* values are one-tailed, and a *P* value less than 0.05 was considered statistically significant for all tests. Data were analyzed in SPSS-19 (SPSS Inc.).

## Results

### Baseline characteristics

Eighty patients (45 women and 35 men) completed the study. Their mean age was  $58.85 \pm 10.6$  years. Forty-five patients (56.25%) were in stage 3 of the disease. The majority of patients had breast cancer (40%). No significant difference was observed between the two groups in terms of baseline demographic characteristics, including age, gender, marital status, employment, education, type of cancer, stage of cancer, and treatment modality ( $P > 0.05$ ) (Table 2). Before the intervention, both groups were statistically similar in illness perception

**Table 2** Patients' characteristics by group and group differences (*P* value)

Characteristics	Experimental group (( <i>n</i> = 40) <i>n</i> (%))	Control group (( <i>n</i> = 40) <i>n</i> (%))	<i>P</i> value
Age (mean, SD)	58.1 (7.8)	59.6 (6.4)	0.76
Gender			0.82
Male	18 (45)	17 (42.5)	
Female	22 (55)	23 (57.5)	
Marital status			0.29
Married	22 (55)	19 (47.5)	
Single	5 (12.5)	7 (17.5)	
Divorced	3 (7.5)	8 (20)	
Widowed	10 (25)	6 (15)	
Employment status			0.43
Employed	11 (27.5)	7 (17.5)	
Retired	11 (27.5)	12 (30)	
Unemployed	18 (45)	21 (52.5)	
Education level			0.19
Less than primary	14 (35)	12 (30)	
Primary or secondary	24 (60)	23 (57.5)	
Tertiary or above	2 (5)	5 (12.5)	
Type of cancer			0.38
Breast	15 (37.5)	17 (42.5)	
Colorectal	8 (20)	5 (12.5)	
Gastrointestinal	10 (25)	11 (27.5)	
Lung	4 (10)	6 (15)	
Leukemia	3 (7.5)	1 (2.5)	
Stage of cancer			0.51
I	4 (10)	2 (5)	
II	14 (35)	11 (27.5)	
III	19 (47.5)	26 (65)	
IV	3 (7.5)	1 (2.5)	
Treatment modality			0.62
Chemotherapy only	25 (62.5)	23 (57.5)	
Neoadjuvant chemotherapy	15 (37.5)	17 (42.5)	

*SD* standard deviation

and emotional coping, except in the subscale of timeline cyclic ( $P > 0.05$ ) (Table 3).

### Illness perceptions

Intragroup analysis showed a significant difference between the two groups in mean score of global illness perception ( $P < 0.001$ ). Furthermore, significant differences were also observed between the two groups in mean scores of illness perceptions subscales including timeline acute-chronic, timeline cyclic, consequences, personal control, treatment control, and illness coherence ( $P < 0.001$ ). But the difference between intervention and control groups in emotional representation was not significant ( $P < 0.571$ ). The intergroup analysis showed significant changes in the intervention group in terms of global illness perception and all its subscales with the exception of emotional

representation. However, no significant difference was observed in the control group in terms of global illness perception and its subscales ( $P < 0.05$ ) (Table 3).

### Emotional coping

Intragroup analysis showed no significant difference between the two groups in mean score of emotional coping ( $P < 0.08$ ), and intergroup analysis showed no improvement in emotional coping in neither the intervention group ( $P < 0.468$ ) nor the control group ( $P < 0.316$ ) (Table 3).

### Discussion

The results obtained suggest that this nurse-led supportive program had no significant effect on emotional coping, but

**Table 3** Effects of supportive program on illness perceptions and emotional coping

Variables	Group	Before	After	Difference	<i>P</i> value
Timeline acute/chronic	Experimental	17.25 (1.07)	19.97 (3.69)	2.73 (4.08)	< 0.001*
	Control	16.72 (2.28)	17.02 (2.00)	-0.30 (2.33)	0.421
	<i>P</i> value	0.590	< 0.001* <sup>†</sup>		
Timeline cyclical	Experimental	12.87 (1.65)	14.90 (1.89)	2.03 (2.37)	< 0.001*
	Control	14.02 (2.92)	14.07 (1.77)	-05 (1.52)	0.836
	<i>P</i> value	0.002*	< 0.001* <sup>†</sup>		
Consequences	Experimental	20.77 (2.36)	23.57 (2.85)	2.80 (3.35)	< 0.001*
	Control	20.72 (3.58)	20.95 (2.15)	-0.23 (3.05)	0.645
	<i>P</i> value	0.731	< 0.001* <sup>†</sup>		
Personal control	Experimental	20.45 (3.88)	23.42 (3.21)	2.97 (4.58)	< 0.001*
	Control	20.37 (3.33)	20.72 (2.76)	-0.35 (2.86)	0.444
	<i>P</i> value	0.716	< 0.001* <sup>†</sup>		
Treatment control	Experimental	16.50 (2.39)	19.55 (5.67)	3.05 (5.72)	0.002*
	Control	15.95 (2.65)	16.50 (2.14)	-0.55 (3.13)	0.273
	<i>P</i> value	0.999	< 0.001* <sup>†</sup>		
Illness coherence	Experimental	14.10 (2.96)	17.45 (3.59)	3.35 (3.83)	< 0.001*
	Control	14.80 (2.74)	14.15 (2.13)	0.65 (2.21)	0.069
	<i>P</i> value	0.731	< 0.001* <sup>†</sup>		
Emotional representations	Experimental	17.90 (4.60)	18.52 (5.12)	0.63 (5.34)	0.464
	Control	18.35 (5.15)	18.65 (5.11)	-0.30 (3.25)	0.564
	<i>P</i> value	0.493	0.571 <sup>†</sup>		
Global IPQ-R	Experimental	116.57 (8.44)	137.40 (14.58)	20.83 (18.09)	< 0.001*
	Control	120.95 (10.36)	118.50 (7.59)	-2.45 (8.58)	0.079
	<i>P</i> value	0.287	< 0.001* <sup>†</sup>		
Emotional coping	Experimental	21.55 (8.48)	22.47 (3.02)	-0.93 (7.97)	0.468
	Control	21.00 (3.43)	20.50 (3.42)	-0.50 (3.11)	0.316
	<i>P</i> value	0.471	0.08 <sup>†</sup>		

IPQ-R Illness Perception Questionnaire-Revised, *SD* standard deviation

\* Significant *P* value < 0.05

<sup>†</sup> *P* value by comparisons of between-group differences using multivariate analysis of covariance (MANCOVA)

increased all illness perceptions, except for emotional representations.

One of the main findings was the effect of the intervention on changing positive perceptions including timeline, controllability, illness coherence, and consequences. To change illness perception and coping [30], patients need both effective and ongoing mode of information delivery and honest, sensitive, and unhurried interactions [2]. Traeger et al. reported that through changes in illness perceptions, cognitive behavioral stress management (CBSM) intervention can act as a buffer against the negative effect of perceived stress on improving emotional well-being [31].

A few studies conducted on cognitive behavioral therapy (CBT) in breast cancer patients showed that by changing unhelpful illness perceptions, this intervention resulted in more constructive illness perceptions and these positive perceptions lead to a better QoL and reduced stress [32]. Yan et al. showed that patients in the

telephone follow-up intervention had significantly positive perceptions about symptoms and the duration of their illness compared to the control group. Moreover, the intervention group had more positive beliefs about causes of disease and the controllability [30]. The greater perception of controllability is associated with adherence to chemotherapy [32]. However, a study indicated that perceived personal control was not associated with emotional well-being. While higher perceived control has predicted higher emotional well-being in cancer patients, some have reported that benefits of perceived controllability might partly depend on the aspects of cancer the patient perceives as controllable [33].

Previous studies on cancer patients have shown that group interventions facilitate positive reappraisal of the illness and can increase preparedness of caregivers [34]. A 10-week CBSM program in prostate cancer survivors improved emotional well-being, but did not make any difference in illness



perceptions, including personal-treatment control, illness coherence, consequences, and personality/behavioral causes, and the authors concluded that stress level, sexual dysfunction, and urinary dysfunction can influence the effect of intervention [31]. In the present study, the intervention had no changing effect on emotional representation. Higher levels of emotional representations or threatening illness perceptions are associated with higher levels of psychological distress, anxiety, depression, and ineffective coping strategies such as denial, avoidance [13], and helplessness/hopelessness among cancer patients, which may account for the relation to unfavorable health consequences [35].

In line with reducing emotional distress and improving coping, it is asserted that a nurse-led individual educational program leads to better management of symptoms, improved patient's emotional strength [1], positive experiences, and coping with treatment side-effects by providing information [4]. However, despite improvement in illness perceptions in the present study, emotional coping did not improve. Perhaps due to the fact that patients with different information seeking styles may respond to coping differently [36].

In Miller's model, two main cognitive coping styles including monitoring and blunting were proposed. "Blunters" refrain from obtaining information in order to reduce emotional distress and ultimately fall into defensive or fear-control motivation. "Monitors" actively search for information and scan for threatening cues, and thus experience higher levels of stress, which disrupt effective problem solving and coping [36, 37]. Lack of emotional coping change in this study may also be explained by low levels of self-efficacy. Patients with different information seeking or coping styles (blunters and monitors) may respond differently on low self-efficacy [36]. Traeger et al. found that prostate cancer patients who experience more daily stress may have less resources to cope with disease concerns [33].

Supportive programs have been sparsely used to improve coping and emotional distress of cancer patients, and the main focus of interventions on other health outcomes [4, 15–17] has produced conflicting results. In a study by Mohd-Sidik et al., repetitive counseling by pharmacists based on the "Managing patients on chemotherapy" module had positive effects on cancer patients undergoing chemotherapy in improving self-esteem and psychological affect [38]. However, a randomized controlled trial of a tailored information pack for patients with rectal cancer showed no difference between intervention and control groups in depression and readjustment scores [39]. These differences can be explained by the fact that information needs of cancer patients during chemotherapy phases change over time [40]. Moreover, the educational-supportive needs of cancer patients in western countries are different from those in eastern countries [1].

## Limitations

A quasi-experimental design with a non-randomized block was chosen in the present study. When randomization is not implemented, known and unknown confounders may be unequally shared by the two groups. Temporal bias may occur due to the selection of non-randomized time blocks. Thus, a 10-week interval was observed between recruiting the two groups. Methodology of the present study would have been strengthened with a randomized controlled trial (RCT). But using this design was not possible due to the risk of contamination of information, clinician learnt bias, and single setting. The present study was conducted on patients undergoing chemotherapy in an outpatient oncology clinic in Iran, which limits generalizability of the results. In addition, our sample was consisted of patients without end-stage cancer. Data were only collected before and after the intervention. Thus, given the fluctuating coping ability of patients and their changing needs during cancer trajectory [41], it is recommended that in future studies, these time intervals be extended, which can better reflect the short-, middle-, and long-term effects.

## Conclusion and application

The present study results showed that the combination of providing individualized information and emotional support by the nurse will be effective in increasing positive illness perceptions including timeline, consequences, controllability, and illness coherence, and changed perceptions cannot automatically lead to improved coping. To meet cancer patients' needs, it is recommended that patient-reported outcome measures (PROMs) in clinical practice be used. Specialist nurses should empower cancer patients in the self-management of side effects through a systematic and "real time" assessment of patient-centered needs and also by screening for illness perceptions, coping styles, and their referral to consultants. Given the role of couples [42] and peer support by the ethnic or cultural members [21] in improving illness perceptions and coping in cancer patients, it is recommended that couple-based interventions or of peers be used in the supportive programs for cancer patients in future studies, especially during different treatments and end-stage of cancer.

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## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no competing interests.

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