

Investigating the Effect of Self-Care Training on Life Expectancy and Quality of Life in Patients with Gastrointestinal Cancer under Radiotherapy

Davood Hekmatpou¹, Azadeh Nasiri¹, Fatholah Mohaghegh²

¹Nursing Department, Nursing and Midwifery Faculty, Arak University of Medical Sciences, ²Medicine Department, Medical Faculty, Arak University of Medical Sciences, Arak, Iran



Corresponding author: Davood Hekmatpou, BScN, MScN, PhD in Nursing

Nursing and Midwifery Faculty, Arak University of Medical Sciences, Arak, Iran

Tel: 09181616539; Fax: 08634173528

E-mail: dr_hekmat@arakmu.ac.ir

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ABSTRACT

Objective: A huge amount of the efforts made by health teams is dedicated to caring for cancer patients. This study has aimed to investigate the effect of self-care training on life expectancy and quality of life (QOL) in patients with gastrointestinal cancer who were under radiotherapy. **Methods:** In this clinical trial, 50 patients were selected using the block randomization method. The intervention was performed at Ayatollah Khansari Hospital in Arak, Iran. The patients in the intervention group received three sessions of face-to-face training. The data collection tools included Schneider's Life Expectancy Questionnaire and EORTC QOLQ-C30. Data were analyzed by SPSS version 23. **Results:** In the control group, 16 were male (64%) and 9 female (36%), and in the intervention group, 14 were male (56%) and 11 were female (44%). Before the intervention, the two groups were homogenous regarding all variables. After the intervention,

the mean of QOL was 67 ± 22.62 in the intervention group and 56 ± 18.55 in the control group ($P < 0.05$). In examining the different dimensions of QOL, improvement in all functional dimensions was observed in the intervention group. After the intervention, the mean score of life expectancy showed a significant difference ($P < 0.05$) between the intervention group (39.52 ± 5.26) and the control group (31.6 ± 7.13). **Conclusions:** It was found that self-care training improved the QOL and life expectancy of patients with gastrointestinal cancer who were under radiotherapy. Therefore, self-care training is recommended to improve the QOL and the life expectancy of cancer patients.

Key words: Gastrointestinal cancer, life expectancy, quality of life, radiotherapy, self-care

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Introduction

Cancer is one of the most significant life-threatening diseases. Besides a large number of care efforts dedicated to this disease in the health system, cancer also imposes high costs on society.^[1] Cancer patients find themselves at the end of their lives and are often awaiting death isolated from others.^[2] Currently, cancer is one of the leading causes of death worldwide. The World Health Organization announced that, in 2016, about 1,685,000 new cases and 595,000 deaths from cancer had been recorded. In Iran, cancer is the third-highest cause of death.^[3] The most three common cancers in Iran are gastric, breast, and colorectal cancers (between both sexes). In an epidemiological survey of gastrointestinal cancers in Markazi province, conducted by Almasi *et al.* in 2006–2011, it was found that of 1,255 registered patients who were in need of follow-up and support by the health system, 642 were suffering from gastric, 444 from colorectal, and 169 from esophageal cancer (on an average 200 new cases per year).^[4]

Generally, several therapies are used to treat cancer, including surgery, radiotherapy, chemotherapy, hormone therapy, immunotherapy, and hyperthermia, which may be used on the patient simultaneously or at different times.^[5] Radiotherapy is considered as a key component of cancer treatment^[6] since, in addition to its low costs – about 5% of total cancer care costs^[7] more than 60% of all patients need this type of treatment during their illness. Depending on the tumor's location, the type of radiation, energy level, and intensity of radiation show various side effects in different organs of the body.^[8] Among the side effects of radiation, fatigue, skin complications, diarrhea, decreased blood components, nausea, vomiting, sexual and reproductive disorders, urinary and bladder disorders, insomnia, depression, and anxiety can be introduced, leading to generally poor quality of life (QOL).^[5,7,9,10] In addition, radiation therapy can be associated with fear and lack of understanding. The help-seeker may be afraid of the treatment's failure. Nursing education can reduce such fears and misconceptions.^[11] Considering that radiotherapy treatment is performed in outpatient centers and that taking a patient home changes the responsibility for patient care. As a result, the teaching of self-care methods seems critical to improving the person's self-care ability.^[12,13] In the past, the evaluation of treatment success was based on recovery and/or death. Today, however, patient survival is not the only objective of treatment; patients also want a good QOL.^[14,15] QOL has been acknowledged as one of the important variables in relation to clinical care, and the efforts of the health system are being directed toward maintaining a higher QOL for patients.^[16] On the one hand, the psychological impact of diagnosing a life-threatening

illness such as cancer and on the other hand, the physical symptoms associated with the disease and treatment side effects, have a negative impact on the QOL of cancer patients.^[17] In addition, among chronic diseases, cancer has the greatest negative impact on the life expectancy of patients.^[2,18]

Considering what has been argued so far about the physical and psychiatric complications of radiotherapy, and performing radiotherapy in outpatient centers, as well as the low awareness of patients for self-care techniques, this study aimed to investigate the effect of self-care education on the QOL and life expectancy of patients undergoing gastrointestinal radiotherapy.

Methods

This study is a clinical trial. This project has been registered under the code of IRCT2016072929114N1 at the Iranian Center for Clinical Trials. The study population consisted of 50 patients undergoing radiotherapy of the gastrointestinal tract, referred to the radiotherapy department of Ayatollah Khansari Hospital in Arak. The sample size was determined according to a similar study, including 50 patients assigned to two groups of control and intervention with 25 participants in each ($\alpha = 0.05$, $\beta = 0.2$, $d = 0.4937$, $m1 = 21.26$, $m2 = 24.23$, $sd1 = 4.29$, $sd2 = 4.26$).

Accounting for the inclusion criteria, 50 patients were selected by the convenience sampling method; the allocation of patients into two groups, such as intervention and control, was done by block randomization.

The inclusion criteria included the presence of a type of nonmetastatic gastrointestinal cancer such as stomach cancer, esophagus cancer, cancer of colon and rectum; all the patients received surgical intervention before radiotherapy; the patient being referred to the outpatient radiotherapy department; the absence of mood illness (such as depression); and it being the patient's first radiotherapy experience.

Exclusion criteria included patient death; acute side effects of cancer/cancer treatment, in a way that the patient was not able to participate in the study; patient's personal reluctance to continue; or if the treatment was suddenly discontinued or interrupted by the physician.

After introducing himself, the researcher explained the purpose of the research and assured patients of the confidentiality of their information, then obtained their informed consent for participation in the study. The right to withdraw from the study at any stage was also emphasized. Thereafter, the intervention was performed as follows: the control group completed the relevant questionnaires (demographic information, QOL, and life

expectancy scales) and received the routine care (meaning patient education by a radiotherapist physician and radiotherapy specialist at the center).

In the intervention group, after completing three questionnaires, in addition to routine care, a nurse administered an educational intervention to the patients. The intervention for the patients included three face-to-face training sessions of 1 h. The first session was held before radiotherapy started, the second session was held 7 days after the start of treatment, and the third session was held 14 days after the start of radiotherapy. Each session consisted of a lecture, a question-and-answer component, and a slideshow presentation for patients. Moreover, a telephone number was provided to patients for answering their questions during the treatment. In all three sessions, the teaching was face-to-face, and a training pamphlet was given to patients at the end, as well as a telephone number for subsequent follow-up. All educational materials were selected based on the type of cancer and the side effects of radiotherapy, based on the location under treatment. They were developed by a nurse and were approved by a supervisor with a doctoral degree in nursing and a radiotherapy physician (the questionnaires were completed by asking the questions from patients in collaboration with an expert from the radiotherapy department).

The EORTC questionnaire for assessment of the QOL in cancer patients was used, a translated version of which is also available in Persian. The validity and reliability of the Persian version of this questionnaire were evaluated by Safaee and Moghim Dehkordi in 2007, reporting the reliability by Cronbach's alpha 0.65 for fatigue, 0.69 for pain, and 0.66 for nausea and vomiting dimensions. Its convergent validity was reported above 0.4 and was acceptable, by testing the relationship between constructs.^[19] This questionnaire is a multi-dimensional questionnaire designed to measure the QOL of cancer patients and includes 30 questions in five functional subscales (physical, role, social, emotional, and cognitive functioning), eight symptomatic subscales (fatigue, pain, nausea/vomiting, dyspnea, insomnia, appetite loss, diarrhea, and constipation) and two distinct items of economic problems and overall health status (perception of one's overall health and QOL). The main method of scoring the questions was based on a 4-point Likert scale, scoring from 1 (not at all) to 4 (very high).^[20,21]

Schneider's Life Expectancy Questionnaire was used in this study,^[22] the Persian translation of which is also available and validated by Kazemi with Cronbach's alpha of 0.79, and its formal and content validity has also been approved.^[23] The questionnaire consists of 12 items and aims to assess the level of life expectancy in individuals. This questionnaire assesses the two dimensions of life

expectancy: (1) the energy for achieving goals in life; and (2) the personal plan for achieving goals in life. The scoring is based on a 5-point Likert scale, from 1 (totally disagree) to 5 (totally agree).^[22,24,25]

The permission to conduct this research was obtained from the Ethics Committee of Arak University of Medical Sciences, with the code IR. ARAKMU. REC.1395.209.

Data were analyzed by SPSS version 23 (IBM SPSS Statistics, New York).

Results

In this study, 50 patients participated, of which 30 were men (60%) and 20 were women (40%). The ratios were 16 men (64%) and 9 women (36%) in the control group, and 14 men (56%) and 11 women (44%) in the intervention group. Furthermore, the mean age of the intervention group was 64.68 ± 13.10 and of the control 65.84 ± 11.67 , which were not significantly different ($P = 0.742$). The duration of the disease in the intervention group was 1.47 ± 0.51 years and in the control group 1.40 ± 0.50 years, which showed no significant difference between the two groups ($P = 0.594$). The two groups were homogenous in terms of demographic variables before the intervention [Tables 1 and 2].

According to Table 3, the results show an improvement in the mentioned functional dimensions in the intervention group compared to the control group ($P < 0.05$). In the cognitive and social domains, after the intervention, a significant improvement was observed in the condition of these domains in the intervention group ($P = 0.000$), while in the control group, the condition of these domains worsened after the intervention.

Table 1: Comparing of demographic variables between intervention and control groups

Demographic variable	Groups, n (%)		χ^2	P
	Intervention	Control		
Gender			0.333	0.733
Male	14 (56)	16 (64)		
Female	11 (44)	9 (36)		
Level of education			0.325	0.569
Literate	15 (60)	13 (52)		
Illiterate	10 (40)	12 (48)		
Marital status			0.857	0.538
Married	16 (64)	19 (76)		
Single	9 (36)	6 (24)		
Habitat			0.089	0.100
City	16 (64)	17 (68)		
Village	9 (36)	8 (32)		
Type of cancer			0.221	0.313
Esophageal cancer	9 (36)	6 (24)		
Gastric cancer	14 (56)	15 (50)		
Colon Cancer	2 (8)	4 (16)		

Table 2: Frequency of “Patients’ clinical characteristics” in intervention and control groups

Type of cancer	Groups		Test/P
	Intervention	Control	
Esophagus	9/36	6/24	$\chi^2=0.231$
Stomach	14/56	15/60	$P=0.313$
Colon	2/8	4/16	
Duration of disease (year), Mean±SD	1.47±0.51	1.40±0.50	$t=0.536$ $P=0.594$

SD: Standard deviation

Table 3: Evaluation of functional life quality of life based on the quality of life questionnaire in intervention and control groups (Mean±SD)

Functional dimensions	Groups		P
	Intervention	Control	
Physical			
Before	27.46±28.1	31.21±6.96	0.212
After	14.93±15.54	45.33±19.05	0.000
P	0.007	0.001	
Role play			
Before	30.00 ±31.54	22.00 ±21.36	0.500
After	20.00±22.04	26.00 ±25.85	0.001
P	0.035	0.002	
Emotional			
Before	36.66±30.51	42.00 ±20.89	0.339
After	17.66±14.49	55.33±21.36	0.000
P	0.001	0.004	
Cognitive			
Before	16.00 ±17.66	26.00 ±21.55	0.090
After	6.66±12.72	28.66±23.82	0.000
P	0.002	0.645	
Social			
Before	39.33±32.94	54.00 ±31.65	0.118
After	23.33±18.002	62.00 ±29.47	0.000
P	0.009	0.162	

SD: Standard deviation

According to Table 4, the results show that there was a significant difference between the two groups in the evaluation of QOL items in terms of nausea and vomiting, pain, and appetite loss. This means that, in the intervention group, the results showed a decrease in these symptoms after the intervention compared to the control group ($P < 0.05$). Although after the study, the control group also showed a decrease in the emergence of symptoms, this decrease, as well as the respected improvement of the conditions in the intervention group, was greater than that of the control group.

In the item of fatigue, the difference between the intervention and control groups before and after the intervention was significant; however, it was statistically insignificant. There was a significant difference in sleep disorder and constipation in the intervention group compared to the control group after the intervention, and

there was a decrease in these symptoms ($P < 0.05$). There was no significant difference between the two groups in terms of the dyspnea ($P > 0.05$). However, there was a significant difference in the intervention group before and after the intervention; although it was not statistically significant, it can have clinical considerations. In diarrhea and economic problems items, no significant difference was observed in the results ($P < 0.05$). However, in examining the economic problems, the intervention and control groups each show improvement independently ($P < 0.05$).

According to Table 5, after the intervention, there was a significant difference between the two groups, which means that QOL improved in the intervention group ($P < 0.05$). Besides which, after the intervention, an assessment of QOL scores in both groups indicated an improvement of conditions that was greater in the intervention group compared to the control group.

In Table 6, after the intervention, there was a significant increase in the intervention group compared to the control group ($P = 0.000$). Furthermore, the results indicated that changes in the mean score of life expectancy were significant in both groups; there was an increase in the mean life expectancy in the intervention group, while life expectancy declined in the control group.

In Table 7, after the intervention, there was a significant increase in “Agency” in the intervention group compared to the control group ($P = 0.000$). Moreover, after the intervention, there was a significant increase in “Pathway” in the intervention group compared to the control group ($P = 0.044$).

Discussion

In this study, QOL improved in the intervention group. This indicates the positive effect of the self-care education intervention on the mean total score of QOL among cancer patients. Yüce and Yurtsever showed that education has a positive impact on the QOL of cancer patients;^[26] this finding is also consistent with the results of a study by Hochstenbach *et al.* in 2015, which showed the positive effect of an intervention on pain control and improving the QOL of patients.^[27] Khazae-Pool *et al.* also reported similar results in their study, entitled “The effect of self-care education on the QOL of patients with postsurgical esophageal cancer.”^[17] Of course, Davoodi *et al.* reported that education had no impact on the QOL of patients, and the results were not significant.^[28] Furthermore, a study by Ajh in 2012 showed that training had no positive impact on general outcomes of QOL.^[29]

Studying the domains of QOL in the present study showed that the scores of physical and role functioning improved after the intervention; this was consistent with the results of Yüce and Yurtsever^[26] and Khazae-Pool^[17] Salehi

Table 4: Evaluation of quality of life symptom items based on quality of life questionnaire in intervention and control groups (Mean ± SD)

Symptom items	Groups		P
	Intervention	Control	
Fatigue			
Before	76.44 ± 17.95	36.00 ± 16.44	
After	76.44 ± 17.95	36.00 ± 0.000	
P	0.999	0.999	
Nausea/vomiting			
Before	75.33 ± 30.09	70.66 ± 31.65	
After	90.00 ± 15.21	65.33 ± 25.87	
P	0.012	0.482	
Pain			
Before	65.33 ± 22.52	50.00 ± 25.00	
After	77.33 ± 16.58	43.33 ± 23.07	
P	0.007	0.072	
Shortness of breath			
Before	76.00 ± 28.08	80.00 ± 27.21	
After	84.00 ± 19.53	73.33 ± 0.26	
P	0.034	0.060	
Sleep disorder			
Before	66.66 ± 34.60	52.00 ± 34.44	
After	81.33 ± 23.72	42.66 ± 24.57	
P	0.091	0.137	
Anorexia			
Before	57.33 ± 35.38	53.33 ± 31.91	
After	85.33 ± 16.88	42.66 ± 28.08	
P	0.001	0.185	
Constipation			
Before	80.00 ± 33.30	6.66 ± 38.49	
After	93.33 ± 13.60	70.66 ± 36.41	
P	0.070	0.751	
Diarrhea			
Before	82.66 ± 27.41	86.66 ± 27.21	
After	85.33 ± 19.43	81.33 ± 30.55	
P	0.635	0.389	
Financial problems			
Before	59.28 ± 41.27	53.12 ± 21.27	
After	64.00 ± 31.70	50.66 ± 33.49	
P	0.010	0.000	

SD: Standard deviation

Table 5: General health status (overall quality of life (Mean ± SD))

General health status	Groups		P
	Intervention	Control	
Before	55.00 ± 29.06	64.33 ± 15.68	0.269
After	67.00 ± 22.66	56.00 ± 18.55	0.043
P	0.001	0.010	

SD: Standard deviation

et al., in their study on the effect of self-care education on the QOL of patients undergoing radiotherapy, showed that the physical and emotional dimensions had a positive and significant effect on the QOL of the patients undergoing

radiotherapy. In both dimensions, their results were consistent with the present study.^[15]

In the present study, the scores for the emotional dimension showed an improvement, which was in line with Davoodi's^[28] study. Khazae-Pool also showed that training improved the emotional function of patients.^[17] Li found that lower levels of the emotional dimension in patients with bladder cancer in China are due to their low QOL compared with other countries, and the psychosocial interventions that increase QOL can improve emotional functioning in these patients.^[25]

In the cognitive and social domains, the results after the intervention showed a significant improvement in the intervention group in the condition of these domains, while the control group experienced a drop in the condition of these domains. Yüce and Yurtsever conducted a study in Turkey that showed significant differences in all functional and symptomatic domains after educating patients on oral mucosal inflammation; education was useful in improving the QOL of cancer patients.^[26]

In the present study, the questions in the symptom domain showed that there was a significant difference in the items of nausea and vomiting, pain, and appetite loss between the two groups. This means that, after the intervention in the intervention group, the results showed a decrease in these symptoms compared to the control group. Although the results of the control group showed a decrease in the incidence of symptoms after the study, this decrease in incidence and the improvement of the conditions was greater in the intervention group compared to the control group. These results are in line with the findings of the Khazae-Pool study.^[17] In a study in 2017, Karimi *et al.* showed that self-care education can have a positive effect on the control of nausea and vomiting in patients undergoing chemotherapy.^[30] Moreover, Yazdani used yoga in patients undergoing radiotherapy to reduce the scores of nausea and vomiting, and pain items in the intervention group.^[31]

Davoodi *et al.* found a statistically significant difference only in the item of nausea; the scores in the items of pain and appetite loss were not significant.^[28] However, the study by Ajh did not find any statistical significance in any of the symptomatic items, which provided training in the field of nursing care and treatment, and considered education ineffective on symptomatic items.^[29] Rustøen *et al.* showed that self-care interventions do not affect the pain of cancer patients,^[32] which is opposed to the results of this study. In his study, entitled "The effects of training on fatigue management in patients with cancer," Purcell did not observe any decrease in fatigue scores and the results were not statistically significant.^[33] This finding is

Table 6: Comparison of life expectancy in intervention and control groups (Mean±SD)

Life expectancy	Groups		t/P
	Intervention	Control	
Before intervention	36.76±6.63	65.44±6.79	0.646/0.522
After intervention	39.52±5.26	31.60±7.13	4.467/0.000
Paired t-test			
t	-2.360	2.568	
P	0.027	0.017	

SD: Standard deviation. Independent t-test

Table 7: Comparing of all dimensions of life expectancy in intervention and control groups (Mean±SD)

Dimensions	Groups		P
	Intervention	Control	
Agency			
Before	3.29±0.87	3.17±0.83	0.675
After	3.62±0.6	2.74±0.91	0.000
P	0.013	0.015	
Pathway			
Before	3.32±0.97	3.58±0.88	0.305
After	3.56±0.78	3.04±0.77	0.044
P	0.055	0.004	

SD: Standard deviation

similar to the findings of Khazae-Pool *et al.*, in which fatigue scores were not statistically significant after the intervention.^[17]

There was a significant difference in sleep disorder and constipation items in the intervention group compared to the control group after intervention, and the incidence of symptoms decreased in these items; this finding was consistent with the results of Hanai *et al.*, who studied the effect of self-care education on constipation in patients undergoing chemotherapy in 2015.^[34] These results are consistent with the results of Yüce and Yurtsever^[26] and Ajh.^[29]

There was a significant difference in the intervention group in terms of dyspnea before and after the intervention. Although it is not statistically significant, this can be considered clinically. Boulet *et al.* showed in their study that an educational program had been effective on the respiratory symptoms of asthmatic patients; however, it was not consistent with the results of the present study.^[35]

In examining the economic problems of the intervention and control groups, each one has independently improved in the scores. Delgado-Guay *et al.* showed that economic problems are directly related to the QOL and depression in cancer patients;^[36] the present study, in comparison, shows that QOL has improved in the intervention group despite no changes in the economic dimension.

The results showed that, after the intervention, there was a significant increase in the mean of life expectancy in the intervention group compared to the control group. Mean life expectancy scores were also significant in both groups, but an increase in the intervention group and a decline in the control group were observed in the item of life expectancy. In the study of Movahedi *et al.*, an education program has contributed to improving the life expectancy and general health of patients. Movahedi showed that providing educational services and hope promotion programs with appropriate methods can have beneficial effects, since life expectancy is an inner motivation that can enrich one's life, enabling patients to have a better view toward their current situation.^[2] Moreover, a study by Moghadam showed that forming groups, providing information, and talking with patients improved life expectancy scores and increased hope in patients.^[37]

Both Lee *et al.*, in China,^[25] and Kazemi *et al.*, in Iran,^[23] showed that hope has a positive relationship on QOL and increasing hope is effective in improving the QOL of patients. Therefore, in the present study, the direct relationship between life expectancy and QOL in the intervention group can be confirmed.

Berendes *et al.*, in a study entitled "Hope in lung cancer patients," investigated the relationship between hope and clinical and psychological symptoms of people with lung cancer, and showed that hope was associated with clinical symptoms, especially pain and fatigue, and those patients with high hope experience less pain and fatigue than other patients.^[38]

Li found that lower levels of emotional functioning in patients with bladder cancer in China, compared to other countries, are due to their poor QOL, and psychosocial interventions that increase QOL can improve the emotional dimension in these patients and improve their QOL. Besides, there is a direct relationship between QOL and hope.^[25] These results are in line with the results of Kazemi and Momeni Javed who showed that the increased QOL by self-care could have a positive and direct effect on life expectancy.^[23]

Based on the results of the present study, self-care education can increase life expectancy in patients by empowering patients in terms of self-care and increasing their awareness in dealing with the side effects of illness and treatment. As in examining both dimensions of hope (the energy for achieving their goals and personal planning for achieving their goals), the results indicate a significant difference between the two groups, and the intervention group showed greater energy and planned better to achieve their goals compared to the control group. Although the results in both dimensions indicate improvement in both groups after the intervention,

the superiority of the intervention group is noticeable in the results compared to the control group.

The sample size and follow-up duration are two limitations of this study, which may have influenced its outcomes. It seems that longer follow-up, along with training regarding the chronic side effects, can lead to better results.

Conclusion

Self-care education improves the hope and QOL of individuals. In fact, "Self-care education has a positive effect on the hope and QOL of patients with GI cancer under radiotherapy." Regarding life expectancy, the intervention group showed more planning and more energy to achieve their goals in life, and the overall life expectancy scores in the intervention group increased, indicating the effect of self-care education. On the other hand, according to the research mentioned above, which indicated the direct relationship between hope and QOL, it can be said that increasing hope can improve QOL, since hopeful people try more to control the disease.

Finally, about the impact of cancer and the side effects created during treatment, the QOL in humans naturally decreases over time. Maintaining the quality of life at the onset of illness is also a success, and its improvement after the treatment indicates the effectiveness of the interventions that have been done during treatment.

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Conflicts of interest

There are no conflicts of interest.

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