

Emotional Intelligence as A Predictor of Health-Related Quality of Life in Breast Cancer Survivors

Sahar Mirzaei¹, Ahmad Izadi Tame², Robab Anbiaie³, Fateme Moradipour⁴, Malihe Nasiri⁵, Camelia Rohani⁶

¹Student Research Committee, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, ²Department of Psychology, Imam Hossein Comprehensive University, ³Department of Radiotherapy, Imam Hossein Hospital, Shahid Beheshti University of Medical Sciences, ⁴Outpatient Clinic, Mahdiah Hospital, Shahid Beheshti University of Medical Sciences, ⁵Department of Nursing, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, ⁶Department of Community Health Nursing, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran



Corresponding author: Camelia Rohani, PhD

Department of Community Health Nursing, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Tel: +98-2188655367 (330); Fax: +98-2188202518

E-mail: camelia.rohani@sbm.ac.ir

Received: September 03, 2018, Accepted: November 26, 2018

ABSTRACT

Objective: The objective of this study is to explore the predictive role of emotional intelligence (EI) and its elements for health-related quality of life (HRQoL) dimensions in a sample of breast cancer survivors. **Methods:** This cross-sectional study was conducted in a single oncology clinic at a university hospital. A sample of breast cancer survivors ($n = 180$) completed three questionnaires: Short-Form Health Survey SF-36 (the RAND 36-item) with 8 dimensions; Cyberia Shrink EI Test (with five elements); and demographic Characteristics. The data were analyzed using SPSS version 20 (IBM Corporation, Armonk, NY, USA). A series of multiple linear regression models were used to analyze the data. **Results:** EI was a predictor for two dimensions of HRQoL components in survivors: mental ($\beta = 0.45, P < 0.001$); and physical ($\beta = 0.27, P < 0.001$). However, it was a better predictor for the mental HRQoL than for physical. More specifically, several

elements of EI, including self-motivation, self-awareness, and self-control, demonstrated significant variance with a medium effect for prediction of dimensions of HRQoL. “Self-motivation” ($\beta = 0.27, P < 0.001$) and “self-awareness” ($\beta = 0.29, P < 0.01$) together were the best predictors of the variances of survivors’ “general health” ($R^2 = 28\%$). “Self-motivation” ($\beta = 0.39, P < 0.001$), and “self-control” ($\beta = 0.19, P < 0.05$), also together, were the best predictors of the variances of survivors’ “emotional well-being” ($R^2 = 28\%$). **Conclusions:** Educational intervention programs should be planned by concentrating on special elements of EI, including self-motivation, self-awareness and self-control, to improve HRQoL dimensions in breast cancer survivors.

Key words: Breast cancer, emotional intelligence, health-related quality of life, survivors

Access this article online

Quick Response Code:



Website: www.apjon.org

DOI:
10.4103/apjon.apjon_76_18

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

Cite this article as: Mirzaei S, Tame AI, Anbiaie R, Moradipour F, Nasiri M, Rohani C. Emotional Intelligence as A Predictor of Health-Related Quality of Life in Breast Cancer Survivors. *Asia Pac J Oncol Nurs* 2019;6:261-8.

Introduction

Breast cancer is the most common cancer in women in Europe, North America, and the Mediterranean region.^[1,2] It is a common malignancy among women in Iran and accounts for 16% of all cancers. In Iran, breast cancer is more common in young and middle-aged women, with a 5-year survival rate of 71%.^[3] Evidence has shown that breast cancer survivors experience physical and psychological problems as well as various symptoms including fatigue, depression, and sleep disorders.^[4-7] Thus, breast cancer and its treatment influence patients' quality of life (QoL)^[8,9] or health-related QoL (HRQoL).^[10] The World Health Organization (WHO) defines QoL as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns."^[11] However, HRQoL includes at least physical, psychological and social functioning dimensions in the context of disease.^[12] In clinical research, HRQoL is usually used for evaluating patients' QoL.^[13] In the present study, HRQoL as an outcome variable refers to the subjective experience of breast cancer survivors of their global health status in the context of disease, which was measured through physical and mental dimensions using a patient-reported outcome questionnaire.

Evidence reveals that personal resources can help breast cancer survivors to better cope with their disease and improve their HRQoL.^[14] In the literature, emotional intelligence (EI) has been introduced as one of the most important personal resources.^[15] It is defined as the capacity for processing emotional information, including information regarding recognizing, constructing and regulating emotions, expressing emotions in oneself and to others, and managing emotions for emotional growth.^[16] EI is the ability to recognize one's own and others' feelings, and to find ways to cope with and adapt to these feelings.^[17] In his book, *Working with Emotional Intelligence*, Daniel Goleman categorized five components of EI: Self-awareness; self-motivation; social awareness; self-control or regulation; and social skills.^[18] In the present study, we followed Goleman's model and examined these five elements of EI. A review of the literature reveals that to improve the HRQoL of cancer survivors, an improvement in communication skills, and an increase in the ability to develop positive feelings, self-esteem and flexibility is required. This process helps to manage stress, obtain information, find medical assistance, receive psychosocial support, and to be able to cope with cultural problems.^[14,19-23]

A meta-analysis found that the ability to cope with emotions effectively develops a sense of well-being in an individual. If, however, an individual is unable to find

ways to adapt to negative emotions, it significantly and negatively impacts their feelings.^[22] Thus, regulation of emotions improves an individual's physical and mental health in different ways.^[24] For example, a greater EI level with high interpersonal skills creates more effective social and individual relationships, and better mood, resulting in greater life satisfaction, lower depression, and improved physical health. Interpersonal skills for EI are related to the management of emotions. It appears that individuals with higher EI are more resistant to stress than those with lower levels.^[25]

Few studies have investigated the role of EI in health outcomes in cancer patients.^[10,26,27] Patients with higher levels of EI reported better levels of HRQoL and health outcomes. However, there have been several studies with cross-sectional or interventional designs, with clinical and non-clinical samples. The results of a study involving university students proposed the predictive role of EI for three dimensions of mental, social, and physical health.^[15] In other studies, the relationship between EI and some dimensions of HRQoL was investigated in older adults,^[23] as well as patients with vestibular schwannoma.^[28] Interventional studies incorporating EI training programs have also involved different patient populations including those with type-II diabetes mellitus,^[29] and asthma.^[30] The results demonstrated that EI training programs led to an increase in total QoL scores of the interventional diabetic group. However, in patients with asthma, EI training resulted in only a minor impact on mental health and social relationships.

Prompted by the scarcity of studies investigating the relationship between elements of EI and HRQoL dimensions in the context of cancer, this study aimed to investigate the predictive role of EI and its elements for HRQoL dimensions in a sample of female breast cancer survivors.

Methods

Sampling and data collection

The present investigation was a cross-sectional study initiated with 180 female breast cancer survivors who were selected from a single oncology clinic at a university hospital in the capital city (a center for diagnosis and treatment of breast cancer). From the 180 survivors, 18 did not respond ($n = 10$) or did not completely answer the questionnaires ($n = 8$) and were thus excluded from the study, leaving a final sample size of 162. The inclusion criteria were as follows: female breast cancer survivor with Iranian nationality; age ≥ 18 years; completed treatments at least 6 months previously; ability to read and answer questionnaires; and no history of other cancers or recent

hospitalization(s). Individuals who experienced disease recurrence or metastasis were excluded.

Data collection in this study was performed using three questionnaires. The first author attended outpatient oncology clinics 5 days per week for 3 months (November 2017 to March 2018). After an explanation of the study objectives, the cancer survivors were invited to participate in the project. On verbal acceptance, participants completed an informed consent form, and subsequently answered the questionnaires in a private room in the clinic over a period of 20-30 min.

Ethical approval

The study was approved by the Ethical Student Research Committee of Shahid Beheshti University of Medical Sciences with Code No. IR.SBMU.RETECH.REC.1396.

Measurements

Short-Form Health Survey SF-36 (RAND 36-item)

The Short-Form Health Survey SF-36 (RAND 36-item) was used for assessing survivors' HRQoL in this study. It comprises eight dimensions: physical functioning (10 items); physical role (4 items); emotional role (3 items); vitality (4 items); emotional well-being (5 items); social functioning (2 items); pain (2 items); and general health (5 items). The scores range from 0 to 100 in each dimension, with 100 representing the best level of functioning or well-being.^[31,32] Four subscales related to physical health are represented by the Physical Component Summary (PCS) or physical dimension of HRQoL: physical functioning, physical role, pain, and general health. Four subscales related to mental health were represented by the Mental Component Summary (MCS) or mental dimension of HRQoL: social functioning; emotional role; vitality; and emotional well-being. The instrument was previously translated and validated into Persian and cross-culturally adapted to the Iranian population.^[31] In the present study, the reliability of the RAND 36-item, using Cronbach's alpha coefficient, ranged from 0.61 to 0.83 for all dimensions.

Cyberia Shrink Emotional Intelligence Test

The Cyberia Shrink EI Test consists of 70 items in two parts.^[33] The first part (40 items) includes items by which the subjects were tested on their reactions to various situations. During validation of the test in Persian, the second part (30 items) was not used due to cultural differences. In addition, seven items from the remaining 40 were discarded during the validation process because of low correlation with the total score of the test.^[34] The remaining 33 items covered the five elements of EI: Self-motivation (7 items); self-awareness (8 items); self-control or self-regulation (7 items); social awareness or empathy (6 items); and social

skills (5 items). The test items were scored using a five-point Likert scale (never = 5 to always = 1); for negative items, the scoring was inverted (9, 10, 12, 14, 18, 20, 22, 28, and 33). The scores of the test ranged from 33 to 165, with higher scores indicating better EI. The score range for the subscales was as follows: Self-motivation (7–35), self-awareness (8–40), self-control (7–35), social awareness (6–30), and social skills (5–25). The reliability of this test was examined using Cronbach's alpha coefficient in Persian studies,^[34,35] and demonstrated an acceptable range (0.63–0.83). In this study, the Cronbach's alpha coefficient for the entire test was calculated to be 0.83.

Demographic Characteristics Questionnaire

The demographic characteristics of breast cancer survivors, including age (years), marital status, educational level, job status, income, and the time passed since the last treatment (months), were obtained through a short interview with the patients in the clinic.

Data analysis

The data were analyzed using SPSS version 20 (IBM Corporation, Armonk, NY, USA) through descriptive and inferential statistics. The distribution of outcome variables (the scores of the RAND 36-item and the EI) was normal; thus, parametric statistics were used. To explore predictors of HRQoL dimensions, a correlation matrix (according to Pearson correlation coefficient), followed by a series of multiple linear regression (MLR) models, were used to analyze the data. In regression models, to make predictions, the relationship between variables, both independent and dependent, should be measured.^[36] Therefore, a correlation matrix was constructed for the five elements of EI and dimensions of the RAND 36-item to assess correlations between variables. To analyze data in SPSS (IBM Corporation, Armonk, NY, USA), a stepwise solution was selected for entering independent variables into the regression models. "With the stepwise solution, variables are entered in the method outlined for the forward solution and are assessed at each step using the backward method to determine whether their contribution is still significant, given the effect of other variables in the equation."^[36] The total EI score and its five elements were introduced as independent variables into the regression models. Dimensions of the RAND 36-item were considered one by one as a dependent variable in the regression models. Before conducting the regression models, a series of univariate analyses was run with demographic variables, and the results were not significant at the level of $P < 0.05$. However, demographic variables with significance level at 0.1 or 0.15 were selected as independent variables for subsequent regression models (age and education).

“This step can be helpful in identifying variables that, by themselves, are not significantly related to the outcome but make an important contribution in the presence of other variables.”^[37] To examine whether EI accounted for a small, medium, or large amount of the variance in dimensions of the RAND 36-item, Cohen’s guideline was used (small: $f^2 \geq 0.02$; medium $f^2 \geq 0.15$; large $f^2 \geq 0.35$).^[38] The data were considered to be significant at $P < 0.05$.

Results

The demographic characteristics of the breast cancer survivors are summarized in Table 1. Results revealed a mean and standard deviation of total EI total score 111.58 ± 11.49 (range, 33–165). In addition, the mean and standard deviation of the PCS and the MCS, composite scale scores of the RAND 36-item, were 59.93 ± 21.14 , and 65.73 ± 19.79 (range, 0–100), respectively.

The results of the correlation matrix involving the five elements of EI and the RAND 36-item dimensions, as a precondition for regression models indicated that two elements of EI (self-motivation [$r = 0.13-0.44$; $P < 0.01$]

and social-awareness [$r = 0.22-0.47$; $P < 0.01$]), were positively correlated with all subscales of the RAND 36-item. Social skill was positively correlated with only the emotional role ($r = 0.36$; $P < 0.01$) and the MCS ($r = 0.29$; $P < 0.01$). Self-control ($r = 0.22-0.40$; $P < 0.01$) and total EI ($r = 0.20-0.50$; $P < 0.01$) were positively correlated with all subscales of the RAND 36-item, except for the physical role. Eventually, self-awareness was positively correlated with all subscales of the RAND 36-item ($r = 0.17-0.43$; $P < 0.01$), except for physical functioning and physical role.

Results of the MLR models indicated that, after controlling for age and education, “total EI” was a predictor for all subscales of the RAND 36-item, except for “physical functioning” and “physical role.” In addition, “total EI” was the best predictor of MCS ($\beta = 0.45$, $P < 0.001$) compared with the PCS ($\beta = 0.27$, $P < 0.001$) between composite scales scores of the RAND 36-item [Table 2]. Furthermore, among various elements of the EI, “self-motivation” and “social awareness” were two predictors of different subscales of the RAND 36-item, with the highest frequency. “Self-motivation” was a predictor for five subscales of the RAND 36-item: “emotional well-being” ($\beta = 0.39$, $P < 0.001$); “social functioning” ($\beta = 0.34$, $P < 0.001$); “vitality” ($\beta = 0.29$, $P < 0.01$); “general health” ($\beta = 0.27$, $P < 0.001$); and “physical functioning” ($\beta = 0.25$, $P < 0.01$). Moreover, “social awareness” was a predictor for five subscales of the RAND 36-item: “pain” ($\beta = 0.38$, $P < 0.001$); “emotional role” ($\beta = 0.37$, $P < 0.001$); “physical role” ($\beta = 0.24$, $P < 0.01$); the PCS ($\beta = 0.34$, $P < 0.001$); and MCS ($\beta = 0.30$, $P < 0.01$). “Self-control” was also a common predictor, but only for three subscales of the RAND 36-item: “emotional well-being” ($\beta = 0.19$, $P < 0.05$); “social functioning” ($\beta = 0.17$, $P < 0.05$); and the MCS ($\beta = 0.26$, $P < 0.01$). “Social awareness” was a common predictor for both the PCS ($\beta = 0.34$, $P < 0.001$) and MCS ($\beta = 0.30$, $P < 0.01$) [Table 3].

After controlling for age and education, the total EI score accounted for 7% of the variance in survivors’ PCS (small effect), but 27% of the variance in the survivors’ MCS (medium effect) [Table 2]. Additionally, the regression results revealed that “self-motivation” and “self-awareness” together predicted 28% of variances in the “general health” of survivors (medium effect) ($R^2 = 0.28$). Equally, “self-motivation” and “self-control” together predicted 28% of variances in “emotional well-being” of survivors (medium effect) ($R^2 = 0.28$). Moreover, “social awareness” and “self-control” together predicted 27% of variances in the MCS of survivors (medium effect) ($R^2 = 0.27$) [Table 3].

Discussion

In this study, we investigated that the predictive role of EI for HRQoL dimensions in the context of breast cancer

Table 1: Demographic characteristics of female breast cancer survivors ($n = 162$)

Variables	Frequency (%)
Age (year)	
20-30	5 (4.3)
31-41	45 (27.8)
42-53	65 (40.1)
≥ 54	47 (29)
Marital status	
Single	15 (9.3)
Married	124 (76.5)
Divorced	10 (6.2)
Widowed	13 (8)
Educational level	
Primary school	24 (14.8)
Secondary school	37 (22.8)
High school	51 (31.5)
College	29 (17.9)
University	21 (13)
Job status	
Housewife	108 (66.7)
Employed	44 (27.2)
Retired	10 (6.2)
Income	
Low	59 (36.4)
Lower middle	45 (27.7)
Upper middle	42 (25.9)
High	16 (9.8)
Time since completing the treatments (month)	
9-12	54 (33.3)
13-24	48 (29.6)
25-72	39 (24.1)
>72	21 (13)

Table 2: Multiple linear regression analyses results for total emotional intelligence and health-related quality of life dimensions

Dependent variables	Independent variables	t	B	SE	Standardized β	P
General health	Emotional intelligence	5.21	0.496	0.09	0.38	0.000
	$R^2=0.14$					
Pain	Emotional intelligence	3.67	0.44	0.12	0.28	0.003
	$R^2=0.07$					
Social functioning	Emotional intelligence	4.31	0.45	0.10	0.33	0.000
	Age (≤ 40 ; > 41)	-2.62	-7.87	3.48	-0.17	0.025
	$R^2=0.16$					
Emotional well-being	Emotional intelligence	6.79	0.47	0.08	0.47	0.000
Vitality	Emotional intelligence	4.39	0.46	0.10	0.33	0.000
	Age (≤ 40 ; > 41)	-2.55	-8.88	3.47	-0.19	0.019
Emotional role	Emotional intelligence	5.76	1.23	0.21	0.45	0.000
	Age (≤ 40 ; > 41)	-1.98	-13.49	6.81	-0.15	0.049
PCS	Education (less than college; college and higher)	-3.15	-20.89	6.64	-0.24	0.022
	$R^2=0.21$					
	Emotional intelligence	3.57	0.35	0.10	0.27	0.000
MCS	$R^2=0.07$					
	Emotional intelligence	6.33	0.61	0.10	0.45	0.000
	Age (≤ 40 ; > 41)	-2.45	-7.91	3.23	-0.17	0.015
	$R^2=0.27$					

Dimensions of the physical role and physical functioning were removed from the table (nonsignificant data). SE: Standard error, PCS: Physical Component Summary, MCS: Mental Component Summary

survivors using self-report questionnaires. Our findings demonstrated that EI was a predictor for both physical and mental HRQoL in breast cancer survivors. This is consistent with studies that reported similar results in cancer patients,^[10] or in different target groups.^[39-41] This means that in our study, breast cancer survivors with higher EI reported better levels of HRQoL in physical and mental dimensions. However, this result was stronger in the mental dimension of HRQoL compared with physical dimension. This finding is consistent with a study by Fernández-Abascal and Martín Díaz,^[42] who found that EI dimensions were better predictors of mental health (48.4%) than physical health (15.6%) in 855 undergraduate students. As a psychological factor,^[10] EI is the ability to perceive, control, and evaluate emotions.^[43] This ability suggests that there is a direct link between EI and psychological health.

After controlling for age and education in regression models, EI accounted for 7% of the variance in survivors' physical HRQoL (small effect), compared with 27% of the variance in survivors' mental HRQoL (medium effect). The medium effect of EI for mental HRQoL, compared with its small effect for physical HRQoL, indicated a stronger predictive role of EI for explaining mental factors in our context. Thus, EI appears to be a robust predictor for mental HRQoL. A previous meta-analysis emphasized that the link between EI and mental health is important.^[22]

Among various elements of EI, self-motivation and self-awareness were the most common predictors of

HRQoL dimensions. By increasing self-motivation in breast cancer survivors, five dimensions of HRQoL, emotional well-being, social functioning, vitality, general health, and physical functioning, improved. In addition, by improving social awareness in survivors, five dimensions of HRQoL (emotional role, physical role, bodily pain, physical and mental components) increased. Although we found the same result for bodily pain in our study, there is a different argument. In our context, breast cancer survivors with higher social awareness reported that bodily pain interfered more with their normal work at home or outside during the previous 4 weeks. This relationship was found in the correlation between the sociability factor of EI and bodily pain in a study by Fernández-Abascal and Martín Díaz,^[42] but not in their regression models. Self-control was also a common predictor in our study, but only for three dimensions of HRQoL (emotional well-being, social functioning, and the mental component of HRQoL^[10]). In a study involving 62 cancer patients, patients with higher levels of EI reported higher levels of HRQoL in dimensions of emotional role, social functioning, vitality, and mental health. Interestingly, social awareness was a common predictor for both physical and mental components of HRQoL in our study. In other words, by increasing social awareness, both physical and mental components of HRQoL developed in cancer survivors. Social awareness refers to empathy, and understanding the emotions, needs, and concerns of other individuals, feeling comfortable

Table 3: Multiple linear regression analyses results for elements of the emotional intelligence and health-related quality of life dimensions

Dependent variables	Independent variables	t	B	SE	Standardized β	P
General health	Self-motivation	3.37	1.28	0.52	0.27	0.000
	Self-awareness	3.66	1.92	0.38	0.29	0.001
	$R^2=0.28$					
Pain	Social awareness	5.23	2.31	0.44	0.38	0.000
	$R^2=0.16$					
Physical role	Social awareness	3.25	2.21	0.68	0.24	0.001
	$R^2=0.06$					
Physical functioning	Self-motivation	3.27	1.42	0.43	0.25	0.001
	$R^2=0.08$					
PCS	Social awareness	4.55	5.86	1.28	0.34	0.000
	$R^2=0.12$					
Social functioning	Self-motivation	4.09	2.36	0.58	0.34	0.000
	Self-control	2.04	0.76	0.37	0.17	0.043
	$R^2=0.22$					
Emotional well-being	Self-motivation	4.8	1.15	0.44	0.39	0.000
	Self-control	2.39	1.5	0.31	0.19	0.018
	$R^2=0.28$					
Vitality	Self-motivation	3.49	1.46	0.57	0.29	0.001
	Self-awareness	2.53	1.46	0.42	0.21	0.012
	$R^2=0.20$					
Emotional role	Social awareness	4.6	3.31	0.85	0.37	0.000
	Social skills	2.22	2.53	1.14	0.17	0.028
	$R^2=0.24$					
MCS	Social awareness	3.16	5.42	1.71	0.30	0.002
	Self-control	2.68	3.85	1.74	0.26	0.008
	$R^2=0.27$					

In each analysis, five elements of EI and two demographic variables (age and education) were entered into the regression models. Only significant independent variables were shown in the table. SE: Standard error, PCS: Physical Component Summary, MCS: Mental Component Summary, EI: Emotional intelligence

socially, and recognizing dynamic power in groups. Social awareness can affect an individuals' perception, behavior, and response.^[44] Previous studies have found that adjustment of emotions improves an individual's physical and mental health.^[14,24,45]

Interestingly, several elements of EI demonstrated significant variance with medium effect in regression models for prediction of various dimensions of HRQoL. Self-motivation and self-awareness together predicted 28% of variances in survivors' general health. Self-motivation and self-control together predicted 28% of variances in survivors' emotional well-being. These results are in accordance with similar EI studies, although with different subjects (diabetic elderly individuals^[46] and primary school teachers^[47]). Similarly, social awareness and self-control together predicted 27% of variances in survivors' mental component of HRQoL. Similar results were found in a

study by Extremera and Fernández-Berrocal^[15] who applied the Trait Meta-Mood Scale for measurement of EI. Two subfactors – clarity and mood repair – are in accordance with elements of self-control and self-awareness in EI. In regression models, they found that individuals with high scores in these factors reported better physical, social functioning, mental health, vitality, and more positive general health. They reported that by managing and improving emotional capacities in the framework of these subfactors, there is a possibility to move toward better physical, social, and mental health. Thus, planning for educational intervention programs by focusing on self-awareness, self-control, and self-motivation in EI can be beneficial for improving breast cancer survivors' HRQoL. These elements are potentially related to self-efficacy (confidence in the ability to have control over individual's motivation, behavior, and social environment^[48,49]) and may help to empower survivors.

In summary, the results suggest that EI and its elements are valid predictors for physical and mental dimensions of HRQoL in breast cancer survivors. However, they predicted the mental dimension of HRQoL better than the physical dimension. It appears that with increasing levels of EI, the levels of health and well-being improve through a stress reduction process and better emotional management.^[50] According to these results, there is now an opportunity to increase the EI of breast cancer survivors through educational intervention programs and thereby improve HRQoL.

There were some limitations to the present study, and therefore, the results should be interpreted with caution. Using nonprobability sampling and self-report questionnaires are two particular limitations of the study. We did not analyze outcome variables in respondents who were excluded from the study. Due to the cross-sectional design of the study, it was not possible to have a deep perspective on the causality of the relationships; thus, it is necessary to perform longitudinal studies to determine mediational factors to gauge the emergence and development of emotional capacities over time. Nevertheless, this study adds knowledge to the psycho-oncology literature pertaining to the role of EI and its elements – especially self-awareness, self-control, and self-motivation – as significant predictors of physical and mental dimensions of HRQoL. Therefore, it appears that breast cancer survivors with greater EI have better control of their emotions through self-motivation, social awareness, and self-control, which in turn means they are better able to control their stress and access to improved HRQoL.

Conclusion

Results of the present study suggest that EI and all of its elements are predictors of two dimensions of HRQoL,

mental and physical components, in breast cancer survivors. However, all elements of EI were better predictors for the mental component of HRQoL than the physical component. More specifically, several elements of EI demonstrated a significant variance with medium effect for prediction of the dimensions of HRQoL in survivors: “self-motivation” and “self-control” for emotional well-being; “self-motivation” and “self-awareness” for general health; and “self-awareness” and “self-control” for the mental component. “Social awareness” was also found to be a common predictor for two main components of HRQoL, physical and mental. It appears that increasing EI leads to improvement in HRQoL dimensions through emotional management as a stress reduction process. Therefore, educational intervention programs should be planned by concentrating on special elements of EI, such as self-motivation, self-awareness and self-control, to improve HRQoL dimensions in breast cancer survivors.

Financial support and sponsorship

This study was supported by a grant from the Student Research Committee, School of Nursing and Midwifery of Shahid Beheshti University of Medical Sciences, Tehran, Iran (Grant No. 1396/78655).

Conflicts of interest

There are no conflicts of interest.

References

- Salehi M, Gohari MR, Vahabi N, Farid Z, Yahyazadeh SH, Kafashian MR. Comparison of artificial neural network and cox regression models in survival prediction of breast cancer patients. *Sci J Ilam Univ Med* 2013;21(2):120-8.
- American Cancer Society. Cancer Facts and Figures; 2017. Available from: <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2017/cancer-facts-and-figures-2017.pdf>. [Last accessed on 2018 May 08].
- Karimi A, Moradi A, Saye Miri K, Delpishe A, Saie Miri F. Investigation of 1 to 10-year survival of breast cancer in Iranian women: A systematic review and meta-analysis. *Iran J Midwifery Infertil* 2016;22:17-25.
- Fiorentino L, Ancoli-Israel S. Insomnia and its treatment in women with breast cancer. *Sleep Med Rev* 2006;10:419-29.
- Hollon SD, Stewart MO, Strunk D. Enduring effects for cognitive behavior therapy in the treatment of depression and anxiety. *Annu Rev Psychol* 2006;57:285-315.
- Berger AM, Gerber LH, Mayer DK. Cancer-related fatigue: Implications for breast cancer survivors. *Cancer* 2012;118:2261-9.
- Bower JE. Behavioral symptoms in patients with breast cancer and survivors. *J Clin Oncol* 2008;26:768-77.
- Kenyon M, Mayer DK, Owens AK. Late and long-term effects of breast cancer treatment and surveillance management for the general practitioner. *J Obstet Gynecol Neonatal Nurs* 2014;43:382-98.
- Van Dijck S, Nelissen P, Verbelen H, Tjalma W, Gebruers N. The effects of physical self-management on quality of life in breast cancer patients: A systematic review. *Breast* 2016;28:20-8.
- Rey L, Extremera N, Trillo L. Exploring the relationship between emotional intelligence and health-related quality of life in patients with cancer. *J Psychosoc Oncol* 2013;31:51-64.
- World Health Organization. Programme on Mental Health. WHOQOL Measuring Quality of Life. World Health Organization; c1997. Available from: http://www.who.int/mental_health/media/68.pdf. [Last accessed on 2017 Dec 18].
- O'Connor RM. Measuring Quality of Life in Health. Edinburgh: Churchill Livingstone; 2004.
- Fayers PM, Machin D. Quality of Life: The Assessment, Analysis and Interpretation of Patient-Reported Outcomes. 2nd ed. West Sussex, USA: John Wiley & Sons Ltd.; 2007.
- Austin EJ, Saklofske DH, Egan V. Personality, well-being and health correlates of trait emotional intelligence. *Pers Individ Differ* 2005;38:547-58.
- Extremera N, Fernández-Berrocal P. Emotional intelligence as predictor of mental, social, and physical health in university students. *Span J Psychol* 2006;9:45-51.
- Mayer JD, Salovey P. What is emotional intelligence? In: Salovey P, Sluyter D, editors. *Emotional Development and Emotional Intelligence: Implications for Educators*. New York: Basic Books; 1997.
- Mayer JD, Salovey P, Caruso DR. *Emotional Intelligence Test (MSCEIT) User's Manual*. Toronto, ON: Multi-Health Systems; 2002.
- Goleman D. *Working with Emotional Intelligence*. New York: Bantam Books; 1998.
- Finocchiaro C, Ossola M, Monge T, Fadda M, Brossa L, Caudera V, *et al.* Effect of specific educational program on dietary change and weight loss in breast-cancer survivors. *Clin Nutr* 2016;35:864-70.
- Kimman ML, Dirksen CD, Voogd AC, Falger P, Gijzen BC, Thuring M, *et al.* Nurse-led telephone follow-up and an educational group programme after breast cancer treatment: Results of a 2x2 randomised controlled trial. *Eur J Cancer* 2011;47:1027-36.
- Loprinzi CE, Prasad K, Schroeder DR, Sood A. Stress management and resilience training (SMART) program to decrease stress and enhance resilience among breast cancer survivors: A pilot randomized clinical trial. *Clin Breast Cancer* 2011;11:364-8.
- Martins A, Ramalho N, Morin E. A comprehensive meta-analysis of the relationship between emotional intelligence and health. *Pers Individ Differ* 2010;49:554-64.
- Luque-Reca O, Pulido-Martos M, Lopez-Zafra E, Augusto-Landa JM. Emotional intelligence and health-related quality of life in institutionalised spanish older adults. *Int J Psychol* 2015;50:215-22.
- Matthews G, Zeidner M, Roberts RD. *Emotional Intelligence: Science and Myth*. Cambridge, MA: MIT Press; 2002.
- Lopes PN, Brackett MA, Nezlek JB, Schütz A, Sellin I, Salovey P. Emotional intelligence and social interaction. *Pers Soc Psychol Bull* 2004;30:1018-34.
- Hashim SH, Khalil MS. Self-efficacy, emotional intelligence, and quality of life amongst Saudi sample cancer patients. *J Psychol Clin Psychiatry* 2018;9:450-4.
- Teques AP, Carrera GB, Ribeiro JP, Teques P, Ramón GL. The importance of emotional intelligence and meaning in life in psycho-oncology. *Psychooncology* 2016;25:324-31.
- van Leeuwen BM, Borst JM, Putter H, Jansen JC,

- van der Mey AG, Kaptein AA. Emotional intelligence in association with quality of life in patients recently diagnosed with vestibular schwannoma. *Otol Neurotol* 2014;35:1650-7.
29. Yalcin BM, Karahan TF, Ozcelik M, Igde FA. The effects of an emotional intelligence program on the quality of life and well-being of patients with type 2 diabetes mellitus. *Diabetes Educ* 2008;34:1013-24.
 30. Sanchooli M, Fathi Aghdam G, Rezaishirazi R, Sanchooli J. The effect of emotional intelligence training on the quality of life in asthmatic patients. *Int J Basic Sci Med* 2016;1:67-71.
 31. Montazeri A, Goshtasebi A, Vahdaninia M, Gandek B. The short form health survey (SF-36): Translation and validation study of the Iranian version. *Qual Life Res* 2005;14:875-82.
 32. VanderZee KI, Sanderman R, Heyink J. A comparison of two multidimensional measures of health status: The Nottingham health profile and the RAND 36-item health survey 1.0. *Qual Life Res* 1996;5:165-74.
 33. Behbahani AA. A comparative study of the relation between emotional intelligence and employee's performance. *Procedia Soc Behav Sci* 2011;30:386-9.
 34. Mansouri B. Normalization of Emotional Intelligence Test Cyberia shrink on Tehran University Students [MA thesis]. Tehran: Allameh Tabatabaiee University; 2001.
 35. Kuchak Zade TS, Alizade SH, Namazi A. The relationship between emotional intelligence and general health. *J Educ Dev Jundishapur* 2015;6:139-46.
 36. Munro BH. *Statistic Methods in Health Care Research*. 5th ed. Philadelphia: Mosby; 2005. p. 259-62.
 37. Bursac Z, Gauss CH, Williams DK, Hosmer DW. Purposeful selection of variables in logistic regression. *Source Code Biol Med* 2008;3:17.
 38. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2th ed. Hillsdale, NJ: Lawrence Erlbaum; 1988.
 39. Mikolajczak M, Avalosse H, Vancorenland S, Verniest R, Callens M, van Broeck N, *et al.* A nationally representative study of emotional competence and health. *Emotion* 2015;15:653-67.
 40. Rief W, Bardwell WA, Dimsdale JE, Natarajan L, Flatt SW, Pierce JP. Long-term course of pain in breast cancer survivors: A 4-year longitudinal study. *Breast Cancer Res Treat* 2011;130:579-86.
 41. Shahnnavazi M, Parsa-Yekta Z, Yekaninejad MS, Amaniyan S, Griffiths P, Vaismoradi M, *et al.* The effect of the emotional intelligence education programme on quality of life in haemodialysis patients. *Appl Nurs Res* 2018;39:18-25.
 42. Fernández-Abascal EG, Martín-Díaz MD. Dimensions of emotional intelligence related to physical and mental health and to health behaviors. *Front Psychol* 2015;6:317.
 43. Johnson SJ, Batey M, Holdsworth L. Personality and health: The mediating role of trait emotional intelligence and work locus of control. *Pers Individ Differ* 2009;47:470-5.
 44. Serrat O. *Understanding and developing emotional intelligence. Knowledge Solutions: Tools, Methods, and Approaches to Drive Organizational Performance*. Singapore: Springer Singapore; 2017. p. 329-39.
 45. Salovey P, Stroud LR, Woolery A, Epel ES. Perceived emotional intelligence, stress reactivity, and symptom reports: Further explorations using the trait meta-mood scale. *Psychol Health* 2002;17:611-27.
 46. Abbasabad Arabi H, Bastani F, Navab E, Haghani H. Investigating quality of life and its relationship with emotional intelligence (EQ) in elderly with diabetes. *Iran J Psychiatry Clin Psychol* 2015;21:215-24.
 47. Ahmadnejad M, Hassani M, Sepehriaan A, Shojaee K. Surveying the relationship between emotional intelligence and working life quality with job adjustment of registered and unregistered teachers in elementary level of sardasht province schools during 1389-90. *Res Curriculum Plann* 2012;9:123-36.
 48. Amirian SM, Behshad A. Emotional intelligence and self-efficacy of Iranian teachers: A research study on university degree and teaching experience. *J Lang Teach Res* 2016;7:548-58.
 49. Azizian S, Samadi A. Study of relationship between emotional intelligence (EI) and self efficacy the case of the staff of the Hamedan Branch of Islamic Azad University. *Procedia Soc Behav Sci* 2012;31:496-502.
 50. Slaski M, Cartwright S. Health, performance and emotional intelligence: An exploratory study of retail managers. *Stress Health* 2002;18:63-8.