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Health-Promoting Behaviors among Iranian Breast Cancer Patients Using the Self-Regulation Model

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ABSTRACT

Aims A healthy lifestyle is a crucial modifiable risk factor in breast cancer prevention. This study aimed to identify predictors of health-promoting behaviors based on the self-regulation model among breast cancer patients in northern Iran.

Instrument & Methods This cross-sectional analytical study was conducted in 2021 involving 260 breast cancer patients. A questionnaire assessed demographic characteristics, disease status, psychosocial factors related to the self-regulation model, health-promoting behaviors, and patients' attitudes toward their health. Data were analyzed using correlation coefficients and multivariate linear regression.

Findings The average age of participants was 52.6±10.6 years. A direct correlation was found between perceived treatment effectiveness and all domains of health-promoting behaviors. The multivariate regression model indicated that perceived treatment effectiveness significantly predicted health-promoting behaviors, including a healthy diet (β=0.20, p=0.016), vitamin consumption (β=0.21, p = 0.002), and performing mammography (β=-0.26, p=0.001).

Conclusion Perceived treatment effectiveness is closely linked to enhanced health-promoting behaviors.

Keywords Health Promoting Behaviors; Patients; Breast Cancer

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Introduction

Breast cancer (BC) remains a significant public health concern globally [1], with rising incidence rates and varying survival outcomes influenced by numerous factors, including healthcare systems and treatment accessibility [2]. Among the types of cancer, BC is a common, malignant, and progressive disease that affects various aspects of a person's life [3]. According to a report from the World Health Organization, 2.3 million women had BC, and 685 thousand died from it in 2020 [4]. In Iran, recent statistics indicate a concerning trend; the average age of women diagnosed with BC has decreased by approximately ten years, highlighting the urgent need for effective health promotion strategies tailored to this demographic [5]. Understanding the implications of these survival rates not only sheds light on the effectiveness of the Iranian healthcare system but also underscores the necessity for improved treatment options and preventive measures [6]. Health-promoting behaviors play a crucial role in the prevention and management of BC [7]. Decision-making in patients with BC has largely focused on treatment options, with less attention paid to health-promoting behaviors such as a healthy diet, regular exercise and physical activity, vitamin intake, and timely screening [8]. The growing trend of chronic diseases and the importance of improving the quality of life for this group of patients, along with increasing their lifespan, have made the need for health promotion interventions and a healthy lifestyle more prominent than ever [9]. For more effective training and interventions, it is a priority to identify the factors that predict behaviors in order to design appropriate and effective training for these individuals based on a suitable model [10].

Health-promoting behaviors represent a multidimensional model of voluntary and cognitive actions that lead to maintaining and enhancing health, self-actualization, and success [11]. Meanwhile, the task of health education—both in understanding health behaviors and in transferring knowledge related to health behavior—is to create an effective strategy for increasing the level of healthy behavior. This defines the scope of practices by using models and theories as frameworks for shaping rules in the field of health [12] and helps identify individual and environmental characteristics that influence human behavior [13]. Since one of the goals of health professionals is to assist patients in responding appropriately to risk factors for diseases [14], it is essential to establish a clear connection between these behaviors and their impact on BC outcomes [15]. This connection will provide a foundation for exploring the self-regulation model, which serves as a framework for understanding how individuals can manage their health proactively [16].

Self-regulation is the act of modifying behavior based on self-observations. Accordingly, the self-regulation model was proposed in 1980 by Leventhal *et al.*, and it includes three components of interpretation, adaptation, and evaluation [15, 17]. The interpretation stage is related to the recognition of health-threatening factors, which enables the individual to address their potential disease problem through the perception of disease symptoms and their social consequences [18].

The adaptation or action plan stage is characterized by efforts to control fear or other emotions related to the disease or threat. In the evaluation stage, individuals compare their level and status of performance with the degree of achievement of desired standards to identify discrepancies or differences along a spectrum of desirable to undesirable behaviors and determine what intervention is needed [19]. Self-regulation involves personal control over the monitoring of behaviors, thoughts, and emotions through a continuous cycle of review to manage an identified or emerging problem, to produce a desired outcome or avoid an undesirable outcome [20]. Therefore, the self-regulation model can be used to explain how beliefs or knowledge about a disease may interfere with the recognition and management of its symptoms, considering the individual as an active problem-solving agent in the management of their disease [21]. This model specifically includes the self-system, cognitive and emotional experiences, and health-promoting behaviors. The self-system comprises self and social environmental factors that are essential for understanding health threats. It includes demographic factors (age, socioeconomic factors, etc.), biological factors (passive treatment), and cultural and regional factors (such as rural areas). When the self-system is presented with a stimulus like BC, a cognitive and emotional experience of the health threat is formed in the individual. Cognitive experiences may include salient features of the disease, such as, "What is the disease?" or "What is the impact of a health-promoting behavior?" [15, 22].

In justifying the role of the self-regulation model in the health-promoting behaviors of BC patients, it can be stated that the psychosocial factors of the model, such as distress, perceived risk, and perceived treatment effectiveness, are integrated into the interpretation stage. This integration allows patients to gain a correct understanding of their disease and to follow the recommendations and training provided to manage their condition. This accurate understanding of their health status can reduce mortality, complications, and adverse outcomes of the disease while improving quality of life. Subsequently, in the evaluation stage, patients address the objective aspects of the disease along with the strategies they have selected and planned to achieve the health-related goals resulting from the disease understanding stage. Finally, in the evaluation stage, by comparing their own

performance and behavior with the desired level, they can determine which types of health-oriented behaviors to select and implement [20, 22]. Since there is a significant relationship between perceived treatment effectiveness and patients' cultural status, which affects their healthcare behaviors and attitudes [23], this study aimed to determine the health-promoting behaviors among BC patients in the North of Iran, focusing on how social, cultural, and economic factors influence these behaviors. By examining this specific population, we can identify unique characteristics that may affect their health management strategies, such as regional healthcare access and cultural beliefs.

Furthermore, this research aimed to engage with the existing literature on health-promoting behaviors in BC patients, identifying a profile of patients' lifestyles. By doing so, we hope to reinforce the significance of our research within the broader context of health promotion. The findings of this study could inform future interventions and health policies aimed at enhancing health-promoting behaviors among BC patients, ultimately contributing to improved health outcomes.

Instrument and Methods

Study type, setting, and participants

This cross-sectional analytical study aimed to identify predictors of health-promoting behaviors based on the self-regulation model among BC patients registered in the hospital/clinical breast cancer registry program at Guilan University of Medical Sciences, conducted in 2021.

The sample size was determined using Kline's formula [24], which suggested a requirement of five observations per item across 47 items, with an additional 10% accounted for attrition, resulting in a calculated sample size of 260 participants.

The national clinical breast cancer registry program in Iran, established in 2018, is a collaborative effort involving 12 provinces and 15 hospitals. This registry collects over 160 data items, including patient demographics, diagnostic factors, treatment modalities, and follow-up information for BC patients admitted for initial treatment. By the time of this study, 497 patients had been registered in the clinical cancer registry program of Guilan province. Participants were selected using a simple random sampling method based on the existing sampling framework from the hospital BC registration system database. Random numbers were generated using the Excel program and assigned to the corresponding patient file numbers.

Inclusion criteria included a newly confirmed diagnosis of BC, registration in the hospital BC registry program at treatment units affiliated with Guilan University of Medical Sciences (specifically Razi Hospital and Pursina Hospital), and being in either the active or inactive treatment stage (completion of treatment). Patients who did not respond to the questionnaire items were excluded, as were those unwilling to participate and individuals with metastasis or recurrence.

Procedure

Following approval from the Ethics Committee, registered patients were offered a complimentary consultation with an oncology specialist. On the day of the clinic visit, the researcher introduced herself, obtained informed consent, ensured confidentiality, and explained the study's purpose. The questionnaire was then administered to participants, with the researcher conducting interviews with illiterate patients. The second part of the questionnaire, concerning disease status, was completed by the researcher based on the patient's medical records and guidance from the attending physician. Data collection spanned five months, from October 7, 2020, to March 10, 2021.

Questionnaires

Data were collected using a questionnaire divided into four sections. The first section gathered demographic information, including age, body mass index (BMI), education level, employment status, marital status, family income, family history of disease, and participants' self-assessment of their health status, rated from poor to excellent. The second section focused on health-promoting behaviors, which were assessed using a scale that measured various dimensions of health-related activities, including physical activity, nutrition, vitamin consumption, and mammography.

Physical activity was measured using the standard International Physical Activity Questionnaire (IPAQ) [25]. This questionnaire was validated in a study conducted across 12 countries and has demonstrated strong reliability, with a test-retest Spearman correlation of approximately 0.8 [26]. Nutrition was assessed using questions related to healthy eating from the Health-Promoting Lifestyle Profile (HPLP II) Questionnaire [27, 28]. Vitamin consumption was evaluated using three questions, and mammography was determined by two questions. The reliability of these two sections of the questionnaire was assessed using test-retest reliability on 20 subjects, yielding a correlation coefficient of 0.79 for vitamin consumption and 0.97 for mammography.

The third section evaluated the participants' psychological factors related to self-regulation skills. It included questions concerning the psychosocial factors of the self-regulation model, which the research team prepared based on Kelly *et al.*'s study [22], and results from library studies, including anxiety and depression levels, perceived risk, and perceived treatment effectiveness (Table 1). According to the panel of experts, the content validity index (CVI) and content validity ratio (CVR) were 0.8 and 0.88 for distress, 0.7 and 1 for perceived risk, and 0.88 and 0.98 for perceived treatment effectiveness, respectively. The corresponding Cronbach's alpha

values for distress, perceived risk, and perceived treatment effectiveness were 0.92, 0.79, and 0.89, respectively. Finally, the fourth section collected information on the participants' disease-related factors, such as the stage of cancer, treatment modalities, and duration since diagnosis.

Statistical analysis

Data were analyzed using SPSS version 20. Descriptive statistics were calculated for demographic and clinical characteristics. The correlation between parameters was assessed using the Pearson correlation coefficient. To identify predictors of health-promoting behaviors, a multivariate linear regression analysis was performed using the backward elimination method. This approach allowed for the adjustment of confounding parameters and the identification of significant predictors of health-promoting behaviors among the participants. The significance level was set at $p<0.05$ for all analyses.

Table 1. The subscales, items, scores, and psychometric properties of the scale

Scale, Subscale	Scoring	Items
Self-regulation model		
Distress	A five-point Likert scale: 1=disagree strongly, 5=agree strongly A high score indicates less distress	Worried about hair loss after my illness Fear of death Worrying about having pain Worrying about having nausea and vomiting after taking the medicine Being nervous Being anxious To be stressed Feeling depressed (I have no desire to do daily tasks) Feeling sad and sad Feeling hopeless (no hope for the future)
Perceived risk	A five-option Likert scale: very high=5, very low=1 A high score indicates more perceived risk	How do you see your chances of getting breast cancer again before the age of 70? How do you think the probability of recurrence of breast cancer in you compared to other women?
Perceived treatment effectiveness	A five-point Likert scale: 1=disagree strongly, 5=agree strongly A high score indicates more perceived treatment effectiveness	Having a healthy diet (low fat, low salt, limited sugar, and more vegetables) makes my treatment process better Taking the vitamins recommended by the doctor will improve my treatment process. Doing periodic mammograms will help my treatment process. Doing clinical breast tests (tests requested by the attending physician) as a course helps my treatment process. Having physical activity makes my treatment process better.
Health-promoting behaviors		
Healthy diet	A four-point Likert scale: 1=never, 4=always A high score indicates more healthier diet	I choose a diet that is low in fat, saturated acids, and cholesterol I use sugar and foods containing sugar (sweets) in a limited way. I use a little soy and soy products. I use limited red meat and liver. I rarely consume processed foods (such as sausages, hamburgers, and smoked fish). I use daily between 6 and 11 units of bread, cereals, rice, and other similar foods such as pasta (equivalent to one palm of bread, half a glass of rice or pasta). I use 2 to 3 units of fruit group daily (equivalent to an apple, banana, and medium orange, or three-quarters of a glass of fruit juice). I use more than 3 units of vegetables daily (equivalent to one glass of raw leafy vegetables or half a glass of other raw or cooked vegetables). I use 2 to 3 units of milk, yogurt, cheese, and other dairy products daily (equivalent to a glass of milk or yogurt or the size of a can of cheese matches). I use 2 to 3 units of foods such as fish, chicken, eggs, beans, and nuts (equivalent to 120 to 180 grams of chicken or fish meat, one egg or one-third of a glass of nuts, or half a glass of cooked beans) I eat breakfast
Vitamin consumption	A four-point Likert scale: 1=never, 4=always A high score indicates better vitamin consumption	I take iron supplements. I take calcium supplements. I take vitamin D supplements.
Attitude about reducing the risk of cancer recurrence by doing mammography and breast clinical tests	A four-point Likert scale: 1=never, 4=always A high score indicates better attitude	I do mammography to reduce the risk of recurrence of breast disease. To reduce the risk of recurrence of breast disease, I perform clinical breast tests.
Physical activity	In this way, 3.3 METs for walking, 4 METs for moderate physical activity, and 8 METs for intense physical activity were considered. The total amount of physical activity per week was calculated as (day×minute×MET)	The short version of the International Physical Activity Questionnaire (IPAQ) (36). Amount of intense, moderate, and walking physical activity in the last week. The total time spent per week in the form of seven questions was considered as the amount of physical activity of the respondents.

Findings

A total of 260 patients participated in this study, with a mean age of 52.6±10.6 years. Over 80% of the participants had completed diploma or sub-diploma education, and 87.7% were housewives. Approximately 94% of the patients were married, and the majority reported a family income ranging from 10 to 30 million IRR. Notably, 50% of the subjects had an underlying health condition. Also, the BMI of participants was found to be28.00±3.58kg/m^2 (Tables 2 and 3).

Table 2. Frequency of background characteristics of the participants (n=260)

Parameter	Values
Education	
Primary school/illiterate	76(29.2)
High school	54(20.8)
Diploma	87(33.5)
Graduate degree	43(16.5)
Employment	
Household	227(87.7)
Employed	23(8.5)
Retired	10(3.8)
Marital status	
Single	13(5.3)
Married	230(94.3)
Widowed/divorced	17(6.5)
Monthly household income (IRR)	
Less than 10.000.000	10(3.8)
10.000.000-30.000.000	138(53.1)
More than 30.000.000	112(43.1)
The presence of an underlying disease	
Yes	130(50)
No	130(50)
Health condition	
Bad	30(11.5)
Moderate	73(28.1)
Good	131(50.4)
Very good	17(6.5)
Excellent	9(3.5)

The most prevalent cancer type among participants was ductal carcinoma (p=0.4), while stage 2 cancer was the most common disease stage (p=0.27). More than 70% of patients tested positive for estrogen and progesterone receptors (p=0.88).

Significant positive correlations were found between perceived treatment effectiveness and a healthy diet (r=0.14, p<0.01), vitamin consumption (r=0.17, p<0.001), physical activity (r=0.13, p<0.01), and mammography (r=0.24, p<0.001). An inverse correlation was observed between distress and perceived risk (r=-0.59, p<0.001; Table 4).

Linear regression analysis revealed a significant association between perceived treatment effectiveness and adherence to healthy behaviors, including diet, vitamin consumption, and mammography. Overall, higher perceived treatment effectiveness correlated with increased engagement in health-promoting behaviors (Table 5).

Age was identified as a significant independent factor influencing health-promoting behaviors, particularly physical activity, vitamin consumption, and mammography. Specifically, increasing age was associated with a significant decrease in physical activity (B=-3.7, p<0.001) and mammography scores (B=-0.03, p=0.013), while it correlated with an increase in vitamin consumption (B=0.04, p=0.031).

Furthermore, treatment status emerged as an independent predictor of physical activity, with treated individuals reporting lower average physical activity scores compared to those who had completed treatment (B=-52.29, p=0.02). A significant dose-response relationship was also noted, indicating that a better assessment of health condition was associated with higher levels of physical activity (p<0.05).

Table 3. Frequency of clinical characteristics of the participants (n=260)

Parameter	Values
Treatment status	
Active	129(49.6)
Completed	131(50.4)
Type of cancer	
Ductal	248(95.4)
Lobular	11(4.2)
Ductalobular	1(0.4)
Disease stage	
I	78(30)
II	95(36.5)
III	70(26.9)
IV	17(6.5)
Disease grade	
I	41(15.8)
II	121(46.5)
III	98(37.7)
Estrogen receptors/progesterone receptors	
Positive	189(72.7)
Negative	71(27.3)
Human epidermal growth factor receptor 2 (Her-2/neu)	
Positive	151(58.19)
Negative	109(41.9)

Table 4. Correlation coefficients between the constructs of the self-regulation model and dimensions of health-promoting behaviors

Parameter	7	6	5	4	3	2	1
1- Healthy diet	0.139*	-0.005	0.018	-0.03	0.099	0.04	1
2- Vitamin consumption	0.172**	-0.061	0.073	0.09	0.11	1	
3- Physical activity	0.134*	-0.024	0.045	-0.13	1		
4- Mammography	0.243**	-0.029	-0.083	1			
5- Distress	0.035	-0.59**	1				
6- Perceived risk	-0.096	1					
7- Perceived treatment effectiveness	1						

* p<0.01; ** p<0.001

Table 5. Predictors of various dimensions of health-promoting behaviors using linear regression model

Parameter	Healthy diet	Physical activity	Vitamin consumption	Mammography
Age (year)	0.2 (-0.03, 0.06), 0.06	-3.7* (-5.61, -1.80), -0.25	0.04* (0.003, 0.08), 0.15	-0.03* (-0.06, -0.01), -0.16
BMI (kg/m²)	0.01 (-0.09, 0.09), 0.01	-2.94 (-7.00, 1.13), -0.09	0.006 (-0.07, 0.08), 0.01	-0.06 (-0.12, -0.004), -0.13
Grade				
1	Reference			
2	-0.68 (-1.94, 0.6), -0.09	8.16 (-45.42, 61.75), 0.03	-0.73 (-1.78, 0.32), -0.13	-0.05 (-0.79, 0.69), -0.01
3	0.09 (-1.22, 1.40), 0.01	6.11 (-49.5, 61.72), 0.02	-0.56 (-1.65, 0.53), -0.09	-0.22 (-0.99, 0.55), -0.05
Distress	-0.002 (-0.07, 0.06), -0.01	-1.30 (-4.12, 1.50), -0.08	0.02 (-0.04, 0.07), 0.06	0.02 (-0.02, 0.06), 0.08
Perceived risk	0.25 (-0.24, 0.74), 0.08	-6.73 (-27.545, 14.09), -0.05	0.18 (-0.23, 0.998), 0.07	0.04 (-0.25, 0.32), 0.02
Perceived treatment effectiveness	0.20* (0.04, 0.36), 0.15	5.88 (-0.90, 12.66), 0.10	0.21* (0.09, 0.34), 0.2	-0.26* (-0.36, -0.17), -0.33
Treatment status				
Completed	Reference			
Active treatment	-0.31 (-1.34, 0.71), -0.05	-52.29* (-95.8, -8.79), -0.02	-0.22 (-1.07, 0.638), 0.04	-0.08 (-0.69, 0.52), -0.02
Self-assessment of health condition				
Bad	Reference			
Moderate	1.53 (-0.01, 3.05), 0.2	66.67* (1.82, 131.52), 0.19	1.21 (-0.060, 2.47), 0.19	-0.45 (-1.35, 0.45), -0.09
Good	1.94* (0.49, 3.38), 0.28	91.92* (30.61, 1531.22), 0.3	0.69 (-0.51, 1.89), 0.12	0.39 (-0.46, 1.23), 0.09
Very good	1.65 (-0.51, 3.8), 0.12	141.48* (50.12, 232.84), 0.23	0.08 (-1.71, 1.86), 0.01	0.26 (-0.99, 1.53), 0.03
Excellent	2.01 (-0.75, 4.78), 0.11	141.45* (24.39, 258.5), 0.17	-0.27 (-2.56, 2.01), -0.02	-0.32 (-1.94, 1.30), -0.03
R^2	0.06	0.16	0.09	0.18

Values indicate beta coefficient (95% confidence interval), standardized beta; R^2: Coefficient of determination of the full model; * p<0.05

Discussion

This study aimed to identify the predictors of health-promoting behaviors in breast cancer patients in northern Iran, using the self-regulation model. BC remains the most common cancer among women worldwide and is the leading cause of cancer-related death in 11 regions globally [29]. Maintaining a healthy lifestyle not only reduces the risk of BC but also enhances recovery and survival, particularly in postmenopausal women [30, 31].

Patients who had completed treatment reported significantly higher levels of distress than those undergoing active treatment. This is consistent with Thakur *et al.*'s study in North India, finding heightened distress and poor body image in the early months after completing treatment [32]. The long-term decline in distress aligns with the findings of Sajjadyan *et al.*, noting that BC patients adapt over time, utilizing problem-solving strategies and spirituality to cope [33]. The fear of disease recurrence can exacerbate distress, particularly in the post-treatment phase [34]. Corkum *et al.* also observed that higher distress scores are associated with reduced rates of immediate breast reconstruction post-treatment [35], while Westbrook *et al.* noted that distress peaks at symptom recurrence and is lowest during the first course of treatment [36]. These findings emphasize the need for psychological support even after treatment concludes, with palliative care planning playing a crucial role in addressing distress.

In terms of perceived risk, patients undergoing active treatment had significantly higher scores than those who had completed treatment. This observation aligns with Attari *et al.*'s findings, showing that higher perceived risk correlates with shorter treatment delays [37]. According to Leventhal's self-regulation model, emotional responses to illness influence individuals' coping strategies. Our results suggest that at the beginning of diagnosis and treatment, perceived risk is high, driving patients to initiate treatment. As treatment progresses and uncertainty diminishes, perceived risk decreases. Interestingly, we also observed an inverse relationship between perceived risk and distress [15]. As patients move through their treatment, their distress levels increase while perceived risk declines, highlighting the psychological complexity of BC cancer recovery.

Previous studies have shown that distress is highest in the first-month post-treatment and gradually decreases over time. For example, one study found that distress levels drop significantly within 12 months of treatment completion [38]. Comorbid depression can amplify the distress experienced by BC patients, underscoring the importance of integrating mental health screening from the point of diagnosis through post-treatment care [39]. Referrals to mental health professionals for psychological counseling and support could improve patients' self-regulation capacities and overall well-being.

Physical activity was significantly higher among patients who had completed treatment compared to those still undergoing treatment. Kelly *et al.*'s research supports this, showing that post-treatment patients are more physically active than those who are newly diagnosed and in active treatment [22]. Ormel *et al.* have identified several factors influencing physical activity, including a history of exercise, fewer physical limitations, and family support [40]. Rogers also demonstrated that aerobic exercise and muscle strengthening improved post-treatment outcomes for BC survivors [41]. These findings suggest that the treatment process, along with its side effects, reduces the opportunity and motivation for physical activity, which improves once treatment is completed.

Among the constructs of the self-regulation model, perceived treatment efficacy was strongly associated with health-promoting behaviors, such as maintaining a healthy diet, engaging in physical

activity, and taking vitamins, but it was inversely associated with regular mammography. This aligns with the findings of Cyriac *et al.*, demonstrating that self-regulation enhanced adherence to a healthy diet [42], and Rainey *et al.*, reporting improvements in health-promoting behaviors among women educated about BC risk factors, highlighting the role of awareness in lifestyle change [43]. However, according to Kelly *et al.*'s study, individuals undergoing active treatment consume less healthy food, use fewer vitamins, and attend fewer clinical examinations compared to those who had completed treatment. Additionally, higher perceived treatment effectiveness was linked to improved diet and vitamin use but showed no association with exercise or cancer screening [22]. Rastad *et al.* also revealed that while 55% of individuals have limited knowledge about BC, around 90% exhibit poor performance [44]. In our study, the limitations of accessing mammography in the public sector, the high cost in the private sector, and the difficulty of securing an appointment due to the limited number of centers available in the research environment at the time of the study may explain this behavior among patients.

The self-regulation model emphasizes that individuals adjust their behaviors in response to psychologically stimulating events, such as illness, by leveraging self-efficacy and feedback over time [15].

Patient registries are instrumental in understanding health outcomes and play a critical role in disease prevention and health improvement. By addressing the multifaceted needs of cancer patients, health-oriented models can utilize registry data to inform targeted interventions, ultimately optimizing health outcomes.

Although this study faced challenges, such as patients' reluctance to respond during active treatment, it highlights the importance of understanding the psychological and behavioral dimensions of BC recovery. Future studies should explore educational interventions based on the self-regulation model to promote health-enhancing behaviors in both active and post-treatment BC patients.

Conclusion

Perceived treatment effectiveness is closely linked to enhanced health-promoting behaviors.

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Ethical Permissions: The study was conducted in accordance with the Declaration of Helsinki, and ethical approval was obtained from the Ethics Committee of the Research and Technology Vice-Chancellor of Guilan University of Medical Sciences with the code IR.GUMS.REC.1399.297. Informed consent was obtained from all participants prior to data collection, ensuring their right to withdraw from the study at any time without any repercussions.

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