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Original Article

Relationship Between Health-Promoting Behaviors and Health Locus of Control in Women with Breast Cancer: The Mediating Role of Cancer Self-Efficacy

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Abstract

Background: Women diagnosed with breast cancer may be more inclined to take preventive measures if they believe they have control over their health. This study explored the mediating influence of cancer self-efficacy in the association between health locus of control (HLC) and health-promoting behaviors in women with breast cancer.

Method: In this descriptive-correlational study, a purposive sampling method was employed to select 282 women diagnosed with breast cancer in Ahvaz, Iran, between November 2021 and June 2022. Participants were requested to complete the Health-Promoting Lifestyle Profile II (HPLP-II), Multidimensional Health Locus of Control Scale (MHLC), and Cancer Behavior Inventory (CBI). The data was then analyzed using path analysis conducted with SPSS Amos version 25.

Results: The results indicated a significant correlation between cancer self-efficacy and health-promoting behaviors among women with breast cancer (P=0.001). A significant correlation was also between health-promoting behaviors and HLC in women (P=0.001). According to the results, the mediating role of cancer self-efficacy in the relationship between HLC and health-promoting behaviors was significant in women with breast cancer (P=0.001).

Conclusion: Consequently, the research model exhibited a satisfactory fit. This study's findings highlighted the influence of cancer self-efficacy in facilitating the impact of HLC on enhancing health-promoting behaviors in women with breast cancer.

Keywords: Breast neoplasms, Health behavior, Locus of control, Women

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1. Introduction

Cancer is a disease characterized by the deformation and abnormal proliferation of cells (1, 2). According to the American Cancer Society, more than 1.1 million new breast cancer cases are diagnosed annually in women worldwide. The prevalence of this disease increases by 1–2% every year in developed countries and 5% in less developed ones (3). In Iran, breast cancer is the most common malignancy diagnosed in women, comprising 24.4% of all cancers (4). Cancer has various effects on the lives of patients. The primary issues and problems that cancer patients typically encounter include the psychological and emotional effects of this disease, as well as diagnostic and therapeutic measures (e.g., stress, pain, and depression) (5). It also impacts family members, marital life, and social relationships, leading to economic and nutritional challenges and treatment complications (6). Reducing complications and mortality and improving the quality of life of cancer patients are among the most debated topics in psychology (7). An effective way to achieve these goals is through engagement in health-promoting behaviors (8). Several factors can influence health-promoting behaviors, including the health locus of control (HLC) and self-efficacy (9, 10). Women with breast cancer may be internally motivated to prevent the disease if they believe they have control over their health (11).

One of the key concepts in psychology is HLC, which posits that people can have an internal or external HLC. Individuals with an internal HLC believe they can manage their health, and their health status is directly affected by their behaviors and performance. Conversely, those with an external HLC believe that factors such as medical diagnosis, treatments, luck or fortune, and fate are responsible for their health (12). Previous studies indicated that some cancer patients possess an external HLC and trust their oncologist, while others have an internal HLC and believe in their

abilities to manage their health (13, 14).

As the central concept of Bandura's social-cognitive theory (15), self-efficacy refers to one's ability to accomplish a specific goal or task that produces a particular outcome, significantly affecting one's performance and emotions. Self-efficacy relates to one's belief in managing chronic disease health requirements and outcomes. One of the most critical factors influencing human behavior is self-efficacy. Judgments of one's inefficiency in a situation can create more significant pressure than the situation's quality and characteristics (16). Individuals with low self-efficacy tend to be pessimistic about their abilities and avoid situations that require skills beyond their current capabilities.

Conversely, those with high self-efficacy view challenging tasks as opportunities to overcome (17, 18). Since studies reported positive effects of self-efficacy on health-promoting behaviors, higher self-efficacy in cancer patients can be assumed to enhance their adaptation to their illness, improve their quality of life and emotional states, and alleviate their psychological problems (19, 20). Additionally, high self-efficacy can reduce cancer symptoms, enhance patients' mental well-being, and improve their communication with medical staff (21).

Moghaddam Tabrizi and colleagues (22) demonstrated a positive and significant correlation between self-efficacy and perceived social support. Park and colleagues (23) analyzed factors influencing health-promoting behaviors in patients with thyroid cancer. They reported variations depending on the disease stage: self-efficacy and social support in the acute stage, social support and fear of relapse in the extended stage, and social support and age in the permanent stage. Dopelt and co-workers (24) found that most patients had an external HLC, with women more frequently holding an external HLC than men. Some interviewees mentioned trusting their oncologists and believing they should follow their prescribed treatment without questioning or researching the disease and treatment options. Toscano and colleagues (25) analyzed the correlation between coping strategies, HLC, and health-related quality of life in breast cancer patients, showing that negative coping strategies and HLC remained positive throughout the disease, affecting changes in quality of life.

Additionally, emotional coping and internal HLC were associated with changes in the quality of life in these patients. Wu and colleagues (26) demonstrated that self-efficacy and hope completely mediated the correlation between positive coping and resilience. Furthermore, Marr and Wilcox (27) indicated that self-efficacy and social support mediated the correlation between internal HLC and health practices. The present study aimed to investigate the mediating role of cancer self-efficacy in the correlation between HLC and health-promoting behaviors in women with breast cancer. Additionally, the conceptual model of the current study is depicted in Figure 1.

2. Methods

2.1. Design and Participants

This cross-sectional study was conducted among all women diagnosed with breast cancer in Ahvaz, Khuzestan Province, Iran, from November 2021 to June 2022.

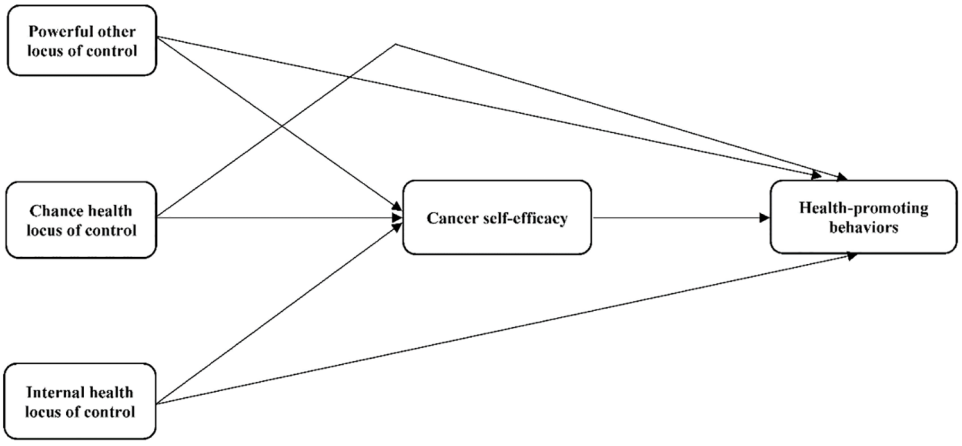

Figure 1: The figure shows the conceptual model of the study.

2.2. Inclusion and Exclusion Criteria

The inclusion criteria were as follows: having a minimum of a guidance school degree, 18 years of age or older, and having been diagnosed with breast cancer. The exclusion criteria were having acute psychiatric disorders, being on psychoactive drugs, and failing to complete the research questionnaires.

2.3. Procedure

The researchers visited the chemotherapy centers of Ahvaz hospitals and the chemotherapy departments at the offices of oncologists and surgeons to select participants. In order to ensure the sample's representativeness concerning the number of research variables (28), purposive sampling was employed, resulting in the selection of 300 women as the research sample. Accounting for potential experimental mortality, distorted questionnaires, and outliers, 282 questionnaires were utilized to analyze and test the research hypotheses. Upholding ethical principles throughout this study, the researchers personally completed all research questionnaires. Furthermore, the relevant officials and participants were informed about the research objectives and procedures before completing the questionnaires. Written informed consent was obtained from all participants by the researchers.

2.4. Measurement Tools

2.4.1. Health-Promoting Lifestyle Profile II (HPLP-II): Designed by Walker and colleagues (29), this questionnaire comprises 52 items across six dimensions, scored on a 4-point Likert scale. The total score on this tool ranges from 52 to 208. In the study by Mohamadian and co-workers (30), the questionnaire's validity was confirmed (CVI=0.84, CVR=0.90). Additionally, Mohamadian and co-workers (30) reported an alpha Cronbach coefficient of 0.86 for the HPLP-II. In this study, the obtained Cronbach's alpha was 0.85.

2.4.2. Multidimensional Health Locus of Control Scale (MHLC): Developed by Wallston and colleagues (31), the MHLC assesses the health locus of control for individuals in various fields, including medicine, psychology, health management, and others. This scale comprises 18 items categorized into three subscales: Powerful Other Locus of Control (PHLC), Chance Health Locus of Control (CHLC), and Internal Health Locus of Control (IHLC). Jafari and colleagues (32) reported an alpha Cronbach coefficient of 0.86 for the MHLC. They (32) confirmed the validity of the MHLC (CVI=0.90, CVR=0.91). Furthermore, in this study, the Cronbach's alpha was 0.79.

2.4.3. Cancer Behavior Inventory (CBI): The CBI is a highly valid and reliable measurement tool consisting of 33 items, widely utilized in various studies to assess topics such as medical records, preventive behaviors, and cancer knowledge. This multidimensional tool comprises seven subscales designed to measure the quality of life in cancer patients. Each item on this scale is rated on a 9-point Likert scale, with scores ranging from 33 to 297, where higher scores indicate a higher level of self-efficacy in cancer patients (33). Karamoozian and colleagues (34) reported an alpha Cronbach coefficient 0.75 for the CBI. They (34) confirmed the validity of the CBI (CVI=0.98, CVR=0.98). In this study, the Cronbach's alpha was 0.81.

2.5. Statistical Analyses

The data were subjected to statistical analysis, which included descriptive statistics such as mean, standard deviation, and minimum and maximum scores. The correlation between the studied variables was assessed using the Pearson correlation coefficient. Additionally, path analysis was employed to evaluate the hypothesized model in SPSS Amos version 25.

3. Results

According to the demographic results, 12 (4.26%), 45 (15.96%), 129 (45.74%), and 96 (34.04%) of the women held master degrees, bachelor degrees, high school diplomas, and middle school education, respectively. Additionally, 19 (6.74%), 11 (41.84%), and 145 (51.42%) of the participants fell into the age groups of 20–35, 35–50, and 50–65 years old, respectively. Among the women in this study, 211 (74.82%) were homemakers, while 71 (25.18%) were employed. Table 1 presents the research variables' mean, standard deviation, minimum, and maximum scores. Furthermore, Table 1 displays the matrix of correlation coefficients among research variables to assess their correlations. As per Table 1, significant correlations were observed among all research variables.

Based on the goodness-of-fit indices in Table 2,

Table 1: Mean, standard deviation, minimum, maximum scores and correlation coefficient between research variables

Variables	Mean±SD	Min.	Max.	1	2	3	4	5
1- Powerful other locus of control	28.13±3.04	21	32	1				
2- Chance health locus of control	24.43±8.11	17	31	0.25**	1			
3- Internal health locus of control	23.11±6.36	19	30	0.39**	0.30**	1		
4- Cancer self-efficacy	96.17±18.21	88	169	0.43**	0.34**	0.45**	1	
5- Health-promoting behaviors	133.35±24.12	98	180	0.32**	0.21**	0.31**	0.51**	1

**P<0.01, SD: Standard Deviation

Table 2: Fit indicators in the proposed and modified models

Fit indicators	χ^2	df	(χ^2/df)	IFI	TLI	CFI	NFI	RMSEA
Proposed model	9.37	2	4.69	0.92	0.94	0.91	0.88	0.310
Modified model	5.77	3	1.92	0.99	0.94	0.99	0.98	0.060

IFI: Incremental Fit Index; TLI: Tucker–Lewis index; CFI: Comparative Fit Index; NFI: Normed Fit Index; RMSEA: Root Mean Square Error of Approximation

Table 3: Path coefficients of direct correlation between study variables in the proposed and modified models

Path	Proposed model		Modified model	
	β	P	β	P
Powerful other locus of control to health-promoting behaviors	0.10	0.912	-	-
Chance health locus of control to health-promoting behaviors	-0.02	0.710	-	-
Internal health locus of control to health-promoting behaviors	0.06	0.270	-	-
Cancer self-efficacy to health-promoting behaviors	0.44	0.001	0.52	0.001
Powerful other locus of control to cancer self-efficacy	0.27	0.001	0.27	0.001
Chance health locus of control to cancer self-efficacy	-0.19	0.001	-0.19	0.001
Internal health locus of control to cancer self-efficacy	0.29	0.001	0.29	0.001

the proposed model did not adequately fit the data and was subsequently excluded from consideration. Some direct paths within the model (PHLC to health-promoting behaviors, CHLC to health-promoting behaviors, and IHLC to health-promoting behaviors) were non-significant based on the standard parameter coefficients and significance levels detailed in Table 3. Subsequently, the goodness of fit for the modified model was reassessed. Table 2 presents the fit indices for the modified model, and the results indicated that the modified model demonstrated a good fit with the data. Consequently, it was selected as the final model. Figure 2 illustrates the standardized path coefficients in the finalized model.

In this study, self-efficacy served as the mediating variable, and a bootstrap test was conducted to assess the significance of mediating correlations. The findings revealed that self-efficacy significantly mediated the correlation between HLC and health-promoting behaviors in women with breast cancer (P=0.001) (Table 4).

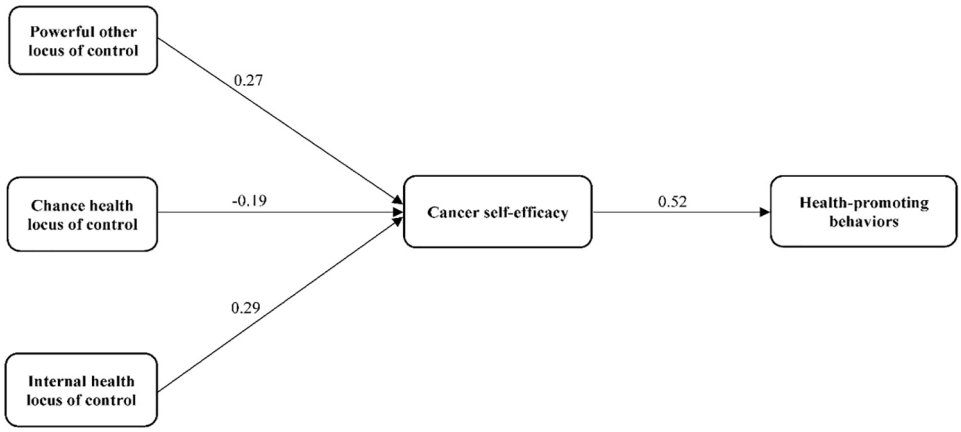

Figure 2: The figure shows the modified model of the mediating role of cancer self-efficacy in the correlation between health locus of control and health-promoting behaviors.

Table 4: Estimation of indirect paths in the modified model

Paths	Modified model	
	β	P
Powerful other locus of control to health-promoting behaviors through the mediating role of cancer self-efficacy	0.14	0.001
Chance health locus of control to health-promoting behaviors through the mediating role of cancer self-efficacy	-0.09	0.001
Internal health locus of control to health-promoting behaviors through the mediating role of cancer self-efficacy	0.15	0.001

4. Discussion

The present study aimed to investigate the mediating role of cancer self-efficacy in the correlation between Health Locus of Control (HLC) and health-promoting behaviors in women with breast cancer. According to the research results, no significant associations existed between health-promoting behaviors and either Personal Health Locus of Control (PHLC) or Chance Health Locus of Control (CHLC). Since these variables were analyzed in this study as a model, the lack of a significant direct association could be attributed to the correct selection of the mediator in the assumed model, with the mediator explaining the entire share of the association through the indirect path. As a result, the direct association was not statistically significant; however, this does not imply that it was clinically insignificant.

In contrast to our results, Sepah Mansour and Bagheri (35) reported a significant correlation between health-promoting behaviors and PHLC or CHLC. Moreover, Hossaini and colleagues (36) reported a significant correlation between health-promoting behaviors and Internal Health Locus of Control (IHLC) in medical and non-medical students. This correlation became significant after removing the mediating variables from the model, as demonstrated by simple correlation coefficients. Additionally, women with breast cancer who have IHLC typically exhibit a higher sense of responsibility and are less influenced by others, thereby making their own decisions. Positive job performance with attributes such as creativity, initiative, freedom, positive self-efficacy, hard work, high self-confidence, a challenging spirit, and high perceived physical health are the most important personality traits of individuals with IHLC (13). Considering the findings of previous studies regarding IHLC, it can be stated that women with breast cancer who have IHLC can better cope with life issues and adopt adaptive methods (24). Compared with those with external HLC, these individuals pay more attention to and often engage in health-promoting behaviors.

Consistent with previous findings, it can be stated that women with breast cancer with a high CHLC score believe that they have no control over their health and that their health is influenced by factors such as luck (24, 35). Consequently, they engage in health-promoting behaviors less frequently. Moreover, such individuals act passively and exhibit poor social functioning because they believe that events are uncontrollable. Previous studies also showed that a high CHLC score is associated with unhealthy behaviors such as smoking, inappropriate eating habits, inactivity, obesity, poor dental hygiene, and alcohol abuse (37). A high CHLC score is regarded as a risk factor for health-related behaviors. The study's findings suggested that women with breast cancer who have IHLC generally pay more attention to health-promoting behaviors, including maintaining good eating habits, increasing exercise, managing stress, and maintaining a positive perception of their quality of life.

Individuals with Internal HLC are likelier than those with External HLC to engage in health-promoting behaviors, which contribute to disease prevention and health promotion (12).

Previous research found a significant correlation between self-efficacy and health-promoting behaviors in women with breast cancer (22). Furthermore, disease self-efficacy is defined as a patient's trust or belief in understanding and managing a disease, which can be influenced by the patient's knowledge of the disease and the importance of treatment adherence, particularly for chronic diseases like cancer. Consequently, increasing patients' self-efficacy and adherence to treatment plays a significant role in disease management (38). According to Bandura, people's behavior is frequently predicted by their beliefs in their abilities (39). Due to their low self-efficacy

beliefs, breast cancer patients may perform poorly, even though they possess the necessary abilities to manage post-treatment complications and symptoms.

On the other hand, patients with high levels of self-efficacy naturally desire to improve their circumstances and exhibit more extraordinary tenacity in overcoming challenges related to their illness. As a result, they can better manage and control it (40). In other words, this finding demonstrated that cancer patients must believe that they can engage in self-care activities and that these activities positively affect their health to engage more in health-promoting behaviors.

Consistent with previous studies, this research reported a significant correlation between HLC and self-efficacy in women with breast cancer (27). To explain this finding, one can state that individuals react differently to challenges depending on how much control they believe they have over their lives. This study also found that internal IHLC significantly affected health-promoting behaviors. Accordingly, women with breast cancer who have IHLC tend to choose healthier behaviors and are more efficient in dealing with their disease.

4.1. Limitations

Given that this study was conducted exclusively on women with breast cancer in Ahvaz, Khuzestan Province, Iran, caution must be exercised when attempting to extrapolate the findings to other populations. Due to the specific nature of the target statistical population, which consisted solely of women with breast cancer, researchers encountered considerable challenges in recruiting participants for the study. Furthermore, participants had to be excluded from the research due to their illnesses, rendering them incapable of completing the questionnaires.

5. Conclusion

It is recommended that the results of this study be utilized to increase awareness among cancer patients. Therapists and counselors, recognizing the pivotal role of research variables in enhancing the treatment process, are advised to employ diverse techniques to enhance patients' self-efficacy and adherence to health-related behaviors. For instance, they can foster more effective communication and trust between patients and therapists by emphasizing improved patient-provider interactions. Simultaneously, they can encourage patients to partake in health-promoting activities actively.

Ethical Approval

The Ethics Review Board of Islamic Azad University- Ahvaz Branch approved the present study with the code of IR.IAU.AHVAZ.REC.1400.087. Also, written informed consent was obtained from the participants.

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Authors' Contribution

Ameneh Etemadi Asl: Substantial contributions to the conception and design of the work; the acquisition, analysis, and interpretation of data for the work, drafting the work. Sasan Bavi: Substantial contributions to the conception and design of the work; the acquisition, analysis, and interpretation of data for the work, drafting the work and reviewing it critically for important intellectual content. Reza Johari Fard: Substantial contributions to the design of the work, drafting the work and reviewing it critically for important intellectual content. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work, such that the questions related to the accuracy or integrity of any part of the work.

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