Research Paper

Mediating Role of Cognitive Emotion Regulation Strategies in the Relationship Between Anxiety and Body Image in Women With Breast Cancer Volunteered for Mastectomy

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ABSTRACT

Background: The loss of breast is a major concern for women with breast cancer volunteer for mastectomy, because they feel that their feminine identity is at risk of damage. The present study aims to investigate the mediating role of Cognitive Emotion Regulation (CER) in the relationship between anxiety and body image in women with breast cancer volunteered for mastectomy.

Methods: The is a correlational study. The study population consists of all women with breast cancer volunteered for mastectomy referred to Imam Khomeini and Imam Hossein hospitals in Tehran, Iran. Of these, 350 volunteers were selected by a convenience sampling method. The instruments were Beck Anxiety Inventory, Body Image and Relationship Scale of Hormes et al., and Cognitive Emotion Regulation Questionnaire of Garnefski et al. Structural equation modeling were used to analyze the research hypotheses.

Results: Anxiety had a positive effect on maladaptive CER strategies (β=0.654) and a negative effect on body image (β=-0.574) (P<0.001). The direct effect of maladaptive CER strategies on body image was positive and significant (β=0.271, P<0.05). The direct effects of anxiety on adaptive CER strategies (β=-0.836) and body image (β=-0.849) were negative and significant (P<0.001). The direct effect of adaptive CER strategies on body image was negative and significant (β=−0.266, P<0.001).

Conclusion: Women undergoing mastectomy will experience more anxiety and negative body image if they use maladaptive CER strategies, while those who use adaptive CER strategies will experience less anxiety and negative body image.

Keywords: Breast cancer, Anxiety, Body image, Cognitive emotion regulation
1. Introduction

The increasing prevalence of cancer in Iran in recent years has led to the recognition of cancer as the major health problem [1]. Unhealthy lifestyles, including smoking, unhealthy diet, sedentary behaviors, as well as changes in the reproductive system, have been shown to intensify the risk of cancer [2]. Breast cancer accounts for 25.5% of all cancers [3] and, according to the World Health Organization, 1.1 million patients with breast cancer are diagnosed each year worldwide [4]. According to the 2020 cancer report published by the World Health Organization, breast cancer is still the second leading cause of death in the world with an incidence rate of 11.6% and mortality rate of 6.6%, which is more common in developing countries in the Middle East [5]. In Iran, according to the latest national report in 2015, breast cancer is the most common type of cancer in women, and its prevalence is 32.9 per 100,000 people, which is higher in Tehran province [6, 7].

What is more worrying is that the patients with breast cancer in Iran are younger than those in western countries [8], and it is the fourth disease with the highest burden among women [9]. However, patients with breast cancer have a longer survival after diagnosis than other cancer cases [10], which requires paying psychological attention to improve the quality of life of these patients. Meanwhile, women undergoing mastectomy surgery experience a lot of psychological distress due to concerns about body image. It has been found that the treatment of breast cancer by mastectomy is significantly related to negative body image, and the results confirm its long-term effects on the quality of life, sexual attractiveness, and psychological adjustment after surgery [11]. Body image is defined as one’s perceptions about physical appearance, but for women it is related to wholeness, and it has been found that women who consider body image as a major factor for their self-esteem, attractiveness and wholeness, have poor psychological adjustment after breast cancer treatment [12].

Breast cancer alters psychological and physical symptoms and femininity in affected women [13]. In this regard, studies have reported different prevalence rates of psychiatric disorders in patients with breast cancer. For example, Grabsch et al. [14] reported the prevalence of psychiatric disorders in women with breast cancer as 42%, and stated that 35% of them suffered from depressive disorder, anxiety or both. Burgess et al. [15] state that 50% of women with breast cancer had symptoms of depressive disorder, anxiety, or both at the time of diagnosis. Grabsch et al. [14], reported the prevalence rate of anxiety symptoms as 32-45% over a 6-month period after the diagnosis of breast cancer. Refaei Saeedi et al. [16] in review study estimated the prevalence of moderate to severe anxiety in women with breast cancer as 16%-65%.

Body image problems in women with mastectomy are affected by age. Young women who attach great importance to their body image, have less satisfaction with body image and poorer psychological adjustment after surgery compared to older women. The variable that can play a mediating role is emotion regulation, which is the process through which a person evoke, maintain, control or change own emotions [17]. According to Gross and Thompson’s emotion regulation model, cognitive emotion regulation strategies can play a role in psychiatric disorders. Various studies have proven its role in depression [18-20], generalized anxiety disorder [21], bipolar disorder [22], eating disorders [23], and social anxiety [24], suicidal ideation [25], marital satisfaction [26], post-traumatic stress disorder [27], autism spectrum disorder [28], substance abuse [29, 30], attention deficit/hyperactivity disorder [31] and borderline personality disorder [32, 33].

Considering that the prevalence of anxiety and stress in women with breast cancer volunteer for mastectomy is increasingly high, and given that a woman with mastectomy finds herself physically and mentally damaged, and due to the relatively high prevalence of breast cancer in Iran (which imposes a great financial burden on the country’s health system) and the importance of Cognitive Emotion Regulation (CER) strategies for its mediation, it seems necessary to know the psychological factors related to breast cancer and its mediating variables. Therefore, this study aims to investigate the mediating role of CER in the relationship between anxiety with body image of women with breast cancer volunteer for mastectomy. This study can help therapists and health policymakers be able to reduce anxiety and concerns about body image in these women by using mediating variables (i.e. CER strategies). Figure 1 depicts the conceptual model of the current study.

2. Methods

This is a correlational study using Structural Equation Modeling (SEM). The study population consists of all women with breast cancer volunteered for mastectomy at Imam Hossein and Imam Khomeini hospitals in 2020-2021. The sampling was done using a convenience sampling method. In this regard, 350 volunteers were select-
ed based on the recommendations of Halinsky & Floret and Miller & Kans [34]. Descriptive statistics, including frequency, were used to describe the data. The SEM (combination of path analysis and confirmatory factor analysis) was used to analyze the research hypotheses. The used instruments were:

**Beck Anxiety Inventory (BAI):** Developed by Beck et al. [35], it is a 21-item tool that measures the severity of anxiety in adolescents and adults. A score of 1-7 indicates normal anxiety, a score of 8-15 suggests mild anxiety, a score of 16-25 shows moderate anxiety, and a score of 26-63 indicates severe anxiety. The items are scored on a 4-point Likert scale [35]. This questionnaire has high reliability. The internal consistency of the questionnaire (Cronbach’s alpha) is 0.92, its test-retest reliability over a one-week interval is 0.75, and the correlation of its questions varies from 0.3 to 0.76 [36, 37]. Moreover, its content validity, concurrent validity and factor validity has been confirmed in various studies, which indicates the high validity of this scale for measuring anxiety [38]. The test-retest reliability in our study for the Persian BAI was reported 0.78.

**Body Image and Relationship Scale (BIRS):** This 32-item questionnaire was developed by Hormes et al. [11] to measure the body image of women with breast cancer. This scale has three subscales of health & strength, social barriers, and appearance & sexuality. Larsson et al. [39] reported the reliability of the scale using Cronbach’s alpha as 0.96, and its convergent validity reported 0.68. For its Persian version, Izadi et al. [40] reported a reliability using Cronbach’s alpha on 73 women with breast cancer as 0.91, and its correlation with Alice Pope’s Self-Esteem inventory was reported 0.82 [41]. The test-retest reliability of the Persian BIRS in our study was obtained 0.74.

**Cognitive Emotion Regulation Questionnaire (CERQ):** This questionnaire was designed by Garnefski et al. [44] to assess an individual’s CER strategies. The questionnaire has 18 items and 9 subscales: self-blame, blaming others, acceptance, planning, positive refocusing, rumination, positive reappraisal, putting into perspective, and catastrophizing [42]. For its Persian version, Cronbach’s alpha at a range of 0.68-0.82 for the subscales showed good reliability. The correlation coefficient between the subscales also showed a strong internal correlation between them. Furthermore, the correlation between the subscales of CERQ with Beck Depression Inventory indicated its high concurrent validity [43]. The test-retest reliability of the Persian CERQ in our study was reported 0.80.

### 3. Results

Table 1 presents the demographic characteristics of participants.

Table 2 shows the results of Kolmogorov-Smirnov test used to examine the assumption that the normality of...
data distribution. Since P>0.05, the assumption of normal distribution was confirmed. Therefore, parametric tests can be used [45] (Table 3).

Table 4 shows that the indirect effect of anxiety on the body image (-0.22) mediated by adaptive CER strategies was significant (P=0.003); adaptive CER strategies reduced anxiety in patients who were worry about their body image. The indirect effect of anxiety on the body image (0.18) mediated by maladaptive CER strategies was also significant (P<0.05). Therefore, it can be said that CER strategies play a mediating role in the relationship between anxiety and body image in women with breast cancer volunteer for mastectomy. The maladaptive CER strategies had a moderate effect size and an increasing mediating role.

Table 5 shows that the direct effect of anxiety on body image was negative and significant (β=-0.574, P<0.001). The direct effect of maladaptive CER strategies on body image was positive and significant (β=0.271, P<0.05). In other words, the patients with maladaptive CER strategies experience more anxiety. The direct effects of anxiety on adaptive CER strategies (β=-0.836) and body image (β=-0.849) were negative and significant (P<0.001). The direct effect of adaptive CER strategies on body image was negative and significant (β=-0.266, P<0.001). In

Table 1. Demographic characteristics of participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>No.(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Y)</td>
<td>25-40</td>
<td>84(24.0)</td>
</tr>
<tr>
<td></td>
<td>40-55</td>
<td>198(57.56)</td>
</tr>
<tr>
<td></td>
<td>55-70</td>
<td>68(19.42)</td>
</tr>
<tr>
<td>Level of education</td>
<td>Lower than high school or diploma</td>
<td>193(55.14)</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>116(33.14)</td>
</tr>
<tr>
<td></td>
<td>Master’s degree and higher</td>
<td>41(11.71)</td>
</tr>
<tr>
<td>Occupation status</td>
<td>Employed</td>
<td>81(23.14)</td>
</tr>
<tr>
<td></td>
<td>Housewife (retired/unemployed)</td>
<td>269(76.85)</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>78(22.28)</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>272(77.71)</td>
</tr>
</tbody>
</table>

Table 2. Kolmogorov-Smirnov (K-S) test results to examine the normality of data distribution

<table>
<thead>
<tr>
<th>Variables</th>
<th>K-S</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body image</td>
<td>0.855</td>
<td>0.156</td>
</tr>
<tr>
<td>Adaptive CER strategies</td>
<td>0.750</td>
<td>0.254</td>
</tr>
<tr>
<td>Maladaptive CER strategies</td>
<td>0.790</td>
<td>0.231</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.680</td>
<td>0.217</td>
</tr>
</tbody>
</table>
other words, the patients with adaptive CER strategies experience less anxiety.

4. Discussion

This study aimed to investigate the mediating role of CER strategies in the relationship between anxiety and body image in women with breast cancer volunteered for mastectomy. The results showed that the adaptive strategies (positive effect) and maladaptive strategies (negative effect) has direct or indirect mediating roles. It can be said that breast cancer patients who use maladaptive CER strategies experience more anxiety and negative body image, while those who use adaptive CER strategies experience less anxiety and negative body image [46]. Findings obtained from this study are consistent with those of previous studies including Sobhani et al. [47], Soltaninejad [48], Dadfarnia et al. [49], Roosta et al. [50], Mahdieh et al. [51], Jahangiri et al. [52], Esfahani [53], Sajjadi and Askarizadeh [54], Sayah et al. [55], Mardani and Mehrabi [56], Weindl et al. [57], Liu et al. [58], and McLafferty et al. [59]. Table 3 shows that adaptive CER strategies is negatively correlated with anxiety and positively correlated with body image. Also maladaptive CER strategies is positively correlated with anxiety and negatively correlated with body image.

Sobhani et al. [47] in a study on mastectomy patients reported that adaptive CER strategies can play a unique role in predicting specific aspects of coping challenges, stress, chronic disease, and surgery. As the sense of control decreases in a person, s/he faces more emotional and

Table 3. Correlation matrix between anxiety, CER strategies, and body image

<table>
<thead>
<tr>
<th>Row</th>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anxiety</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Body image</td>
<td>-0.627**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Adaptive CER strategies</td>
<td>-0.836**</td>
<td>0.444**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Maladaptive CER strategies</td>
<td>0.654**</td>
<td>-0.457**</td>
<td>-0.650**</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 4. Bootstrap test results to determine the mediating role of CER strategies in the relationship between anxiety and body image**

<table>
<thead>
<tr>
<th>Independent</th>
<th>Mediating</th>
<th>Dependent</th>
<th>Resampling</th>
<th>Estimation Error</th>
<th>Bootstrap Bound</th>
<th>Effect Size</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>Adaptive CER strategies</td>
<td>Body image</td>
<td>2000</td>
<td>0.065</td>
<td>-0.350</td>
<td>-0.22</td>
<td>0.003</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Maladaptive CER strategies</td>
<td>Body image</td>
<td>2000</td>
<td>0.052</td>
<td>0.136</td>
<td>0.18</td>
<td>0.032</td>
</tr>
</tbody>
</table>

P<0.01.

**Table 5. Regression coefficients**

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Criterion Variables</th>
<th>β</th>
<th>B</th>
<th>Standard Error</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>Maladaptive CER strategies</td>
<td>0.654</td>
<td>0.335</td>
<td>0.021</td>
<td>16.139</td>
<td>0.010</td>
</tr>
<tr>
<td>Maladaptive CER strategies</td>
<td>Body image</td>
<td>0.271</td>
<td>0.155</td>
<td>0.105</td>
<td>4.475</td>
<td>0.025</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Body image</td>
<td>-0.574</td>
<td>-0.562</td>
<td>0.054</td>
<td>-10.460</td>
<td>0.010</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Adaptive CER strategies</td>
<td>-0.836</td>
<td>-0.528</td>
<td>0.019</td>
<td>-28.418</td>
<td>0.047</td>
</tr>
<tr>
<td>Adaptive CER strategies</td>
<td>Body image</td>
<td>0.266</td>
<td>0.412</td>
<td>0.115</td>
<td>3.564</td>
<td>0.028</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Body image</td>
<td>-0.849</td>
<td>-0.831</td>
<td>0.073</td>
<td>-11.395</td>
<td>0.031</td>
</tr>
</tbody>
</table>

P<0.001.
psychological problems. Using adaptive CER strategies such as positive reappraisal can increase a person’s sense of control over the inner and outer worlds, which in turn reduces emotional problems. CER skills are the most effective individual factor in mental health and increase the sense of control over the inner and outer worlds [46]. The results can be explained by the fact that women with breast cancer volunteered for mastectomy can regulate their emotion by using adaptive CER strategies, including positive reappraisal and positive refocusing. In other words, the person learns how to identify and correct their distortions, to prevent the occurrence of negative emotions, and to exercise more control over their thoughts and emotions. In this way, they can prevent the onset and severity of anxiety.

The mediating role of maladaptive CER strategies can also be explained by the fact that these strategies including self-blame, can cause anxiety by decreasing positive emotions and even increasing negative emotions. Previous studies have shown that excessive use of negative CER strategies such as rumination, catastrophizing, self-blame is associated with high levels of negative emotional reactions such as depression, anxiety; the constant use of these strategies causes intensification and persistence of negative emotions which causes the patients to experience confusion and anxiety instead of responding appropriately to their disease; this anxiety can lead to negative body image especially in women with breast cancer and mastectomy. Another explanation is that the use of adaptive CER strategies causes the patients to look at negative events differently and pay attention to the positive aspects and possible benefits of that event (e.g., mastectomy) in the long run. As a result, they experience less discomfort and tension and can cope with the problems more easily. The use of maladaptive CER strategies causes the person to be anxious instead of responding appropriately to the event, which leads to negative body image.

According to Maroon’s description, adaptive CER strategies act as a social support mechanism and play a major role in emotional disorders such as anxiety. Furthermore, it can be stated that cognition, emotion and behavior are fully interact with each other; CER, by controlling attention and cognitive consequences of emotions, changes the function of the cognitive schema system and, consequently, anxiety symptoms in women with breast cancer volunteered for mastectomy.

5. Conclusion

It can be concluded that CER strategies plays a mediating role in the relationship between anxiety and body image in women with breast cancer volunteered for mastectomy. The use of CER strategies can affect their body image concerns and prevent the destruction of their feminine identity, which in turn can affect the outcome of their treatment. The results of this study can help physicians, psychiatrists, psychologists and counselors.

Limitations

The study had a cross-sectional design, which limits a definitive causal conclusion. We used self-report tools which may offer biased estimates. The role of context was not examined in this study; the structure of this research was mostly adjectives.

Recommendations

Further longitudinal studies can help better understand the variables. Use of clinical interview along with questionnaire is also recommended. The environmental variables should be considered in future studies.

Ethical Considerations

Compliance with ethical guidelines

This study has an ethical approval from Islamic Azad University of Science and Research Branch (Code: IR.IAU..SRB.REC.1399.095).

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Authors’ contributions

Study design, data collection and analysis: Rohollah Zali; Draft preparation: All authors.

Conflict of interest

The authors declared no conflict of interest

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References


