



# The Predictive Role of Body Image and Sexual Function in Quality of Life After Modified Radical Mastectomy Regarding the Mediating Role of Emotion; A Cross Sectional Study

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## Abstract

**Background:** Mastectomy has negative effects on body image, sexual function, and quality of life (QOL). Additionally, maladaptive emotion regulation strategy is considered a trans-diagnostic mechanism underlying the psychiatric syndrome in these patients.

**Objectives:** The predictive role of body image and sexual function in QOL regarding the mediating role of difficulty in emotion regulation has not been studied yet.

**Methods:** In a correlational study, from March to December 2016, among patients undergoing modified radical mastectomy (MRM) at Early-stage Breast Cancer (BC), 90 patients were selected, using respondent-driven sampling (RDS). To collect the data, the Multi-dimensional Body-Self Relations Questionnaire (MBSRQ), the Persian language version of the Female Sexual Function Index (P-FSFI), QOL questionnaire, and Difficulties in Emotion Regulation Scales (DERS) were used. Data were analyzed through Pearson's correlation coefficient, regression analysis, and path analysis, using AMOS and SPSS software version 22 and the significance criterion was considered 0.05.

**Results:** Data analysis showed a direct relationship between body image and sexual function with QOL, and it had an inverse relationship with difficulty in emotion regulation ( $P < 0.01$ ). Also, body image, sexual function, and difficulty in emotion regulation were predictors of QOL ( $P < 0.01$ ). Besides, in predicting QOL based on sexual function and body image, the difficulty in emotion regulation has a mediating role ( $P < 0.01$ ).

**Conclusions:** In patients with breast cancer under mastectomy, proper sexual function, sexual attraction depending on body image, and QOL were influenced by emotion regulation. Reducing the difficulty in emotion regulation through emotion-focused interventions can improve QOL in patients.

**Keywords:** Modified Radical Mastectomy, Body Image, Sexual Behavior, Emotions, Quality of Life

## 1. Background

Breast Cancer (BC) is one of the most common types of cancer in women (1, 2). The incidence of BC in women was 22 per 100 000. However, in the last few decades, we have seen an increase in the survival rate in patients with BC. The survival rate of women with BC from the first decade of the 21st century has increased from 75% (2000-2002) to 77.2% (2012 - 2014) (3). More survival rate after the diagnosis of BC has already highlighted the role of psychological factors in improving quality of life (QOL) in patients (4).

On one hand, the research background shows that cancer treatment (Surgery, Radiotherapy, and Systematic Treatment Selection) can be associated with physical and psychological consequences (3, 5-8). Physical changes such as hair loss and sexual problems and psychological changes such as the loss of QOL, body image dissatisfaction, and difficulty in emotion regulation in Breast cancer survivors (BCS) after surgery are common in such patients (4).

Among the cancer treatments, surgery can lead to anx-

ity, depression, body disfiguration, poor QOL, and sexual dysfunction (3). Surgery can also be associated with some consequences such as pain and psychological problems in admitting the new body (9). One of the types of therapeutic interventions in cancer is mastectomy. Mastectomy has negative effects on body image, sexual function, and QOL in patients (10). BCS experience disappointment due to the body disfiguration after surgery. Research findings show that, even after 18 months of the treatment of cancer, despite improvement in physical function, the indices of emotion regulation and QOL in patients with cancer did not significantly improve (4).

On the other hand, body image is a psychological structure that reflects the person's perceptions, emotions, and attitudes about his or her body and can affect sexual function and satisfaction (11). The body image has two positive and negative dimensions. Positive body image is not defined solely by the absence of a negative body image and is somehow the appreciation of the person towards his/her body, although it may include some aspects the person considers unpleasant (12). Negative body image is one of the most common concerns in women with BC (13).

In the BCS, the body image may be affected by various factors, including socioeconomic status, treatment method, QOL, and sexual function (3). The research background shows that the patient's perception of body image after surgery has a significant difference compared to before surgery (1).

Sexual function is one of the factors that have a close interaction with body image. Generally, a positive body image is associated with sexual function and satisfaction (9, 11). The female sexual dysfunction (FSD) in women with BC is highly prevalent (14). Mastectomy, in particular, can damage body image and, subsequently, reduce sexual function. The results of the study by Darwish et al. (15) showed that body image scores and sexual function in women under modified radical mastectomy (MRM) are significantly lower. In addition to the damage to the body image and sexual function, the QOL decreases in women with BC. Studies have shown that coping behaviors in patients with BC can affect their QOL (16). In this regard, maladaptive emotion regulation strategy has been identified as a trans-diagnostic mechanism underlying the psychiatric syndrome in patients with BC (17).

Today, we see the growth of scholarly research focusing on body image, sexual function, and QOL in women after the oncological treatment of BC (3). Studies have shown that the negative effects of surgery in patients with BC, especially on body image and sexual function, remain unchanged over time (4).

## 2. Objectives

Knowing the important factors in the body image, QOL, sexual function, and emotion regulation can facilitate the process of improving BCS. Despite the increasing growth of studies about physical and psychological components, the interaction of these indices has not been studied yet. Therefore, the present study was conducted to investigate the predictive role of body image and sexual function in QOL after MRM, considering the mediating role of emotion regulation.

## 3. Methods

The present study was a cross sectional study in the form of correlational design based on path analysis. Data were collected from March to December 2016. A total of 90 patients (18 - 65 years old, Median = 44.12, standard deviation = 7.34) under the MRM in the early stages of BC (stage IA to IIB), 6 months after completing an oncology treatment using respondent-driven sampling (RDS) method (18), that is a combination of chain sampling and a mathematical model (Markov chain theory and networks bias), were considered for the study. The sample size ( $n = 90$ ) was estimated based on the allocation of 5 subjects per each parameter (19). Data were collected, using questionnaires and interviews. The instruments included a demographic checklist, structured clinical interviews, Multi-dimensional Body-Self Relations Questionnaire (MBSRQ), Female Sexual Function Index (FSFI), The WHO Quality of Life assessment short version (WHOQOL-BREF), and the Difficulties in Emotion Regulation Scale (DERS). Also, data of each patient were collected from archives in the pathology department.

The inclusion criteria included: 1) age range of 18 to 65 years; 2) history of BC; stage 1 or 2; 3) passing minimum 1 and maximum 5 years from mastectomy; and 4) obtaining informed consent for participation in the study. The exclusion criteria included: 1) history of chronic diseases such as cardiovascular, kidney, liver, diabetes, asthma, thyroid disease, rheumatoid arthritis (RA), cerebrovascular disease, and connective tissue disease; 2) taking the drug (Opioid Analgesics, Anti-nausea, and steroids) 3 months before the study.

The demographical checklist was developed by the researcher to collect personal information such as age, marital status, and history of the disease (20).

Structured clinical interview (SCID) is a clinical interview used to diagnose the dysfunctions of axis 1 based on DSM-5 (21). The kappa coefficient for all of the current diagnoses and life expectancy diagnosis was 0.52 and 0.55, respectively (22).

The sexual function of participants was evaluated through the Persian-language version of P-FSFI with 19 items. Higher scores show more sexual function. Scores are in the range of 2 to 36. The validity and reliability of this scale have been reported as desirable in Iranian society (23).

In this study, Cronbach's alpha was 0.88.

MBSRQ with 46 items was designed by Cash. It was designed to measure a person's perception from his/her body image and assess the body image on a 5-point Likert scale (1 = totally opposite to 5 = fully agree). The validity and reliability of this tool have been reported as desirable in previous studies (24).

The Quality of Life Scale QOLS was evaluated by WHOQOL-BREF that is a 26-item questionnaire. The range of item scores is from 1 to 5; the highest score indicates the better QOL (25).

DERS with 36 items was designed by Gratz and Roemer to evaluate emotion regulation patterns. This tool is designed in the form of a 5-point Likert scale. The validity and reliability of this tool have been reported as desirable in previous studies (26).

### 3.1. Statistical Analysis

The data were analyzed, using Pearson's correlation coefficient, linear regression analysis, stepwise regression, and Path Analysis in Amos and Statistical Package for the Social Sciences (SPSS) software Version 22 (SPSS, Inc., Chicago, IL, USA). The assumptions of the parametric tests were examined before the selection of the statistical test. The results of the Kolmogorov-Smirnov (K-S) test showed that the distribution of the scores of the participants in the research in all variables was normal ( $P > 0.05$ ). The assumption of the linearity of the relationship between the variables was also examined by the analysis of variance and the presupposition was confirmed ( $P < 0.01$ ).

### 3.2. Ethical Approval

All stages of the study were carried out after obtaining informed consent from the participants and based on the Declaration of Helsinki (DoH). The ethics committee of Cancer Research Center, Shahid Beheshti University of Medical Sciences, approved this study.

## 4. Results

Sixty-one cases had right breast cancer and the most affected area in both breasts was the upper quartile (57.12%); 73% of the patients had a tumor size in the range of 1 to 6 cm, and the average tumor size was  $5.11 \pm 2.74$  cm. In

54.39% of the cases, 1-5 lymph nodes were found in the affected side axilla. Sixty percent of the tumors (54 patients) were from invasive ductal carcinoma. Two patients had medullary breast carcinoma (MBC), 2 had Invasive lobular breast cancer, 1 had Ductal carcinoma in situ (DCIS), and 1 had sarcoma. In Table 1, the Pearson correlation test results are presented.

As shown in Table 1, there was a direct relationship between body image, sexual function, and QOL in patients undergoing mastectomy. Also, there was a reverse relationship between the difficulty in emotion regulation and body image, sexual function, and QOL ( $P < 0.01$ ).

To investigate the mediating role of difficulty in emotion regulation in the relationship between body image, sexual function, and QOL, path analysis was used to differentiate the criterion variables.

Table 2 shows that in the prediction of QOL based on the body image, difficulty in emotion regulation had a mediating role. Body image was also a predictor of QOL and difficulty in emotion regulation.

As shown in Table 3, the difficulty in emotion regulation had a mediating role in predicting the QOL based on sexual function. Difficulty in emotion regulation was also a predictor of the QOL.

Table 4 shows that the body image and sexual function are predictors of QOL.

## 5. Discussion

This study was conducted to investigate the predictive role of body image and sexual function in QOL after MRM, considering the mediating role of emotion regulation. The results of this study showed a direct relationship between body image and sexual function with QOL, as well as an inverse relationship between body image and the difficulty in emotion regulation. Also, body image, sexual function, and difficulty in emotion regulation are predictors of QOL.

Although the present study is the first of its kind, extensive research literature supports the distinct relationship between the studied variables in this study.

The results of this study showed a significant relationship between body image, sexual function, and QOL in mastectomy patients. Consistent with our results, the results of a study by Soon et al. (10) showed that mastectomy had negative effects on body image, sexual function, and QOL of patients. In this regard, the results of a study carried out by Thomas et al. (11) showed that body image and perceptions of the person from his/her body affect sexual function. Also, Holmberg et al. (9) showed that a positive body image is associated with good sexual function and satisfaction. Besides, Darwish et al. (15) concluded that the scores of body image and sexual function in women under MRM

**Table 1.** Correlation Coefficients Between Research Variables

	Average (SD)	1	2	3	4
<b>Body image</b>	6.57 (1.29)	1.000			
<b>Sexual function</b>	19.73 (4.12)	0.794 <sup>a</sup>	1.000		
<b>QOL</b>	39.21 (5.79)	0.739 <sup>a</sup>	0.812 <sup>a</sup>	1.000	
<b>Emotion regulation</b>	62.29 (7.31)	-0.703 <sup>a</sup>	-0.729 <sup>a</sup>	-0.831 <sup>a</sup>	1.000

<sup>a</sup>P < 0.01**Table 2.** The Results of Regression Analysis to Predict QOL Based on Body Image with the Mediating Role of Difficulty in Emotion Regulation

Variable		b Coefficient	Standard Error	Beta	t
<b>Predictor: body image</b>	Constant value	9.712	0.311	-	19.076 <sup>a</sup>
<b>Criterion: QOL</b>	body image	0.691	0.049	0.702	14.390 <sup>a</sup>
<b>Predictor: body image</b>	Constant value	39.521	2.503	-	21.311 <sup>a</sup>
<b>Criterion: difficulty in emotion regulation</b>	body image	-3.648	0.413	-0.829	-11.708 <sup>a</sup>
<b>Predictor: difficulty in emotion regulation/body image</b>	Constant value	11.581	0.811	-	15.072 <sup>a</sup>
<b>Criterion: QOL</b>	body image	0.739	0.211	0.784	8.279 <sup>a</sup>
	difficulty in emotion regulation	-0.689	0.041	-0.382	-4.713 <sup>a</sup>

<sup>a</sup> P < 0.01**Table 3.** The Results of Regression Analysis to Predict QOL Based on Sexual Function with the Mediating Role of Difficulty in Emotional Regulation

Variable		b Coefficient	Standard Error	Beta	t
<b>Predictor: sexual function</b>	Constant value	15.129	0.539	-	30.720 <sup>a</sup>
<b>Criterion: QOL</b>	self-esteem	0.921	0.089	0.811	15.322 <sup>a</sup>
<b>Predictor: sexual function</b>	Constant value	36.290	1.369	-	19.321 <sup>a</sup>
<b>Criterion: difficulty in emotion regulation</b>	self-esteem	-2.512	0.329	-0.813	-15.295 <sup>a</sup>
<b>Predictor: difficulty in emotion regulation/sexual function</b>	Constant value	20.092	0.711	-	26.720 <sup>a</sup>
<b>Criterion: QOL</b>	sexual function	0.229	0.019	0.627	8.213 <sup>a</sup>
	self-esteem	0.574	0.093	0.421	6.715 <sup>a</sup>

<sup>a</sup> P < 0.01**Table 4.** Direct and Indirect Effects of Body Image and Sexual Function on QOL with the Mediating Role of Difficulty in Emotion Regulation

Path	Direct Effect	Indirect Effect
<b>Body image → difficulty in emotion regulation → QOL</b>	0.811	0.572
<b>Sexual function → difficulty in emotion regulation → QOL</b>	0.791	0.403

are significantly low and related. In addition, Kowalczyk et al. (3) emphasized that body disfigurement, the loss of QOL, and sexual dysfunction can be considered a consequence of the surgery in the treatment of cancer. In this regard, Hsiao et al. (4) believe that despite improvement in physical functions, the QOL index in patients with cancer, even after 18 months of treatment, did not show a significant im-

provement.

The findings of the present study showed that the difficulty in emotion regulation has a mediating role in predicting QOL based on sexual function and body image. In line with our results, the results of Guimond et al.'s study (17) showed that maladaptive emotion regulation strategy is considered a trans-diagnostic mechanism underlying in

patients with BC. Also, Lai et al. (16) showed that coping behaviors of patients with BC have a significant effect on their QOL. The results of a research conducted by Hsiao et al. (4) showed that after 1.5 years of treatment, and despite the improvement of physical functions, the emotion regulation indices did not show significant improvement. Darwish et al. (15) showed that Egyptian BCS reported lower overall global QOL. Also, Munshi et al. (27) concluded that patients with breast conservation surgery (BCS) had better sexual enjoyment and future perspective scores compared with mastectomy patients.

Mastectomy women, due to impairment in body image, endure stress and tension in the long period because mastectomy causes the patient to remember having cancer. Therefore, they often use adaptive mechanisms focusing on the emotion (emotion focus coping). The continuous use of these matching mechanisms can lead to high levels of anxiety that can damage sexual aspects and ultimately the QOL.

The implementation of this study had some limitations. The most important limitation of the present study was the lack of follow-up of patients in the form of a coherent study, which is suggested to be investigated in future studies. Also, a clinical trial to examine the effectiveness of emotional therapeutic interventions could be a good route for future studies.

### 5.1. Conclusions

The results of this study showed that sexual attractiveness dependent on body image, proper sexual function, and QOL in patients with BC under mastectomy can be affected by the difficulty in emotion regulation. The design of emotional therapeutic interventions to reduce the difficulty of emotion regulation can lead to improved QOL in patients.

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### Footnotes

**Authors' Contribution:** Study concept and design: Pirnia B, Homayounfar N; analysis and interpretation of data: Hosseini N, Ebrahimi F; drafting of the manuscript: Pirnia B, Malekanmehr P; critical revision of the manuscript for important intellectual content: Hosseini N; statistical analysis: Haj Sadeghi Z, Malekanmehr P; administrative, technical, and material support: Pirnia B, Hosseini N; study supervision: Pirnia B.

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**Ethical Approval:** The ethics committee of Cancer Research Center, Shahid Beheshti University of Medical Sciences, approved this study.

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### References

- Bueno JN, Haddad CAS, Rizzi S, Giron PS, Facina G, Nazario ACP. Evaluation of body image, quality of life, tactile sensitivity and pain in women with breast cancer submitted to surgical intervention. *Rev Assoc Med Bras (1992)*. 2018;**64**(6):530-6. doi: [10.1590/1806-9282.64.06.530](https://doi.org/10.1590/1806-9282.64.06.530). [PubMed: [30304311](https://pubmed.ncbi.nlm.nih.gov/30304311/)].
- Pirnia B, Pirnia K. Comparison of two mindfulness-based cognitive therapies and acupuncture on the pain and depression index in a case with lobular carcinoma: A single case experimental study. *Int J Cancer Manag*. 2018;**11**(6). doi: [10.5812/ijcm.65641](https://doi.org/10.5812/ijcm.65641).
- Kowalczyk R, Nowosielski K, Cedrych I, Krzystanek M, Glogowska I, Streb J, et al. Factors affecting sexual function and body image of early-stage breast cancer survivors in Poland: A short-term observation. *Clin Breast Cancer*. 2019;**19**(1):e30-9. doi: [10.1016/j.clbc.2018.09.006](https://doi.org/10.1016/j.clbc.2018.09.006). [PubMed: [30385228](https://pubmed.ncbi.nlm.nih.gov/30385228/)].
- Hsiao FH, Kuo WH, Jow GM, Wang MY, Chang KJ, Lai YM, et al. The changes of quality of life and their correlations with psychosocial factors following surgery among women with breast cancer from the post-surgery to post-treatment survivorship. *Breast*. 2019;**44**:59-65. doi: [10.1016/j.breast.2018.12.011](https://doi.org/10.1016/j.breast.2018.12.011). [PubMed: [30669032](https://pubmed.ncbi.nlm.nih.gov/30669032/)].
- Pirnia B, Pirnia K, Teimouri M, Kolahi P. Acupuncture for back pain in colon cancer: A case report. *Int J Cancer Manag*. 2017;**10**(12). doi: [10.5812/ijcm.15087](https://doi.org/10.5812/ijcm.15087).
- Pirnia B, Pirnia K. Effectiveness of oxytocin on reducing alcohol consumption and depression syndrome in a patient with oropharyngeal carcinoma. *Int J Cancer Manag*. 2018;**In Press**(In Press). doi: [10.5812/ijcm.81752](https://doi.org/10.5812/ijcm.81752).
- Pirnia B, Pirnia K, Ershad Sarabi R, Malekanmehr P, Soltani L, Zahiroddin A, et al. A double-blind randomized controlled trial in effectiveness of parent-child interaction therapy on psychological indicator and cortisol level in children of caregiver with cancer. *Int J Cancer Manag*. 2019;**12**(7). doi: [10.5812/ijcm.85572](https://doi.org/10.5812/ijcm.85572).
- Pirnia B, Pirnia K, Haghghat S, Malekanmehr P, Zahiroddin A. The effectiveness of acupuncture on cortisol levels in a prostate-carcinoma patient under androgen deprivation therapy with dysthymic syndrome: A single-case experimental design. *MEJ/C*. 2020;**11**(2):237-42.
- Holmberg M, Arver S, Dhejne C. Supporting sexuality and improving sexual function in transgender persons. *Nat Rev Urol*. 2019;**16**(2):121-39. doi: [10.1038/s41585-018-0108-8](https://doi.org/10.1038/s41585-018-0108-8). [PubMed: [30375495](https://pubmed.ncbi.nlm.nih.gov/30375495/)].
- Soon PS, Ruban S, Mo HTJ, Lee R, Saliba L, Shah A, et al. Understanding patient choices regarding breast reconstruction after mastectomy for breast cancer. *Support Care Cancer*. 2019;**27**(6):2135-42. doi: [10.1007/s00520-018-4470-0](https://doi.org/10.1007/s00520-018-4470-0). [PubMed: [30251065](https://pubmed.ncbi.nlm.nih.gov/30251065/)].
- Thomas HN, Hamm M, Borrero S, Hess R, Thurston RC. Body image, attractiveness, and sexual satisfaction among midlife women: A qualitative study. *J Womens Health (Larchmt)*. 2019;**28**(1):100-6. doi: [10.1089/jwh.2018.7107](https://doi.org/10.1089/jwh.2018.7107). [PubMed: [30307808](https://pubmed.ncbi.nlm.nih.gov/30307808/)]. [PubMed Central: [PMC6343186](https://pubmed.ncbi.nlm.nih.gov/PMC6343186/)].



12. Todd J, Aspell JE, Barron D, Swami V. Multiple dimensions of interoceptive awareness are associated with facets of body image in British adults. *Body Image*. 2019;**29**:6-16. doi: [10.1016/j.bodyim.2019.02.003](https://doi.org/10.1016/j.bodyim.2019.02.003). [PubMed: [30771695](https://pubmed.ncbi.nlm.nih.gov/30771695/)].
13. Ljungman L, Ahlgren J, Petersson LM, Flynn KE, Weinfurt K, Gorman JR, et al. Sexual dysfunction and reproductive concerns in young women with breast cancer: Type, prevalence, and predictors of problems. *Psychooncology*. 2018;**27**(12):2770-7. doi: [10.1002/pon.4886](https://doi.org/10.1002/pon.4886). [PubMed: [30203884](https://pubmed.ncbi.nlm.nih.gov/30203884/)]. [PubMed Central: [PMC6585728](https://pubmed.ncbi.nlm.nih.gov/PMC6585728/)].
14. Jing L, Zhang C, Li W, Jin F, Wang A. Incidence and severity of sexual dysfunction among women with breast cancer: a meta-analysis based on female sexual function index. *Support Care Cancer*. 2019;**27**(4):1171-80. doi: [10.1007/s00520-019-04667-7](https://doi.org/10.1007/s00520-019-04667-7). [PubMed: [30712099](https://pubmed.ncbi.nlm.nih.gov/30712099/)].
15. Enien MA, Ibrahim N, Makar W, Darwish D, Gaber M. Health-related quality of life: Impact of surgery and treatment modality in breast cancer. *J Cancer Res Ther*. 2018;**14**(5):957-63. doi: [10.4103/0973-1482.183214](https://doi.org/10.4103/0973-1482.183214). [PubMed: [30197331](https://pubmed.ncbi.nlm.nih.gov/30197331/)].
16. Lai HL, Chen CI, Lu CY, Yao YC, Huang CY. Relationships among personality, coping, and concurrent health-related quality of life in women with breast cancer. *Breast Cancer*. 2019;**26**(5):544-51. doi: [10.1007/s12282-019-00954-7](https://doi.org/10.1007/s12282-019-00954-7). [PubMed: [30747373](https://pubmed.ncbi.nlm.nih.gov/30747373/)].
17. Guimond AJ, Ivers H, Savard J. Is emotion regulation associated with cancer-related psychological symptoms? *Psychol Health*. 2019;**34**(1):44-63. doi: [10.1080/08870446.2018.1514462](https://doi.org/10.1080/08870446.2018.1514462). [PubMed: [30516396](https://pubmed.ncbi.nlm.nih.gov/30516396/)].
18. Pirnia B, Khosravani V, Maleki F, Kalbasi R, Pirnia K, Malekanmehr P, et al. The role of childhood maltreatment in cortisol in the hypothalamic-pituitary-adrenal (HPA) axis in methamphetamine-dependent individuals with and without depression comorbidity and suicide attempts. *J Affect Disord*. 2020;**263**:274-81. doi: [10.1016/j.jad.2019.11.168](https://doi.org/10.1016/j.jad.2019.11.168). [PubMed: [31818789](https://pubmed.ncbi.nlm.nih.gov/31818789/)].
19. Pirnia B, Pirnia K, Mohammadpour S, Malekanmehr P, Soleimani A, Mahmoodi Z, et al. The effectiveness of acupuncture on HPA functional in depressed patients under methadone maintenance treatment, a randomized double-blind sham-controlled trial. *Asian J Psychiatr*. 2018;**36**:62-3. doi: [10.1016/j.ajp.2018.06.008](https://doi.org/10.1016/j.ajp.2018.06.008). [PubMed: [29966889](https://pubmed.ncbi.nlm.nih.gov/29966889/)].
20. Pirnia B, Akhondi M, Pirnia K, Malekanmehr P, Farzaneh S, Deilam K, et al. A single-case experimental design to study the combination of cognitive-behavioral therapy and pharmacotherapy for smoking cessation. *CJMB*. 2019;**6**(1):136-9.
21. Pirnia B, Mohammadi AR, Zahiroddin A, Mohammadzadeh Bazargan N, Malekanmehr P, Pirnia K. Evaluation of the effectiveness of auricular acupuncture in suicidal ideation and cortisol level in dysthymic patients with comorbid opiate use disorders enrolled in methadone maintenance treatment: A randomized, double-blind, sham-controlled trial. *Iran J Psychiatry Behav Sci*. 2019;**13**(2). doi: [10.5812/ijpbs.12498](https://doi.org/10.5812/ijpbs.12498).
22. Pirnia B, Pirnia K, Aghajani M, Mardan F, Zahiroddin A. Relationship between function of hypothalamic-pituitary-adrenal axis and executive functions in chronic methamphetamine users: A cross-sectional study. *Asian J Psychiatr*. 2018;**35**:113-4. doi: [10.1016/j.ajp.2018.05.001](https://doi.org/10.1016/j.ajp.2018.05.001). [PubMed: [29879590](https://pubmed.ncbi.nlm.nih.gov/29879590/)].
23. Babakhanian M, Ghazanfarpour M, Najafi MN, Dizavandi FR, Khadivzadeh T, Safaei M, et al. Psychometric properties of Persian language version of the Female Sexual Function Index (P-FSFI) among postmenopausal women. *J Turk Ger Gynecol Assoc*. 2018. doi: [10.4274/jtgga.2017.0131](https://doi.org/10.4274/jtgga.2017.0131).
24. Swami V, Todd J, Mohd Khatib NA, Toh EKL, Zahari HS, Barron D. Dimensional structure, psychometric properties, and sex invariance of a Bahasa Malaysia (Malay) translation of the Multi-dimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS) in Malaysian Malay adults. *Body Image*. 2019;**28**:81-92. doi: [10.1016/j.bodyim.2018.12.007](https://doi.org/10.1016/j.bodyim.2018.12.007). [PubMed: [30599288](https://pubmed.ncbi.nlm.nih.gov/30599288/)].
25. Souza CA, Oliveira LM, Scheffel C, Genro VK, Rosa V, Chaves MF, et al. Quality of life associated to chronic pelvic pain is independent of endometriosis diagnosis-a cross-sectional survey. *Health Qual Life Outcomes*. 2011;**9**:41. doi: [10.1186/1477-7525-9-41](https://doi.org/10.1186/1477-7525-9-41). [PubMed: [21663624](https://pubmed.ncbi.nlm.nih.gov/21663624/)]. [PubMed Central: [PMC3123165](https://pubmed.ncbi.nlm.nih.gov/PMC3123165/)].
26. Miguel FK, Giromini L, Colombarolli MS, Zuanazzi AC, Zennaro A. A Brazilian investigation of the 36- and 16-item difficulties in emotion regulation scales. *J Clin Psychol*. 2017;**73**(9):1146-59. doi: [10.1002/jclp.22404](https://doi.org/10.1002/jclp.22404). [PubMed: [27717003](https://pubmed.ncbi.nlm.nih.gov/27717003/)].
27. Munshi A, Dutta D, Kakkar S, Budrukkar A, Jalali R, Sarin R, et al. Comparison of early quality of life in patients treated with radiotherapy following mastectomy or breast conservation therapy: a prospective study. *Radiother Oncol*. 2010;**97**(2):288-93. doi: [10.1016/j.radonc.2010.04.008](https://doi.org/10.1016/j.radonc.2010.04.008). [PubMed: [20627431](https://pubmed.ncbi.nlm.nih.gov/20627431/)].