Studying the Relation between Mental Adjustment to Cancer and Health-Related Quality of Life in Breast Cancer Patients

Mozhgan Patoo,[1,*] Abbas Ali Allahyari,[2] Ali Reza Moradi,[3] Mehrdad Payandeh,[4] and Leila Hassani[5]

[1]PhD Student in Psychology, Tarbiat Modares University, Tehran, IR Iran
[2]Assistant Professor of Psychology, Tarbiat Modares University, Tehran, IR Iran
[3]Professor of Clinical Psychology, Kharazmi University, Tehran, IR Iran
[4]Department of Hematology-Oncology, Kermanshah University of Medical Sciences (KUMS), Kermanshah, IR Iran
[5]School Counselor at Fars Education Organization, Shiraz, IR Iran

[*]*Corresponding author*: Mozhgan Patoo, PhD Student in Psychology, Tarbiat Modares University, Tehran, IR Iran. E-mail: m.ptoo@yahoo.com

Abstract

Background: Health-related quality of life in cancer patients has been interested to researchers in the domain of health in recent decades. Mental adjustment to cancer is a concept known as an important indicator of life quality, well-being and health of cancer patients. The aim of this paper is to examine the relation between mental adjustment to cancer and health-related quality of life (HRQoL) among some women with breast cancer.

Methods: 100 patients were non-randomly selected from hospitals and oncology clinics in Kermanshah and Shiraz cities, Iran. These patients completed the functional assessment of cancer treatment-breast (FACT-B) in order to measure HRQoL and mini-mental adjustment to cancer questionnaire (Mini-MAC). Data were analyzed by using correlation and regression.

Results: The results show that helplessness/hopelessness (58%), fighting spirit (40%), fatalism (33%) and preoccupation anxiety (18%) explain the variance of HRQoL.

Conclusions: According to the findings, there is no relation between cognitive avoidance styles and HRQoL, and it can be concluded that coping styles helplessness/hopelessness and fighting spirit are the best predictors of HRQoL in patients with breast cancer. Consequently, the evaluation of the coping styles and emergency interventions in order to enhance coping with illness in cancer patients, decrease the sense of helplessness/hopelessness and anxiety are recommended, which in turn are accompanied by increasing HRQoL.

Keywords: Mental Adjustment to Cancer, Health-Related Quality of Life, Coping, Breast Cancer

1. Background

Advances and improvements have been done in diagnosis and treatment of cancer, and have increased survival of breast cancer patients to focus more on health care, quality of life (QOL) of these patients. Therefore, assessment of QOL is now one of the most important issues in studies of oncology. Health related quality of life (HRQoL) is a subjective concept of health-related quality of life consisting of the physical, mental, and social health dimensions (1). This concept is one of the most important issues in the field of cancer research, particularly in breast cancer in women. Factors such as social features, demographic, medical, public health, and life style can influence HRQoL in women with breast cancer. Coping and mental adjustment are important factors in HRQoL in cancer patients (2). Mental adjustment to cancer (MAC) was defined as 'the cognitive and behavioral responses the patient makes to the

diagnosis of cancer (3). This definition includes the emotional reactions to cancer, too (4).

Studies have shown the mental adjustment of cancer patients associated with QOL and psychological distress (5, 6). In addition, some studies have shown that psychological adjustment to cancer may affect patients' health outcomes. Watson et al. (3) developed the mental adjustment to cancer (MAC) scale to measure cognitive and behavioral responses of patients suffering from cancer. This MAC scale has been widely used as a tool to measure the coping response in cancer patients and contain five dimensions. spirit spirit (FS) was characterized by a determinant of fight to the illness and adopting an optimistic attitude with a realistic appraisal of the illness. Fatalism (FA) is the acknowledgment of the illness without seeking further information unless new symptoms are developed. It is a tendency to put oneself in the hands of God. Helplessness-

hopelessness (HH) relate to the tendency to adopt a pessimistic attitude about the illness. Anxious preoccupation (AP) is characterized by constant preoccupation with cancer as an event source of feelings of devastation, anxiety, fear, apprehension, and cognitive avoidance (CA) is tendency to avoidance of direct thinking about the disease (3, 7).

In most studies on coping styles conducted in the East, the fighting spirit and fatalism are classified as positive attitudes (8, 9). In addition, some researches show that anxious reoccupation and helplessness/hopelessness strategies must be as negative emotion factor combined (9). According to the studies by Watson (10), Bredal (11) and Hulbert-Williams (12), and Wang (13), helplessness/hopelessness and anxious preoccupation, and cognitive avoidance are specified as a maladaptive coping styles. According to researches, avoidance response or helplessness/hopelessness was related with higher level of anxiety and depression while active or coping styles have been related with better adaptation (14, 15).

The positive relation between anxiety and depression in patients with breast cancer and anxiety preoccupation, fatalism and helplessness/hopelessness have been reported, while the style of fighting spirit is negatively correlated with anxiety and depression (16). Finding of another study showed that the hopelessness coping response a negative determinant of perceived social support of patients (17). In Johansson's study (18) which was conducted on laryngeal cancer patients, helpless-hopeless and anxious reoccupation responses were associated with mood disorder and HRQoL. Also helpless/hopeless and anxious preoccupation responses that were significantly had a negative effect on well-being, irrespective of phase of illness. The results of Lampic et al. (19) also showed that high level of fighting spirit is related with high levels of psychosocial well-being and mood with less concerns related to cancer, while the preoccupation anxiety and helplessness/hopelessness styles are related to the less psycho-social well-being, more situation anxiety, and more concerns related to cancer. Jacobsen and Jim (2) studied the relation between mental adjustment styles and QoL in Chinese patients with cancer. They showed that the QoL has a positive relation with fighting spirit and a negative relation with fatalism. Also, high fighting spirit has a positive relation with more positive affect which in turn is related with better QOL but higher fatalism is related to less positive affect and more negative emotion, which in return related to worse QoL. There is no significant correlation between fighting spirit and the QoL in other studies. Because of the relation between fatalism and QOL, some studies showed that it was a negative relation (20, 21), while others showed a positive relation (22, 23) or no significant correlation (24).

According to the findings, the relation between adjustment with cancer between patients and HRQoL is varied and inconsistent. Not much research has been done in this regard. The research questions are "what is the relation between these variables in Iranian breast cancer patients?", and "which styles of adjustment impact greatly in the HRQoL of breast cancer patients?"

2. Methods

The study is a cross sectional and correlational one. The correlation and regression methods have been applied to answer the study questions.

2.1. Participants

The study sample was recruited from the cancer clinic in Kermanshah and Shiraz cities. Inclusion criteria of the study included diagnosis of breast cancer in women, who were 18 or older (with confirmed breast cancer diagnosis) with no sever physical or cognitive impairment. After the patients had been informed of the purpose of the study, their consent was obtained. 100 patients participated voluntarily through a non-random convenient sampling procedure from hospitals and oncology clinics in Kermanshah and Shiraz, Iran.

Information on the sample group is shown in Table 1. It should be mentioned that many patients were not aware of the stage of the disease; therefore, questions related to the stage of the disease were eliminated.

2.2. Measures

Demographic questionnaire: This questionnaire includes patient characteristics, such as gender, age, education, marital status and the treatment carried out in the past and in the present.

2.3. Persian Version of the Mini-MAC

The 29-item Mini-MAC (10) was used in its Persian version. The original factor structure was used to obtain scores on the five sub-scales identified in the Watson et al. (10) study namely; fighting spirit (4 items), hopelessness (8 items), anxious preoccupation (8 items), fatalism (5 items) and cognitive avoidance (4 items). It should be noted that the items have been scored based on a 4-point scale from 1 (Definitely does not apply to me) to 4 (Definitely applies to me). A higher score represents a higher level of the respective adjustment style. The Persian version was done by the following standard translation method. To translate the Mini-MAC from English into Persian, the 'forward-backward' procedure was applied. The scale was translated from English into Persian by an expert in English

Table 1. Demographic and Medical Data (n = 100)

Characteristics	N
Mean Age	43.8
Rang Age	24 - 70
Marital status	
Married	85
Single	4
Divorced	3
Widowed	4
Unclear	4
Education	
Diploma	47
diploma degree	37
Undergraduate	13
Graduate	2
Unclear	1
Occupation	
Employed	31
Unemployed/ Retired	59
Unknown	10
Treatment	
Surgery	65
Surgery-Chemotherapy	25
Surgery-Chemotherapy-Radiotherapy	10

and a PhD student in psychology, and next revised by a professor of psychology after obtaining copyright permission from the original author. To be compared with the original, another language expert translated it back to English. The final version obtained made the content valid and provided to another psychology professor to evaluate the scale from content and partial clarity that led to reforms in some items. Alpha coefficients are helplessness/hopelessness 0.94, cognitive avoidance 0.76, anxious preoccupation 0.90, fatalism 0.77, the fighting spirit 0.80 for the subscales and the total scale is 0.84 respectively (25). The findings show that the Mini-MAC can be used as a valid and reliable tool to measure adjustment and coping with cancer.

2.4. Persian Version of the FACT-B

The functional assessment of cancer therapy-breast (FACT-B) is a HRQoL instrument that is specifically developed for breast cancer patients. The FACT-B (V4.0) has two parts: the general subscale on cancer (FACT-G) and the additional concerns on breast cancer as a specific sub-

scale (BCS) with nine items. This scale includes physical well-being (PWB) with seven items, social/family well-being (SFWB) with seven items, the emotional well-being (EWB) with six items, the functional well-being (FWB) with seven items and the BCS with nine items. Each item is rated on a 5-point Likert scale. The total score of the FACT-B is the score sum of all five subscales which can range from 0 to 144. A higher score shows the better QoL of the patient (26, 27). To translate the FACT-B from English into Persian, the 'forward-backward' procedure was applied. The scale was translated from English into Persian by an expert in English and a PhD student in psychology, and next revised by a professor of psychology. To be compared with the original, another language expert translated it back to English. The final version obtained made the content valid and was provided to another psychology professor to evaluate the scale from content and partial clarity that led to reforms in some items (28). Cronbach's alpha coefficients are 0.71, 0.91, 0.78, 0.93, 0.63, and 0.92 for PWB, SFWB, EWB, FWB, BCS and FACT-B total respectively.

In sum, the results show that this scale can be used in research and clinical settings to assess HRQoL in Iranian patients with breast cancer.

3. Results

Information about the correlation between variables of variables study is presented in Table 2.

The results in Table 2 show that helplessness/hopelessness and preoccupation anxiety have significant negative relation with the whole subscales of FACT-B. Cognitive avoidance only has a significant positive relation with social/family well-being. Fatalism and fighting spirit have significant positive relation with social/family well-being, emotional well-being and functional well-being subscales of FACT-B. As it can be seen in the correlation matrix, except cognitive avoidance style, other mental adjustments to cancer have significant relations with HRQoL.

To predict HRQoL by styles of mental adjustment to cancer, regression analysis has been performed (Tables 3 and 4).

Results of regression analysis to HRQoL through mental adjustment to cancer have been shown in Tables 2 and 3. As seen in these tables, helplessness / hopelessness (59%) and fighting spirit (43%), fatalism (40%), and preoccupation anxiety (33%) can explain variance of HRQoL.

4. Discussion

Few studies have explained why mental adjustment styles affect health. Therefore, the present study aimed

Table 2. Correlation Matrix of the Study Variables

	Physical Well-Being	Social/Family Well-Being	Emotional Well-Being	Functional Well-Being	BCS	FACT-B
Helplessness/Hopelessness	-0.250[a]	-0.590[b]	-0.528[b]	-0.654[b]	- 0.237[a]	- 0.768[b]
Preoccupation Anxiety	-0.353[b]	-0.333[b]	-0.545[b]	-0.392[b]	-0.319b	-0.577[b]
Cognitive Avoidance	-0.196	0.351[b]	-0.101	0.151	-0.098	0.113
Fatalism	-0.254	0.655[b]	0.332[b]	0.490[b]	0.141	0.427
Fighting Spirit	-0.007	0.717[b]	0.350[b]	0.665[b]	0.088	0.633[b]

[a] $P < 0.05$
[b] $P < 0.01$.

Table 3. The Results of Regression Analysis to Explain Health Related Quality of Life (HRQoL) Through Mental Adjustment to Cancer Styles

		Sum of Squares	df	Mean of Square	F	Sig.	R	R^2	Std.standard Error of the Estimate
Helplessness/Hopelessness	Regression	21548.751	1	21548.751	111.843	0.001	0.768	0.589	13.880
		15028.237	79	192.670					
Preoccupation Anxiety	Regression	12874.362	1	12874.362	38.829	0.001	0.577	0332	18.208
		25861.838	79	331.562					
Cognitive avoidance	Regression	492.292	1	492.292	1.004	0.113	0.113	0.013	22.143
		38243.908	79	490.307					
Fatalism	Regression	15517.585	1	15517.585	52.082	0.001	0.633	0.400	17.261
		23239.615	79	297.944					
Fighting Spirit	Regression	6783.312	1	6783.312	16.935	0.001	0.427	0.182	20.014
		30442.483	79	400.559					

Table 4. Statistical Indicators and the Coefficients of the Predictive Variables of Mental Adjustment to Cancer in Regression Analysis of Health Related Quality of Life (HRQoL)

	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.
Helplessness/Hopelessness	-0.768	0.212	-2.245	-10.576	0.001
Preoccupation Anxiety	-2.854	0.458	-0.577	-6.231	0.001
Cognitive Avoidance	0.929	0.928	0.113	1.002	0.319
Fatalism	3.868	0.536	0.633	7.212	0.001
Fighting Spirit	2.847	0.692	0.427	4.115	0.001

to investigate the relation between psychological adjustment and HRQoL in women with breast cancer.

According to the findings, helplessness/hopelessness and anxiety preoccupation styles have significant negative relation with all subscales of FACT. Also helplessness/hopelessness (58%) and anxiety preoccupation (33%) explain variance of HRQoL. These findings are coordinate with researches done by Anagnostopoulos et al. (23), Grassi et al. (29) and Akechi et al. (30) that identified helplessness/hopelessness and anxiety preoccupation styles as maladaptive coping styles. Also, it coordinate with Cayrou's study (31) that explains helplessness/hopelessness and anxiety preoccupation as negative coping styles and Kang (9) that suggests the combination of these styles as negative emotion subscales. Given the large role of helplessness/hopelessness coping style in explaining the variance in HRQoL, it can be said that the feeling of helpless-

ness, lack of disease control and knock off the face of the disease play important roles in determining the physical and mental health of patients.

According to other studies, cognitive avoidance subscale only has a significant negative relation with social/family well-being. Also, cognitive avoidance cannot explain role in prediction of HRQoL. This coping strategy is related to assessing the patient's tendency to actively avoid thinking about cancer diagnosis and outcomes (10). Avoiding coping may be adaptive as long as the person has an opportunity to escape from the pressure of this situation. This strategy as an active way of distraction has a positive relation with the fighting spirit. In addition, cognitive avoidance is not necessarily harmful. The result of this study about lack of the relation of cognitive avoidance with the HRQoL is consistent with the findings of Bredal (11) and Johansson et al. (18). It is argued that avoidance is a

coping by itself neither positive and helpful, nor negative and harmful, and the value depends on factors such as the cultural sense and disease conditions.

The other finding of this study shows that fatalism has a significant positive relation with social/family well-being, emotional well-being and functional well-being subscales and has a significant negative relation with physical well-being, as well as no significant relation with breast cancer subscale. In addition, the findings show fatalism explains 18% variance of HRQoL. Some studies which examined the relation between coping styles and psychological health outcomes of cancer patients have mainly been performed in Western countries and few empirical studies investigate the relation between fatalism and HRQoL in Asia. In comparison to Asian studies, the findings of this study are concordant with three studies and are uncoordinated with one study. Ho and colleagues (8) and Ho et al. (32) studies showed that the fighting spirit and fatalism have a positive correlation. They believe that both styles of fighting spirit and fatalism are involved in a positive attitude for the Chinese (8, 30). Also, Kang et al. (9) showed that fatalism was negatively related with helplessness/hopelessness style in Korean patients with cancer. But according to Yeung and Lu (33), fatalism is negatively related to QOL in Chinese patients with cancer. According to Yeung and Lu (33), studies of Kang et al. (9), Ho et al. (8) and Ho et al. (32), the short version of mental adjustment to cancer questionnaire (Mini-MAC) was used in fatalism style that has 5 items while in their study the original version was used MAC with 8 items in fatalism. 2 out of 5 items of fatalism style in Mini-MAC have previously been in original MAC which belongs to fighting spirit subscale (items of "counting blessings" and "value of life"). This might be a possible explanation for the difference between these results that how the study had done by Kang et al. (9) and Ho et al. (8) (as well as in the present study) has been achieved positive relation between fatalism and adaptive psychological consequences.

Another research finding is related to fighting spirit that had positive relation with social/family well-being, emotional well-being and functional well-being subscales, but had no significant relation with physical well-being and other concerns about breast cancer subscales. In addition, the results revealed that fighting spirit explains 40% variance of HRQoL. The fighting spirit is defined as an optimistic attitude and an assessment realistic of the disease (34) and included the preservation of hope when faced with difficult conditions (35). As was expected, this coping strategy has positive relation with HRQoL. This finding is consistent with those of Anagnostopoulos et al. (23) and Rottmann et al. (24). Patients with high fighting spirit see cancer diagnosis as a challenge and view the future opti-

mistically, and believe that it is possible to control the disease (7). So, obviously that is a combination of optimism and hope to the future with the ability to control the disease conditions and can be helpful for physical and psychological well-being and HRQoL in cancer patients. Another unexpected finding is that fatalism with fighting spirit has no significant relation with physical well-being subscale. Also both fighting spirit and fatalism styles have no relation to physical well-being subscale. It is possible to say that these coping styles in relation to aspects of HRQoL that are not directly related to physical condition are more influential but on the physical health and status are not. In other words, the physical problems related to cancer are so severe that even having a positive attitude and coping cannot have any role in reducing them.

This study has several limitations. First, the study is cross-sectional and the relation between variables may be different in longitudinal studies. Second, the scale of MAC has originally been developed in Western countries and although in Persian version has good psychometric properties, it is possible that the adaptation of the concepts of this scale (particularly the concept of fatalism) have problems with the Iranian culture. Third, the sampling method was non-random and available, and had its own problems. So, considering the relation between variables in longitudinal studies and using a random sample are suggested as recommendations for further research in this field to researchers.

Acknowledgments

Footnotes

References

1. Ferrans CE. Definitions and conceptual models of quality of life. In: Lipscomb J, Gotay CC, Snyder C, editors. *Outcomes assessment in cancer.* England: Cambridge University; 2005. p. 14–30.

2. Jacobsen PB, Jim HS. Consideration of quality of life in cancer survivorship research. *Cancer Epidemiol Biomarkers Prev.* 2011;**20**(10):2035–41. doi: 10.1158/1055-9965.EPI-11-0563. [PubMed: 21980011].

3. Watson M, Greer S, Young J, Inayat Q, Burgess C, Robertson B. Development of a questionnaire measure of adjustment to cancer: the MAC scale. *Psychol Med.* 1988;**18**(1):203–9. [PubMed: 3363039].

4. Watson M, Greer S. Personality and coping. In: Holland JC, editor. *Psycho-oncology*. New York: Oxford University Press; 1988.

5. Ferrero J, Barreto MP, Toledo M. Mental adjustment to cancer and quality of life in breast cancer patients: An exploratory study. *Psycho-Oncol.* 1994;**3**(3):223–32. doi: 10.1002/pon.2960030309.

6. Wagner MK, Armstrong D, Laughlin JE. Cognitive determinants of quality of life after onset of cancer. *Psychol Rep.* 1995;**77**(1):147–54. doi: 10.2466/pr0.1995.77.1.147. [PubMed: 7501754].

7. Greer S, Moorey S, Watson M. Patients' adjustment to cancer: the Mental Adjustment to Cancer (MAC) scale vs clinical ratings. *J Psychosom Res.* 1989;**33**(3):373–7. [PubMed: 2795510].

8. Ho SM, Fung WK, Chan CL, Watson M, Tsui YK. Psychometric properties of the Chinese version of the Mini-Mental Adjustment to Cancer (MINI-MAC) scale. *Psycho-Oncology.* 2003;**12**(6):547–56. doi: 10.1002/pon.672. [PubMed: 12923795].

9. Kang JI, Chung HC, Kim SJ, Choi HJ, Ahn JB, Jeung HC, et al. Standardization of the Korean version of Mini-Mental Adjustment to Cancer (K-Mini-MAC) scale: factor structure, reliability and validity. *Psycho-Oncology.* 2008;**17**(6):592–7. doi: 10.1002/pon.1277. [PubMed: 17957732].

10. Watson M, Law MG, Santos MD, Greer S, Baruch J, Bliss J. The Mini-MAC: further development of the mental adjustment to cancer scale. *Journal of Psychosocial Oncology.* 1994;**12**(3):33–46.

11. Bredal IS. The Norwegian version of the Mini-Mental Adjustment to Cancer Scale: factor structure and psychometric properties. *Psycho-Oncology.* 2010;**19**(2):216–21. doi: 10.1002/pon.1564. [PubMed: 19378351].

12. Hulbert-Williams NJ, Hulbert-Williams L, Morrison V, Neal RD, Wilkinson C. The mini-mental adjustment to cancer scale: re-analysis of its psychometric properties in a sample of 160 mixed cancer patients. *Psycho-Oncology.* 2012;**21**(7):792–7. doi: 10.1002/pon.1994. [PubMed: 21656607].

13. Wang WT, Tu PC, Liu TJ, Yeh DC, Hsu WY. Mental adjustment at different phases in breast cancer trajectory: re-examination of factor structure of the Mini-MAC and its correlation with distress. *Psycho-Oncology.* 2013;**22**(4):768–74. doi: 10.1002/pon.3065. [PubMed: 22419539].

14. Burgess C, Morris T, Pettingale KW. Psychological response to cancer diagnosis–II. Evidence for coping styles (coping styles and cancer diagnosis). *J Psychosom Res.* 1988;**32**(3):263–72. [PubMed: 3184015].

15. Friedman LC, Baer PE, Lewy A, Lane M, Smith FE. Predictors of psychosocial adjustment to breast cancer. *J Psychosoc Oncol.* 1989;**6**(1-2):75–94.

16. Watson M, Greer S, Rowden L, Gorman C, Robertson B, Bliss JM, et al. Relationships between emotional control, adjustment to cancer and depression and anxiety in breast cancer patients. *Psychol Med.* 1991;**21**(1):51–7. [PubMed: 2047505].

17. Costa-Requena G, Arnal RB, Gil F. The influence of coping response and health-related quality of life on perceived social support during cancer treatment. *Palliative Support Care.* 2015;**13**(3):683–9.

18. Johansson M, Ryden A, Finizia C. Mental adjustment to cancer and its relation to anxiety, depression, HRQL and survival in patients with laryngeal cancer-A longitudinal study. *Bmc Cancer.* 2011;**11**(1):283.

19. Lampic C, Wennberg A, Schill JE, Glimelius B, Brodin O, Sjoden PO. Coping, psychosocial well-being and anxiety in cancer patients at follow-up visits. *Acta Oncol.* 1994;**33**(8):887–94. [PubMed: 7818920].

20. Schou I, Ekeberg O, Ruland CM. The mediating role of appraisal and coping in the relationship between optimism-pessimism and quality of life. *Psycho-Oncology.* 2005;**14**(9):718–27. doi: 10.1002/pon.896. [PubMed: 15669084].

21. Whitford HS, Olver IN, Peterson MJ. Spirituality as a core domain in the assessment of quality of life in oncology. *Psycho-Oncology.* 2008;**17**(11):1121–8. doi: 10.1002/pon.1322. [PubMed: 18322902].

22. Anagnostopoulos F, Slater J, Fitzsimmons D. Intrusive thoughts and psychological adjustment to breast cancer: exploring the moderating and mediating role of global meaning and emotional expressivity. *J Clin Psychol Med Settings.* 2010;**17**(2):137–49. doi: 10.1007/s10880-010-9191-6. [PubMed: 20376541].

23. Anagnostopoulos F, Kolokotroni P, Spanea E, Chryssochoou M. The Mini-Mental Adjustment to Cancer (Mini-MAC) scale: construct validation with a Greek sample of breast cancer patients. *Psycho-Oncology.* 2006;**15**(1):79–89. doi: 10.1002/pon.924. [PubMed: 15880660].

24. Rottmann N, Dalton SO, Christensen J, Frederiksen K, Johansen C. Self-efficacy, adjustment style and well-being in breast cancer patients: a longitudinal study. *Qual Life Res.* 2010;**19**(6):827–36. doi: 10.1007/s11136-010-9653-1. [PubMed: 20401551].

25. Patoo M, Allahyari AA, Moradi AR, Payandeh M. Iranian Version of the Mini-Mental Adjustment to Cancer Scale: Factor Structure and Psychometric Properties. *J Psychosoc Oncol.* 2015;**33**(6):675–85. doi: 10.1080/07347332.2015.1082169. [PubMed: 26600241].

26. Cella DF, Tulsky DS, Gray G, Sarafian B, Linn E, Bonomi A, et al. The Functional Assessment of Cancer Therapy scale: development and validation of the general measure. *J Clin Oncol.* 1993;**11**(3):570–9. doi: 10.1200/JCO.1993.11.3.570. [PubMed: 8445433].

27. Brady MJ, Cella DF, Mo F, Bonomi AE, Tulsky DS, Lloyd SR, et al. Reliability and validity of the Functional Assessment of Cancer Therapy-Breast quality-of-life instrument. *J Clin Oncol.* 1997;**15**(3):974–86. doi: 10.1200/JCO.1997.15.3.974. [PubMed: 9060536].

28. Patoo M, Allahyari AA, Moradi AR, Payandeh M. Persian Version of Functional Assessment of Cancer Therapy- Breast (FACT-B) Scale: Confirmatory Factor Analysis and Psychometric Properties. *Asian Pac J Cancer Prev.* 2015;**16**(9):3799–803. [PubMed: 25987040].

29. Grassi L, Rosti G, Lasalvia A, Marangolo M. Psychosocial variables associated with mental adjustment to cancer. *Psycho-Oncol.* 1993;**2**(1):11–20. doi: 10.1002/pon.2960020104.

30. Akechi T, Fukue-Saeki M, Kugaya A, Okamura H, Nishiwaki Y, Yamawaki S, et al. Psychometric properties of the Japanese version of the Mental Adjustment to Cancer (MAC) scale. *Psycho-Oncology.* 2000;**9**(5):395–401. [PubMed: 11038477].

31. Cayrou S, Dickes P, Gauvain-Piquard A, Roge B. The mental adjustment to cancer (MAC) scale: French replication and assessment of positive and negative adjustment dimensions. *Psycho-Oncology.* 2003;**12**(1):8–23. doi: 10.1002/pon.634. [PubMed: 12548645].

32. Ho RT, Chan CL, Ho SM. Emotional control in Chinese female cancer survivors. *Psycho-Oncology.* 2004;**13**(11):808–17. doi: 10.1002/pon.799. [PubMed: 15386636].

33. Yeung NCY, Lu Q. Affect mediates the association between mental adjustment styles and quality of life among Chinese cancer survivors. *J Health Psychol.* 2014;**19**(11):1420–9.

34. Greer S, Watson M. Mental adjustment to cancer: its measurement and prognostic importance. *Cancer Surv.* 1987;**6**(3):439–53. [PubMed: 3326657].

35. Cordova MJ, Andrykowski MA. Responses to cancer diagnosis and treatment: posttraumatic stress and posttraumatic growth. *Semin Clin Neuropsychiatry.* 2003;**8**(4):286–96. [PubMed: 14613054].