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The role of mindfulness and emotional schemas in predicting anxiety in patients with cancer: A cross-sectional study

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Original Article

Abstract

BACKGROUND: Diagnosing cancer associates with a high rate of anxiety in these patients. In recent years, mindfulness and emotional schemas have been increasingly considered in order to reduce anxiety. However, no study has been conducted on this regard. This study was conducted to investigate the role of mindfulness and emotional schemas in predicting anxiety in patients with cancer.

METHODS: In a cross-sectional study in 2019, 119 patients with the diagnosis of non-metastatic cancer were estimated based on Morgan table among the patients referred to the chemotherapy centers in Shiraz, Iran, and were selected by purposive sampling. Beck Anxiety Inventory (BAI), Five Facet Mindfulness Questionnaire (FFMQ), and Leahy Emotional Schema Scale (LESS) were completed by participants. Data were analyzed by Pearson correlation coefficient, multi-step regression, and hierarchical analysis by SPSS software.

RESULTS: The two dimensions of mindfulness, including acting with awareness (β = -0.27) and non-reactivity (β = -0.20), negatively were predictors of anxiety (P < 0.001). Besides, the two dimensions of emotional schemas, including controllability (β = -0.30) and blame (β = -0.19), negatively predicted anxiety (P < 0.001). In addition, demographic variables, neither alone nor as modulating variables, had a significant effect on the role of mindfulness and emotional schemas in predicting anxiety (P > 0.05).

CONCLUSION: Identifying the components of mindfulness and emotional schemas and understanding their role in the mechanism of triggering anxiety system in patients with cancer can be useful in line with the planning of psychological interventions and improving mental health in these patients.

KEYWORDS: Cancer; Anxiety; Mindfulness; Schemas

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Introduction

The uncontrolled growth of cells in the body can cause variety of diseases that are called cancer. Diagnosis of cancer can have far-reaching effects on patients' mental health.[1] Even among people with no previous history of psychiatric disorders, the diagnosis of cancer is associated with a high rate of mental disorders that can prevent the treatment and cure of cancer and affect the quality of life and survival index.[1] People who have used psychiatric services in the past may experience a higher rate of vulnerability and risk of death.[2] However, the needs of people with cancer with or without a psychiatric history are less important during treatment of the previous cancer.[3] Advances in early diagnosis and treatment of cancers have led to longer lives with cancer that is considered a global health challenge in the field of mental rehabilitation.[1] The number of people who have survived after the initial diagnosis of 36 types of cancers in 185 countries worldwide in 2018 is estimated equal to 23.8 million people. The

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estimation of mortality rates for cancers was 65 and 41.1 per 100000 for men and women, respectively. In recent years, research on the prevention, care, and treatment of comorbid anxiety with cancer has been considered as a clinical priority in health policies.[4] Research evidence from systematic studies shows that the prevalence of anxiety and depression among patients with cancer is higher than general population.[1] The findings of the study by Kennedy et al. show that stress plays an important role in the progression of cancer in these patients.[5] Anxiety is a common type of psychological distress in patients with cancer.[6] Both norepinephrine (NE) and epinephrine (E) are known to be elevated in individuals with acute or chronic stress. Moreover, stress increases cortisol and interleukin 6 (IL-6) secretion.[7,8] The function of hypothalamic-pituitary-adrenal (HPA) axis is the core of response to stress.[9] Anxiety levels persist for several years even after successful treatment.[10] Patients experience anxiety for a variety of reasons, including pain, lack of psychological support, lack of knowledge of psychiatric symptoms, lack of scientific evidence for effective treatments, and stigma.[11] The relationship between anxiety and cancer has been well established, but its mechanism is still unknown.[12]

Over the past two decades, the mindfulness index and its interventions have become increasingly important in reducing distress and anxiety in patients with cancer.[2] Mindfulness is defined as a situation in which a person, while having a high level of consciousness, focuses on the reality of the present, accepting and acknowledging it, without engaging in reactionary thoughts or emotions to the situation. Mindfulness is associated with low levels of perceived stress, increased emotional regulation, and cognitive control.[13] Research evidence in the field of cancer shows that the state of conscious mindfulness is a protective factor against anxiety.[13] The findings of the study by Ikeuchi et al. show that mindfulness has a significant relationship with anxiety in patients with breast cancer.[14] There is also a relationship between mindfulness and psychological well-being in women with breast cancer.[15]

On the other hand, early maladaptive schemas (EMS) do not lead to specific mental disorders but increase person's vulnerability to mental disorders. Bach et al. believe that some schemas are formed primarily as a result of childhood experiences.[16] Based on Beck's initial description of psychological pathology, each of the mental disorders, including anxiety disorders, is associated with schemas that determine the type of vulnerability to the disorder. Emotions include previous information about individual experiences that are integrated into a coherent structure called emotional schemas. Emotions are influential indices in the decision-making and management of the treatment process in patients with cancer, and the promotion of emotional regulation is effective in improving the conditions of the disease.[17] Early diagnosis of anxiety in patients with cancer is of health and clinical importance.[12] Maladaptive cognitive or emotional schemas can be considered as predictors of anxiety and depression in patients with cancer.[18] Proper identification of maladaptive cognitive schemas and adaptive mechanisms in the evaluation of patients with cancer is clinically important. Research evidence suggests the role of negative cognitive and emotional schemas in predicting anxiety and stress in patients with cancer.[19] Despite the importance of the role of mindfulness and emotional schemas in predicting anxiety in patients with cancer, no similar studies have been performed in Iranian society to date.

The aim of present research was to survey the role of mindfulness and emotional schemas in predicting anxiety in patients with cancer.

Methods

The present study was a cross-sectional study.

Thus, 119 patients (with the diagnosis of non-metastatic cancer) were estimated based on Morgan's table among the patients referred to chemotherapy centers in Shiraz, Fars Province, Iran, 2019, and were selected by purposive sampling and entered into the research process after evaluating criteria for entering and obtaining informed consent. The entry criteria were: 1) age range of 18-65 years, 2) having a non-metastatic cancer based on International Classification of Diseases, 11th Revision (ICD-11), 3) passing the stage of chemotherapy, and 4) residence in Shiraz. Besides, the exclusion criteria were: 1) diagnosis of any acute psychiatric disorder, 2) receiving any psychological intervention or psychiatric medications within six months leading up to the research, and 3) failure to complete the questionnaires used. Data for this study were collected using the Beck Anxiety Inventory (BAI), the Five Facet Mindfulness Questionnaire (FFMQ), and Leahy Emotional Schema Scale (LESS). Pearson correlation tests and multivariate regression tests were used to analyze the data in the software environment of SPSS (version 22, IBM Corporation, Armonk, NY, USA). All stages of the study were performed in accordance with the Declaration of Helsinki (DOH). DOH was prepared and used by the researcher to collect personal information such as age, marital history, and academic level.[20]

Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (DSM) (SCID): It is a clinical interview that is used to diagnose dysfunctions of axis 1 based on DSM-IV. The reliability coefficient between evaluators for SCID is reported to be 0.60.[21] The diagnostic agreement of this tool was favorable for Persian language for most of the specific and general diagnoses with reliability greater than 0.60. The Kappa coefficient for all of the current diagnoses and life expectancy diagnosis was 0.52 and 0.55, respectively.[22]

BAI: It is one of the most common self-report tools in measuring anxiety index. This tool is a 21-item scale in the form of 4-point Likert of anxiety symptoms. The scores are in the range of 0 to 63. Three items in this questionnaire are related to anxious mood, three items are related to specific fears, and the other items measure the automatic symptoms of hyperactivity and motor stress anxiety. This questionnaire is a tool with acceptable validity and reliability in adults.[23] Cronbach's alpha was estimated at 0.78 in the present sample.

FFMQ: This questionnaire was designed by Baer et al. [24] with the aim of evaluating the five components of observation, description, activity with awareness, non-judgment, and non-reactivity. This tool consists of 39 items and is scored in the 5-point Likert scale.

LESS: This tool was designed by Leahy [25] aimed to evaluate 14 emotional schemas. This scale contains 50 items, which are scored in the 5-point Likert scale. Fourteen emotional schemas include seeking approval from others, being perceptible, feeling guilty, a simplistic view of emotion, higher values, being controllable, emotional numbness, trying to be rational, course length, agreement, acceptance of emotions, mental rumination, expression of feelings, and blame. The validity and reliability of this tool have been reported to be favorable (thesis code: 901308).

Results

According to the normality of the distribution of variables and in order to examine the linear relationship between the variables of anxiety, mindfulness, and emotional schemas, Pearson correlation test was used. Multivariate regression was also used to predict anxiety based on mindfulness and emotional schemas. In addition, all variance inflation factor (VIF) values of the predictor variables were lower than 10; therefore, it can be concluded that the linearity between the variables was not observed. On the other hand, the tolerance value obtained for each of the predictor variables indicated that there

was no linearity between the predictor variables. Finally, the Durbin-Watson statistic obtained from this study was 1.29. Therefore, it can be stated that there was no continuous correlation between the data.

The demographic results showed that the present study sample consisted of 119 patients with cancer (72 women and 47 men). The average age of the participants in this study was 44.5 and the standard deviation (SD) was 13.79. The youngest participant was 21 years old and the oldest was 78 years old. In addition, the lowest number of participants had MSc degree with a frequency of 5.9%, and the highest number was related to diploma degree and under it with a frequency of 90.2%. In addition, 80.7% of the participants were married and 19.3% were single.

The distribution of anxiety index scores is presented in table 1.

Table 1. Distribution of anxiety scores

	Gender	Number	Mean ± SD
Anxiety	Total	119	15.51 ± 10.41
	Women	72	16.25 ± 10.80
	Men	47	13.95 ± 9.69

SD: Standard deviation

The distribution of mindfulness index scores in the five dimensions is presented in table 2.

Table 2. Distribution of mindfulness index scores in the five dimensions

Index	Gender	Number	Mean ± SD
Description	Total	119	19.74 ± 7.27
	Women	72	19.66 ± 7.16
	Men	47	19.87 ± 7.50
Observation	Total	119	11.34 ± 3.44
	Women	72	11.38 ± 3.53
	Men	47	11.27 ± 3.32
Acting with awareness	Total	119	17.92 ± 7.62
	Women	72	16.77 ± 7.85
	Men	47	19.68 ± 6.96
Non-judgment	Total	119	10.30 ± 4.53
	Women	72	9.98 ± 4.30
	Men	47	10.78 ± 4.88
Non-reactivity	Total	119	13.86 ± 5.50
	Women	72	13.79 ± 5.98
	Men	47	13.97 ± 4.72

SD: Standard deviation

The distribution of emotional schema scores is presented in table 3.

Table 3. Distribution of emotional schemas scores

Index	Gender	N	Mean ± SD
Seeking approval from others	Total	119	5.25 ± 2.80
	Women	72	5.41 ± 2.82
	Men	47	5.00 ± 2.87
Being perceptible	Total	119	11.10 ± 3.52
	Women	72	11.16 ± 3.21
	Men	47	11.00 ± 3.98
Feeling guilty	Total	119	8.42 ± 3.40
	Women	72	8.44 ± 3.08
	Men	47	8.38 ± 3.01
Simplistic view to emotions	Total	119	10.84 ± 2.64
	Women	72	10.80 ± 2.59
	Men	47	10.91 ± 2.75
Higher values	Total	119	9.73 ± 1.88
	Women	72	9.62 ± 1.89
	Men	47	9.89 ± 1.87
Being controllable	Total	119	6.84 ± 3.38
	Women	72	6.91 ± 3.63
	Men	47	6.74 ± 2.98
Emotional numbness	Total	119	1.39 ± 1.82
	Women	72	1.18 ± 1.63
	Men	47	1.72 ± 2.06
Trying to be rational	Total	119	9.54 ± 2.11
	Women	72	9.48 ± 1.98
	Men	47	9.63 ± 2.30
Course length	Total	119	3.30 ± 2.04
	Women	72	3.12 ± 1.95
	Men	47	3.57 ± 2.15
Agreement	Total	119	5.50 ± 2.92
	Women	72	5.44 ± 2.88
	Men	47	5.59 ± 3.01
Acceptance of emotions	Total	119	11.95 ± 3.50
	Women	72	12.12 ± 3.53
	Men	47	11.70 ± 3.48
Mental rumination	Total	119	9.36 ± 4.22
	Women	72	9.98 ± 4.27
	Men	47	8.40 ± 4.00
Expression of feelings	Total	119	5.28 ± 1.86
	Women	72	5.44 ± 1.62
	Men	47	5.04 ± 2.18
Blame	Total	119	4.97 ± 2.02
	Women	72	4.98 ± 2.09
	Men	47	4.95 ± 1.92

SD: Standard deviation

Simultaneous multivariate regression analysis was used to investigate the role of mindfulness in predicting anxiety. The findings of the regression equation showed that mindfulness was a predictor of anxiety ($P < 0.001$).

Table 4. Anxiety regression coefficients by mindfulness dimensions

	R	R^2	B	β	t	P
Acting with awareness	0.44	0.19	-0.37	-0.27	-2.79	< 0.001
Non-reactivity			-0.38	-0.20	-2.15	

Findings related to anxiety regression coefficients by the dimensions of mindfulness are presented in table 4.

As it can be seen in the findings of table 4, the two dimensions of mindfulness including acting with awareness (β = -0.27) and non-reactivity (β = -0.20) negatively predicted the anxiety (P < 0.001). Moreover, two dimensions of acting with awareness and non-reactivity explained 19% of anxiety variance (R^2 = 0.19).

Simultaneous multivariate regression analysis was used to investigate the role of emotional schema in predicting anxiety. The findings of the regression equation showed that emotional schema was a predictor of anxiety (P < 0.001).

Findings related to anxiety regression coefficients by the dimensions of emotional schemas are presented in table 5.

As it can be seen in the findings of table 5, the two dimensions of emotional schemas including being controllable (β = -0.30) and blame (β = -0.19) negatively predicted the anxiety (P < 0.001). Moreover, four dimensions of being controllable, emotional numbness, blame, and mental rumination explained 34% of anxiety variance (R^2 = 0.34).

In order to investigate the most significant combination of mindfulness components and emotional schemas in anxiety prediction, multi-step regression analysis was used. The findings showed that the values of F calculated in the first and second steps (F = 26.43 and F = 18.87, respectively, P < 0.001) were significant, indicating the high explanatory power of the prediction variables.

Findings related to anxiety regression coefficients by the dimensions of mindfulness and emotional schemas are presented in table 6.

Findings in table 6 show that the mental rumination alone and positively predicted anxiety and explained 18% of the anxiety variance (R^2 = 0.18).

In the second step, "controllability" was added to the regression. Mental rumination positively (β = 0.34, P < 0.001) and "controllability" negatively (β = -0.26, P = 0.003) predicted anxiety. Mental rumination and controllability explained 24% of anxiety variance (R^2 = 0.24).

Hierarchical regression analysis was used to investigate the role of mindfulness, emotional schemas, age, gender, education level, and marital status in predicting anxiety. Thus, in the first step, the variables of age, gender, marital status, and education level entered into the regression equation as predictor variables and anxiety as criterion variable. Then, in the second step, 5 components of mindfulness and 14 emotional schemas were added to the equation.

Examination of regression coefficients showed that the variables of age, gender, marital status, and education level neither alone nor when they entered into the regression equation as a modulating variable had effect on the role of mindfulness and emotional schemas in predicting anxiety in patients with cancer.

Table 5. Anxiety regression coefficients by dimensions of emotional schemas

	R	R^2	B	β	t	P
Being controllable	0.58	0.34	-0.94	-0.30	-2.83	< 0.001
Emotional numbness			1.27	0.21	2.33	
Mental rumination			0.87	0.35	3.38	
Blame			-1.00	-0.19	-2.02	

Table 6. Anxiety regression coefficients by the dimensions of mindfulness and emotional schemas

Steps	Model	R	R^2	B	β	t	P
First	Mental rumination	0.43	0.18	1.06	0.43	5.14	< 0.001
	Mental rumination	0.49	0.24	0.84	0.34	3.98	< 0.001
Second	Being controllable			-0.82	-0.26	-3.06	0.003

Discussion

This study was conducted to investigate the role of mindfulness and emotional schemas in predicting anxiety in patients with cancer. The present study was the first one to be conducted in this field. The results of the present study showed that the two dimensions of mindfulness, including acting with awareness and non-reactivity, were negatively predictive of anxiety. Moreover, two dimensions of emotional schemas, including "controllability" and "blame", negatively predicted anxiety. Besides, demographic variables, neither alone nor as modulating variables, had a significant effect on the role of mindfulness and emotional schemas in predicting anxiety.

In this regard, the findings of the study by Parmentier et al. showed that mindfulness was associated with low levels of anxiety, and emotional regulation played a mediating role between mindfulness and anxiety.[26] The findings of the study by Janusek et al. also showed that in patients with breast cancer, non-judgment and non-reactivity to internal experience was associated with a rapid decrease in stress symptoms, which reflected the role of mindfulness indices in triggering of the perception mechanism of stress and anxiety.[27] In this regard, Zhang et al. have pointed out the relationship between mindfulness and psychological distress.[26] Patients with cancer suffer from psychological distress, which can lead to decreased concentration and involvement with threat-related thinking. In this regard, these patients do not pay attention to the process while doing the work, and this can explain the reduction of the component scores of acting with awareness (i.e., full attention to the ongoing activity instead of the automatic action) and this inability to focus on ongoing activities, in turn, can increase the anxiety levels of these patients. Non-reactivity to the inner experience of the transition of thoughts and feelings is referred to as not conflicting with them. Patients with cancer are unable to release negative thoughts and feelings due to their high level of anxiety experience, and are constantly trying to change those thoughts and feelings instead.

In line with the findings of the present study, in the study of Bredicean et al., negative emotional schemas in patients with breast cancer without reconstructive surgery predicted the anxiety index.[19] The predictive role of the three schemas of controllability, blame, and mental rumination can be explained by the metacognitive model of emotions. This model states that emotions are experiential events that different people respond to them differently. Patients with cancer have been reviewing unpleasant calls for a long time, which leads to a feeling of lack of control in the person, and finally, this feeling of lack of control may lead the person to the use of dysfunctional strategies, such as mental rumination, anxiety, blaming others, and ultimately avoiding exciting situations can lead to persistent negative emotions and eventually a vicious cycle that can lead to anxiety.

Some of the findings of the present study showed that demographic variables such as age did not have a significant effect on the role of mindfulness and emotional schemas in predicting anxiety. In a study by Weiss Wiesel et al., the age index was significantly associated with anxiety in elderly patients with cancer and the rate of anxiety decreased with increasing age.[29] One of the reasons for the differences in the findings was that the study

of Weiss Wiesel et al. focused on the elderly patients, which could explain the findings. Moreover, in the study of Zhang et al., the role of age in the relationship between psychological distress and mental distraction was reported as significant.[28]

This study was accompanied by some limitations during the implementation process. The most important limitation of the present study was cross-sectional design and the mere use of self-reporting tools. It is recommended that other data collection methods be used alongside paper and pen tools in future studies. Another limitation of the present study was the lack of control over the age range of patients. Controlling age variables in future studies can be helpful.

Conclusion

The findings of the present study showed that the two dimensions of mindfulness, including acting with awareness and non-reactivity, were negatively predictive of anxiety. Besides, two dimensions of emotional schemas, including "controllability" and "blame", negatively predicted anxiety. These findings, in line with the research background, indicate the significant role of mindfulness indices and emotional schemas and can be associated with clinical applications in cancer treatment.

Conflict of Interests

Authors have no conflict of interests.

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