Relationship Between Post-traumatic Growth and Illness Perception and Emotion Regulation in Patients with Cancer

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Abstract
Background: Cancer diagnosis causes emotional problems and profound psychological helplessness in patients. We aimed to investigate the relationship between post-traumatic growth and disease perception and emotion regulation in patients with cancer.
Methods: The statistical population of this correlation study was all patients aged 18-65 years with breast, leukemia, and gastrointestinal cancer going to the oncology ward of Omid and Imam Khomeini hospitals in Urmia in the first half of 2021. 250 people (121 women and 129 men) were selected by the purposeful sampling method. Data collection tools included a post-traumatic growth questionnaire, a modified illness perception questionnaire, and the emotion regulation process strategies questionnaire. Pearson's correlation test and multiple regression analysis were used for data analysis.
Results: The results showed that negative illness perception had a significant and negative relationship, and optimistic illness perception had a positive, meaningful relationship with post-traumatic growth ($P<0.05$). Emotion regulation had a significant and positive association with post-traumatic growth ($P<0.05$).
Conclusion: How to perceive the disease and emotion regulation strategies in patients with cancer have an influential role in promoting post-traumatic growth.
Keywords: Post-traumatic growth; Illness perception; Emotion regulation.

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Introduction

Chronic diseases are a growing concern worldwide. People with chronic illnesses often experience the stress of the disease, which leads to reduced quality of life and limitations in their daily tasks.[1] According to the International Agency for Research on Cancer (IARC), over the past 5 years, 43.8 million people have been diagnosed with cancer and 9.6 million with cancer-related deaths.[2] As cancer progresses, patients are exposed to various ailments that often manifest as anxiety, depression, and despair. In general, cancer diagnosis causes emotional problems and profound psychological helplessness in patients.[3]

Despite the problems and complications of cancer, these patients also experience positive changes called post-traumatic growth.[4] Post-traumatic growth is a strong sense of self and self-worth, psychological maturity, and empathy. According to the post-injury growth model, positive changes can be seen in several areas: (1) Self-concept (new assessment of personal strength and flexibility), (2) Appreciating new possibilities in life, (3) Social relationships (feeling emotionally close to others, especially family and friends), (4) Philosophy of life (rearranging values and priorities), (5) Improving

spirituality (increasing participation in religious activities).[5]

One variable that affects the therapeutic outcomes and positive outcomes of chronic physical disorders, including cancer, is illness perception.[6] Illness perception refers to the patient's organized cognitive representation of their illness. According to the theory put forward by Leventhal et al,[7] patients adjust their behavior and emotional response to disease based on their perceptions of the nature, causes, outcome, controllability, treatability, and duration of illness.[8] Illness perception includes seven areas of identity (understanding the symptoms of the disease), course of the disease (chronic or acute), illness outcome, individual control, therapeutic control, coping with the illness, periodicity of the disease, and emotional manifestations of patients.[9] A study of men with AIDS showed that positive disease perception has a significant positive relationship with post-traumatic growth, and negative disease perception has an important negative relationship with post-traumatic growth.[10] Another study[11] showed a meaningful positive relationship between positive disease perception, mental well-being, and positive changes after injury in people with cancer.

Many researchers have emphasized emotion-related

factors among the many variables that may affect post-traumatic growth. Emotion regulation refers to a set of automated and controlled processes that include initiating, maintaining, and changing emotions that affect the occurrence, severity, and duration of emotional states.[12] Four major patterns of cancer-related emotion regulation have been examined: repression, suppression, empirical avoidance, and cognitive reassessment that can affect individuals' psychological responses during cancer and recovery from the illness.[13] Emotion regulation has a mediating role in the relationship between spiritual health and post-traumatic growth in divorced women.[14] Also, a significant positive relationship was found between positive emotion regulation strategies in people with cancer and post-traumatic growth and between the use of a less adaptive approach.[15] There was a negative relationship between repression and post-injury growth. One study[16] showed a significant positive relationship between post-traumatic growth and cognitive strategies for emotion regulation in patients undergoing hemodialysis.

Considering that understanding, the different dimensions of the concept of post-traumatic growth and related variables can provide valuable data for planning daycare and effective adaptation of patients to stressful conditions, as well as the lack of sufficient studies on the relationship between these variables in Iranian patients cancer, we aimed to investigate the relationship between post-traumatic growth and disease perception and emotion regulation in these patients.

Methods

The statistical population of this correlation study was all patients aged 18-65 years with breast, leukemia and gastrointestinal cancer who were referred to the oncology department of Omid and Imam Khomeini hospitals in Urmia in the first half of the year 2021. Considering the possibility of a drop in the participants, 250 people were selected by the available sampling method and participated in the study. The research method was as follows: first, obtaining permission from the Research Ethics Committee of Mohaghegh Ardabili University (code: IR.UMA.REC.1400.012) and referring to the Oncology Department of Omid and Imam Khomeini hospitals in Urmia, the research objectives were explained to the subjects. Next, they were asked to answer the questionnaires individually at the oncology ward. Inclusion criteria were: age of 18 to 65 years, at least six months of chemotherapy and radiation therapy, diagnosis of breast, blood, stomach, and intestinal cancer, no other chronic physical and psychological illness, and ability to read and write. We excluded those with severe mental disorder, those receiving medical or other psychological treatment, and those who were unwilling cooperate.

Pearson's correlation coefficient test and multiple regression analysis were used to analyze the obtained data using SPSS software, version 23. Multiple regression was used to test the hypothesis that illness perception and emotion regulation can predict post-traumatic growth. The following assumptions must be made to use multiple regression: To investigate the default of error independence and non-alignment between predictor variables (illness perception and emotion regulation), Durbin-Watson statistic and tolerance index were examined. If the obtained statistic was less than 4, it indicates the independence of errors. For this analysis, the value of this statistic was 2.02 which suggests that this assumption is valid. Also, a single-sample Kolmogorov-Smirnov test was used to evaluate the normality of data distribution of disease perception and emotion regulation variables. To establish this assumption, the significance levels obtained for each research variable must be greater than 0.05. In this study, the significance level of this test for disease perception and emotion regulation (0.200) was calculated. Therefore, the data of all variables were standard and parametric tests can be used to test each of the variables. To test the homogeneity of variances in this study, Levene's statistical test was used to confirm the homogeneity of variances.

Post-traumatic Growth Questionnaire

The post-traumatic growth questionnaire was built in the United States in 1996 by Tedeschi and Calhoun.[17] This questionnaire has 21 items scored on a 6-point Likert scale (0 = I have not experienced any change to 5 = I have experienced much change). This questionnaire consists of 5 subscales that include relationship with others (becoming more intimate), new opportunities (using new opportunities or changing the course of life), personal strength (feeling overcoming life's problems), spiritual change (promoting spiritual growth and engaging with existential exploration) and understanding the meaning of life (understanding more the value of life or changing life priorities).[17] The reliability of the questionnaire using Cronbach's alpha coefficient (0.90) was previously confirmed by Tedeschi and Calhoun.[17] The total validity of the questionnaire was 0.76 in a study by Mahmoudi et al,[18] Cronbach's alpha index for the total questionnaire was 0.92, and the divergent validity of the questionnaire was 0.51. In the present study, Cronbach's alpha coefficient for the total questionnaire was 0.97.

A Modified Form of Illness Perception Questionnaire

This questionnaire was developed by Moss-Morris et al[19] and includes five subscales of emotional manifestations, treatment control, disease outcomes, acute/chronic timeline, and treatment coherence and three dimensions of patients 'beliefs about the cause of the disease, including factors related to psychological characteristics (patients' beliefs about the role of personality factors in the development of the disease), immune-related factors

(patient's beliefs about, for example, the role of microbes in their condition), and risk factors (the patient believes in the role of factors such as heredity and nutrition in the development of his disease). All items are scored on a 5-point Likert scale (0 = strongly disagree to 5 = strongly agree). In the study of Moss-Morris et al,[19] the total reliability of the questionnaire was obtained using Cronbach's alpha coefficient (0.73). The concurrent validity of the questionnaire was calculated to be 0.54. In one study,[20] the concurrent validity of the questionnaire was 0.61, and its reliability was 0.84 using Cronbach's alpha. In the present study, Cronbach's alpha coefficient for the total questionnaire was 0.67.

Emotion Regulation Process Strategies Questionnaire

This questionnaire has 28 items developed by Schutte et al[21] to evaluate the emotion regulation strategies proposed in the Gross and John process model.[22] It has seven subscales: position selection, position adjustment, attention span, cognitive change, experimental adjustment, behavioral adjustment, and biological adjustment. There are four items for each of the seven strategies. It is scored on a 7-point Likert scale (1 = strongly agree to 7 = strongly agree). The reliability of this questionnaire has been confirmed by Schutte et al[21] with a Cronbach's alpha of 0.94, and concurrent criterion validity was reported to be 0.68. In Hassani and Kadivar's research,[23] the reliability was calculated using Cronbach's alpha coefficient to be 0.94. Also, the concurrent validity of the questionnaire was 0.68. in the present study, Cronbach's alpha coefficient was 0.77 for the total questionnaire.

Results

This study was done on 250 patients with cancer, of which 41 (16.4%) were 18-25 years old, 90 (36%) were 26-40 years old, and 119 (47.6) were 41-60 years old. There were 121 (48.4%) women and 129 (51.6%) men, and 156 (62.4%) were married and 94 (37.6%) were single. The information about the analysis of descriptive statistics based on the mean and standard deviation of the studied variables is given in Table 1.

As shown in Table 1, the mean of growth after trauma was (63.832) and its standard deviation was (14.111), the

Table 1. Descriptive Findings of Research Variables

Variable	Mean	SD	N
Post-traumatic growth	63.832	14.111	250
Relations with others	20.516	5.249	250
New opportunity	14.380	3.899	250
Personal power	11.984	2.682	250
Spiritual changes	6.668	1.624	250
The meaning of life	10.564	2.646	250
Illness perception	66.532	12.818	250
Emotion regulation	117.368	15.447	250

mean of illness perception was (66.532) and its standard deviation was (12.818), the mean of emotion regulation was (117.368), and its standard deviation was (15.447).

Pearson correlation coefficient and multiple regression analysis were used for inferential analysis. Table 2 shows the correlation matrix.

The results of Table 3 show that post-traumatic growth with disease perception had a significant negative correlation ($P < 0.01$) and had a significant positive correlation with emotion regulation ($P < 0.01$).

Multiple regression analysis was used to determine the contribution of disease perception and emotion regulation variables in predicting post-traumatic growth in patients with cancer. Table 4 shows the results of multiple regression.

As shown in Table 4, the significance value was less than 0.05 indicating the significance of the regression model. At least one of the predictor variables has a significant effect on the criterion variable; because of the importance of the whole model, it must now be examined which of the coefficients is not zero; in other words, which variable or variables have a significant effect on the model. The t test is used for this purpose.

The results of Table 5 show that the perception of disease with a beta coefficient of -0.420 at the level of $P < 0.05$ was negative, and emotion regulation with a beta coefficient of 0.345 at the level of $P < 0.05$ negatively predicts post-traumatic growth.

Discussion

We aimed to investigate the relationship between post-traumatic growth and disease perception and emotion regulation in patients with cancer. The results showed that the perception of illness had a significant negative correlation with post-traumatic growth and predicted it negatively ($P < 0.05$). The component of personal control of disease perception has a meaningful positive relationship with post-traumatic growth. Our findings are consistent with several other studies.[9-11] Explaining this finding, it can be said that disease-related stimuli that result from a health threat (e.g., cancer diagnosis) will cause cognitive and emotional states in patients. Such terms influence coping strategies to determine outcomes (e.g., disease status) and emotional outcomes (e.g., emotional distress) through two related parallel processes. Cognitive beliefs and representations about the disease can affect people's emotional responses. The mental model of personal control, positively correlated with post-traumatic stress disorder, can increase self-efficacy and thus protect the individual against health-related problems. The higher a person's self-efficacy, the more positively they will believe in better treatment outcomes and recovery and the more actively they will participate in the treatment process.[10] Also, patients who have more positive perceptions of their illness change their living conditions, have better

Table 2. Correlation Matrix of Research Variables

Variable	1	2	3	4	5	6	7	8
1. Post-traumatic growth	1							
2. Relations with others	**0.86	1						
3. New opportunity	**0.86	**0.69	1					
4. Personal power	**0.78	**0.57	**0.64	1				
5. Spiritual change	**0.70	**0.55	**0.55	**0.57	1			
6. meaning of life	**0.61	**0.46	**0.52	**0.45	**0.45	1		
7. Illness Perception	**0.44	**0.24-	**0.45-	**0.49-	**0.49-	**0.40-	1	
8. Emotion Regulation	**0.44	**-0.40	**-.042	**-0.40	**-0.31	**-0.31	**0.17	1

Note: numbers are correlation coefficients.

$**P<0.01; * P<0.05.$

Table 3. Results of Multiple Regression Analysis to Predict post-traumatic Growth Based on Disease Perception and Emotion Regulation

Source of Changes	Sum of Square	df	Mean Square	F	P
Regression	16788.061	3	8394.031	63.221	0.001
Residual	32794.883	247	132.773		0.001
Total	4958.944	249	46.578		0.001

Table 4. Multiple Regression Coefficients to Predict Post-traumatic Growth With Disease Perception, Emotion Regulation

Variable	B	SE	Beta	t	F	R	R2	P
Illness perception	-0.493	0.063	-0.447	-7/880	62.096	0.447	0.447	0.000
Emotion regulation	0.406	0.052	0.444	7.811	61.017	0.444	0.197	0.009

Table 5. Standard, Non-standard Coefficients and T-statistics of the Main Variables Entered in the Regression Equation

Dependent Variable	Non-standard Coefficients	Standard Coefficients	t	Sig.	Expected Significance
Constant	51.278	-	6.935	0.001	0.05
Illness perception	-0.420	-0.382	-7.260	0.000	0.05
Emotion regulation	0.345	0.378	7.188	0.001	0.05

assessments of illness and life events, experience their illness, build support systems, and make changes. The psychological, spiritual, and social conditions they develop are adapted to infection.[24] However, suppose a person negatively perceives the disease and misconceptions. In that case, they may adopt abnormal adaptation strategies such as avoidance. Such strategies may have detrimental effects on the individual's mental health and prevent growth in the individual.[14]

Another finding of the present study was that emotion regulation had a significant positive correlation with post-traumatic growth. These findings are consistent with several other studies.[14-16] Explaining these results, it can be said that emotion regulation strategies facilitate coping with annoying negative emotions and facilitate the regulation of behaviors by turning attention away from negative emotions. In other words, as the person reconstructs the damaged beliefs associated with the injury, they try to regulate their feelings in a way that reinforces constructive thinking and allows them to engage and deal with memories and feelings related to trauma.[25] Emotion regulation strategies can also facilitate post-traumatic growth by involving the individual in

an emotional stimulus by helping individuals to extract meaning from their traumatic experiences.[15]

In general, and according to the results of our study, the development of post-traumatic stress disorder in people with cancer is predicted based on how the situation is understood and the consequences of the disease and emotion regulation strategies; it can be concluded that beliefs related to the status and outcome of the disease and how the disease is perceived in patients with cancer, it plays a role in their desire to perform health-promoting behaviors and facilitate post-traumatic growth. Emotion regulation strategies also play an influential role in promoting post-traumatic growth in these patients in interpreting the traumatic event and dealing with the crisis. The use of a correlation research plan that does not allow the inference of causal results and the inability to control some disturbing variables such as disease severity, disease period, drug dose, etc. were the most critical limitations of our study, so we suggest using experimental methods in future studies. Also, this study was performed on cancer patients referred to the Oncology Ward of Omid and Imam Khomeini hospitals in Urmia, so the generalization of the results to other cities and groups

should be made with caution. Considering the present study results, the implementation of cognitive-behavioral psychotherapy to change misconceptions and negative perceptions of the disease and the formation of correct beliefs and positive perceptions about the disease to increase healthy behaviors and post-traumatic growth of patients is recommended. It is also suggested to hold courses and workshops on emotion regulation training based on the Gross model in cancer clinics and treatment centers, to help increase positive coping, psychological well-being, and post-traumatic growth of patients.

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