



Predicting post-traumatic growth based on rumination-reflection in patients with cancer

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Original Article

Abstract

BACKGROUND: Following life-threatening experiences such as cancer, people show positive psychological changes, known as post-traumatic growth. Post-traumatic growth is associated with greater physical and mental health experience and lower distress and post-traumatic stress. Thus, the present study aimed to investigate the model of predicting post-traumatic growth based on rumination/reflection with the mediating role of the meaning of life.

METHODS: The research was conducted by correlation method and structural equation modeling (SEM). The sample consisted of 300 patients with cancer referred to hospitals in Tehran Province, Iran, who were selected by purposive sampling. Participants completed the Rumination-Reflection Questionnaire (RRQ), Posttraumatic Growth Inventory (PTGI), and Meaning in Life Questionnaire (MLQ).

RESULTS: Rumination/reflection had a direct and indirect effect (mediated by the meaning of life) on the post-traumatic growth of people with cancer. Meaning of life also had a significant direct effect on post-traumatic growth.

CONCLUSION: The meaning of life both directly and through rumination-reflection has a significant effect on post-traumatic growth in patients with cancer. Therefore, to improve the mental health of these patients, it is recommended that more attention be paid to the meaning of life in these patients during treatment.

KEYWORDS: Post-Traumatic; Growth; Rumination-Reflection; Neoplasms

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Introduction

Cancer is a disorder in the rate of cell proliferation, abnormal cell shape change, and loss of cell differentiation that can occur in any tissue of the body and at any age, and by attacking healthy body tissues, it can cause severe illness and death. The diagnosis of cancer disturbs the feeling of security and invulnerability of the person and damages

various aspects of the patients' lives such as family and social relationships, sexuality, and self-care.¹ Despite this, some people show positive psychological changes after experiencing life-threatening events such as cancer, which is referred to as post-traumatic growth.^{2,3} This term, post-traumatic growth, was coined by Tedeschi and Moore and it means the positive psychological changes that have been obtained from facing big challenges and harmful events in life.² According to the functional-descriptive model, traumatic events cause the collapse of the schemas (fundamental beliefs) before the accident and change the previous goals and ways of giving meaning to

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intense emotions. Then, in response to these conditions, the patient initiates mechanisms such as rumination to prevent the continuation of the situation. Rumination is a set of conscious thoughts that revolve around an important issue and these thoughts appear even in the absence of urgent and necessary environmental demands. Based on Tedeschi and Moore functional-descriptive model and person-centred meta-theoretical perspective, effort-based rumination leads to meaning with the expansion of storytelling. Following the experience of trauma, people search for a new understanding of the meaning and purpose of their lives, and the unification of voluntary rumination/meditation facilitates the emergence of excellence in a person. Meaning in life means a feeling of existential integrity that seeks to respond to the philosophy of life, realize the purpose of life, achieve valuable goals, and as a result, achieve a sense of completeness and usefulness.⁴ The meaning of life also increases with purposefulness. Positive emotion is related to hope, optimism, and life satisfaction.⁵ Rumination about stressful experiences is an important factor in meaning-making because it causes re-evaluation of the trauma or revision of schemas. When people somehow find the meaning of their experience, uninvited rumination decreases.⁶ But another type of rumination is voluntary rumination, which includes a deliberate and purposeful effort to understand the events and their consequences.⁷

Voluntary rumination or reflection, which is defined as the human desire to introspect and gain more information about the philosophy, nature, and purpose of life leads to the reconstruction of post-tragedy schemas and causes the formation of new narratives of life along with new goals and cognitions in which accidents will be considered as opportunities for growth. Therefore, intrusive rumination is necessary to launch cognitive processes towards positive change.⁸

Research has been conducted on the relationship between rumination/reflection and the meaning of life with post-traumatic growth. People who had more rumination immediately after experiencing an accident experienced more post-traumatic growth. Positive rumination, which is distinguished from negative rumination, is constructive and active in assessing the situation, and plays a key role in the constructive aspect of post-traumatic growth; therefore, people who experience constructive mental rumination from the very first moments after encountering an accident and use it positively are more likely to show post-traumatic growth about six months to two years after the crisis.⁹ Rumination/contemplation has a positive relationship with finding meaning in life and leads to an increase in positive emotion and relaxation as well as the search for meaning in life.⁷ Voluntary and intrusive rumination immediately after the event has a positive relationship with finding meaning.¹⁰

The results of the research of Kamijo and Yukawa,¹¹ Fazel et al.,¹² as well as Salehi and Dehshiri¹³ showed that some factors such as spirituality, finding meaning, satisfaction with life, optimism, and patience were observed in people with cancer who had more post-traumatic growth and an increased level of well-being.

Although various studies have investigated post-traumatic growth as well as the relationship between it and various variables, there is still an attempt to answer the question of which of the psychological variables can have a direct and indirect effect on post-traumatic growth. It has great practical importance. In previous research, the role of such ruminations has not been deeply studied and the relationships between rumination-reflection and meaning of life with post-traumatic growth in patients with cancer have not been investigated. Therefore, the current research focuses on the relationship between

rumination and meaning-making processes with post-traumatic growth and seeks to answer the question of whether the meaning of life has a mediating role in the relationship between rumination/reflection and post-traumatic growth in people with cancer.

Methods

The current research was a descriptive and correlational study [using structural equation modeling (SEM)]. The statistical population studied in this research consisted of all patients with cancer aged 30 to 65 who were referred to hospitals in Tehran Province, Iran, including Imam Hossein, Shohada-e-Tajrish, and Imam Khomeini Hospitals, in winter 2019 and spring 2021.

In the present study, taking into account the possibility of attrition of participants, 300 samples were selected by purposive sampling. 65% (196 people) had cancer between 1 and 5 years, 26% (77 people) had cancer for less than one year, and 9% (27 people) had cancer for more than 6 years. 37% (112 people) were in the first stage of the disease, 32% (97 people) were in the second stage of the disease, 5% (16 people) were in the third stage of the disease, and finally, 25% (75 people) were in the initial stages of the disease.

The criteria for entering the research were: diagnosis of cancer by the oncology department of the hospital, the ability to complete the tools, having a diploma or higher literacy, duration of a cancer diagnosis of more than three months, and age range between 30 and 65 years. Moreover, missing each of the entry criteria, not completing the questionnaires accurately and correctly, and withdrawing from continuing cooperation in the research were among the most important criteria for exiting the study.

Before starting the study, the purpose of the research was explained to all the participants and they were also assured that all ethical principles in this study, such as confidentiality and non-disclosure of names, would be

observed and the participants had full authority to withdraw from the research stage.

Data were analyzed using path analysis and SPSS (version 22, IBM Corporation, Armonk, NY, USA) and Amos 21 software. The path analysis based on multivariate regression analysis was used to measure the relationships of the variables. The standard beta regression coefficient was used to determine the direction and intensity of the relationships between the variables. The value of T also showed the significance of their relationships ($P < 0.05$).

Rumination-Reflection Questionnaire (RRQ):

The RRQ contains 24 items, 12 of which evaluate self-rumination focus and 12 of which evaluate adaptive reflective thinking. The answer to each item is placed on a 5-point Likert scale (strongly disagree = 1, disagree = 2, have no opinion = 3, agree = 4, strongly agree = 5).

Examining the construct validity of this scale revealed that the rumination subscale showed a strong positive relationship with neuroticism symptoms, while the reflection scale showed the strongest relationship with openness to experience. Cronbach's alpha reported a good internal consistency of 0.91 and 0.90 for reflection and rumination, respectively. These two factors showed minimum correlation with each other ($r = 0.22$). Moreover, in the research of Manavipour and Shahhosieni, good psychometric properties have been shown for this tool, so that the internal consistency of this scale was reported as 0.84 in Iran and 0.80 in America.¹⁴ In the present study, the reliability of this test for self-rumination and thinking adaptive reflection was obtained as 0.84 and 0.74, respectively, and 0.76 for the whole test.

Posttraumatic Growth Inventory (PTGI):

This questionnaire is designed to measure post-traumatic growth.² A self-assessment tool consists of 21 items, and the person has to give their answers on a six-point Likert scale (I experienced no change = 0, I experienced a

few changes = 1, I experienced few changes = 2, I experienced moderate change = 3, I experienced many changes = 4, I experienced too many changes = 5).

The main form of this questionnaire consists of 5 subscales, which are: 1) relationship with others, 2) new possibilities, 3) individual strength, 4) spiritual changes, and 5) value of life.

In the study of Silva et al., the correlation coefficient of the subscales with the overall score of the questionnaire was positive and significant (0.88) and the Cronbach's alpha coefficient for the entire questionnaire was 0.92.³ Heidarzadeh et al. investigated the psychometric properties of the Persian version of post-traumatic growth in patients with cancer and showed an acceptable fit in confirmatory factor analysis (CFA). Besides, the 5-factor structure of the post-traumatic growth instrument was confirmed. Cronbach's alpha coefficient for the whole instrument was 0.87 and the obtained coefficients for the components of the main 5-factor scale were 0.57 to 0.77, and the correlation between the two test implementations with an interval of 30 days in 18 samples was 0.75.¹⁵ In the present study, the reliability of this test for the relationship with others, new possibilities, personal strength, spiritual changes, and value of life was 0.78, 0.70, 0.74, 0.77, and 0.70, respectively, and for the whole test was 0.70.

Meaning in Life Questionnaire (MLQ): The MLQ measures the two dimensions of meaning in life, i.e., the presence of meaning and the search for meaning, using 10 items based on a seven-point Likert scale (completely incorrect = 1, somewhat incorrect = 2, slightly incorrect = 3, I have no opinion

= 4, slightly correct = 5, somewhat correct = 6, completely correct = 7). Scores range from 5 to 35, with higher scores indicating greater strength of meaning in life. Research shows the validity and stability of questionnaire scores and their convergent and inductive validity. For example, a very good internal consistency (alpha coefficients between 0.82 and 0.87) has been reported for both scales and in a one-month time interval, adequate retest validity (0.70 for the presence subscale and 0.73 for the search subscale) has been reported. In Iran, Mesrabadi et al. investigated the construct validity and diagnostic validity of the MLQ in college students. The results of CFA led to a two-factor model (existence of meaning in life, search for meaning in life) related to each other with acceptable fit indices. Additionally, the results showed that the questionnaire was able to diagnose healthy people.¹⁶ In the present study, the reliability of this test for the presence of meaning and search for meaning was 0.76 and 0.80, respectively, and 0.75 for the whole test. This thesis is approved by the Islamic Azad University, Central Tehran Branch with the code 190347.

Results

The present study was conducted on a sample of 300 people consisting of 218 women (72.7%) and 82 men (27.3%) with cancer aged 18 to 55 years old [mean \pm standard deviation (SD): 42.89 \pm 7.34]. In table 1, the mean, SD, skewness, and kurtosis of the research variables are reported. None of the research variables had serious deviations from a univariate normal distribution.

Table 1. Mean, standard deviation (SD), skewness, and kurtosis of the variables

Variables	Mean \pm SD	Skewness	Kurtosis
Post-traumatic growth	83.323 \pm 10.548	-0.307	-0.387
The meaning of life	55.612 \pm 6.701	-0.125	-0.702
Rumination	46.537 \pm 8.034	-0.219	-0.298
Reflection	40.187 \pm 8.804	-0.453	-0.105

SD: Standard deviation

According to most sources, the skewness and kurtosis of the distribution of scores in the range (2 and -2) can be assumed to be normal. The correlation between the variables is reported in table 2, which shows that there is a significant correlation between the variables. Thus, the correlation between post-traumatic growth with the meaning of life and rumination was 0.474 and 0.349, respectively, which means that the relationship between post-traumatic growth and meaning of life was positive, which means that post-traumatic growth has increased meaning and rumination ($P \leq 0.01$). Besides, the correlation between reflection with the meaning of life (0.449) and rumination (0.483) was also positive and significant ($P \leq 0.01$).

Table 2. Pearson correlation matrix

Variables	1	2	3	4
1 Post-traumatic growth	1			
2 The meaning of life	0.473**	1		
3 Rumination	0.349**	0.297**	1	
4 Reflection	0.130**	0.449**	0.483**	1

**The pearson correlation matrix is between 1 and -1

As can be seen in table 3, all the paths mentioned were significant at the $P \leq 0.01$ level. There was the highest correlation between the meaning of life and growth after the accident (0.759).

The results showed that the ratio of chi-square to the calculated degree of freedom

(χ^2/df) was 2.631 [degree of freedom (df): 20, χ^2 : 52.621], which is less than 3 and indicates the acceptable fit of the model. The goodness of fit index (GFI) was 0.96, adjusted GFI (AGFI) was 0.911, comparative fit index (CFI) was 0.96, and normed fit index (NFI) was 0.94 which shows that all coefficients were higher than 0.90 and indicated the acceptable fit of the model with the data. In addition, the index related to the residuals root mean square error of approximation (RMSEA) (0.075) was less than 0.08, and it is an acceptable level for fitting the model. Rumination-contemplation and the meaning of life explained 64.7% of the variance of post-traumatic growth. Moreover, 25.4% of the variance in the meaning of life was explained by rumination and reflection.

The results of figure 1 show that the meaning of life both directly and indirectly through reflection and rumination had a significant effect on post-traumatic growth.

Discussion

Considering the role and importance of post-traumatic growth in the psychological health and well-being of patients with cancer, the present study was conducted to investigate the mediating role of the meaning of life in the relationship between rumination/contemplation and post-traumatic growth. The results of the present study showed that the meaning of life had a direct and significant effect on the post-traumatic growth of patients with cancer.

Table 3. Path coefficients of the structural model

Route	Parameter B	Standard parameter B	Critical value	P
Rumination \leftarrow post-traumatic growth	0.132	0.345	5.357	< 0.01
Reflection \leftarrow post-traumatic growth	0.126	0.363	5.073	< 0.01
The meaning of life \leftarrow post-traumatic growth	0.929	0.759	6.913	< 0.01
Rumination \leftarrow the meaning of life	0.063	0.203	3.029	< 0.01
Reflection \leftarrow the meaning of life	0.106	0.374	5.575	< 0.01
Rumination \leftarrow the meaning of life \leftarrow post-traumatic growth	0.059	0.153	2.774	< 0.01
Reflection \leftarrow the meaning of life \leftarrow post-traumatic growth	0.099	0.284	4.339	< 0.01

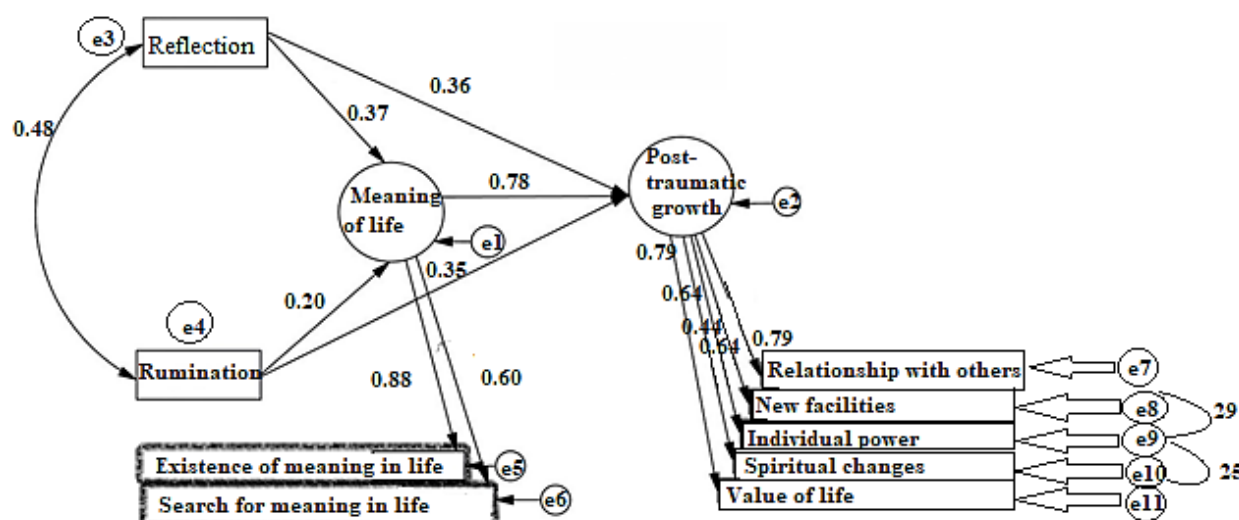


Figure 1. The experimental model of the research in the case of standardized path coefficients

This result is consistent with the other research findings of Fazel *et al.*¹² and Salehi and Dehshiri,¹³ who observed in their results that the meaning of life in most patients caused an increase in post-traumatic growth.

The findings of Fazel *et al.* have shown that patients with cancer who had higher post-traumatic growth reported three beliefs: problems are transitory, they can be solved, and they have the individual ability to cope with problems.¹² This attitude towards the accident increases positive affect and growth after the accident, because the sense of coherence represents a person's positive worldview towards their abilities and the significance of events, which helps people with cancer to find meaning in their suffering and consider it as an opportunity for growth and excellence.⁵ The findings of the present study showed that rumination and reflection had a direct and significant effect on the post-traumatic growth of patients with cancer. The research findings of Ogińska-Bulik¹⁷ and Borawski¹⁸ have shown that reflection and both types of rumination (voluntary and involuntary) have a positive relationship with positive changes after the accident. The findings of Kamijo and Yukawa also showed that post-traumatic rumination could help

improve mental health and positive attitude towards the meaning of life in patients with post-traumatic stress disorder (PTSD).¹¹

The research findings of Wozniak *et al.* have shown that involuntary rumination has a significant negative relationship with post-traumatic growth,¹⁹ which is inconsistent with the findings of the present study that show that rumination has a positive relationship with post-traumatic growth. The relationship between rumination/contemplation and post-traumatic growth of patients with cancer can be explained based on Tedeschi and Moore functional-descriptive model.²

Based on this, getting cancer as a traumatic experience causes the collapse of people's fundamental beliefs. To cope with this situation, affected patients use rumination and cognitive re-evaluations that help them cope with the experience of the disease, which is in line with the research findings of Romeo *et al.*²⁰ and Zhai *et al.*²¹ based on the relationship of rumination and cognitive reappraisal with post-traumatic growth. If intrusive rumination is a natural response immediately after the event, it can create voluntary rumination.¹¹ Consequently, involuntary rumination may be as important to finding meaning as voluntary rumination

and reflection. Involuntary rumination may have a different function according to the time of occurrence, and this may explain the inconsistency between the results of the present study and Wozniak et al.¹⁹ study.

The findings of the present study indicated that rumination and meditation had a significant indirect effect on the post-traumatic growth of patients with cancer through the mediation of the meaning of life. As mentioned, after experiencing a traumatic event, rumination continues in a voluntary and controlled manner and leads to meaning-making, finding meaning by increasing purposefulness, positive emotion, hope, optimism, and life satisfaction.^{22,23}

Changing the attitude towards the problem and seeing it as an opportunity for growth and change leads to post-traumatic growth. Rumination leads to reflection and meaning-making, increased self-awareness, self-focus, conscious awareness of thoughts, emotions, and motivations, increasing acceptance, reducing negative emotions, increasing positive emotions, adjusting emotional responses, finding meaning, and changing attitudes and insights. In patients with cancer, it can have a positive effect on the post-traumatic growth of patients.^{24,25}

It seems necessary to interpret the results of the present study according to some limitations. First, the current research is cross-sectional. Therefore, the formulation of the results of the current research without considering the effect of the passage of time on the variables and their relationships is one of the important limitations of the current research. Moreover, the results of the present study represent the sample of patients with cancer in Tehran Province. Therefore, the generalization of the present research findings to different research groups and communities, including patients with cancer in other cities, patients with other chronic diseases, etc., should be interpreted with caution. It is

suggested that the moderating role of disease diagnosis time and disease stage in the relationship between rumination-reflection and the meaning of life with post-traumatic growth be investigated in patients with cancer.

Conclusion

The findings of the present study showed that rumination and the meaning of life played an important role in predicting the post-traumatic growth of people with cancer; therefore, efforts to improve the psychological adjustment of these people need to pay attention to the variables of rumination, post-traumatic growth, and meaning-making and interactive relationships between these variables.

Conflict of Interests

Authors have no conflict of interests.

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