

Original Article

Relationship between Posttraumatic Growth and Death Attitudes in People with Cancer with Mediating Role of Cognitive Flexibility

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Received: 21 Feb 2023; Revised: 19 Jan 2023; Accepted: 6 Mar 2023

Abstract

Background and Aim: Cancer is a fatal disease that can affect various aspects of life, including personal, family, and social life, and can destroy a person's performance. The present study was conducted with the aim of investigating the mediating role of cognitive flexibility in the relationship between post-traumatic growth and attitude towards death in people with cancer.

Materials and Methods: The present study was descriptive-correlational and structural equation modeling. The statistical population of the present study included cancer patients in Tehran in the year 1401. Among these patients, 120 people were selected as a sample and they were asked to answer the post-traumatic growth questionnaire, death attitude scale and cognitive flexibility questionnaire.

Results: The research results showed that the correlation coefficient between death attitude with cognitive flexibility (0.38) and post-traumatic growth (0.27) is significant at 0.01. Also, cognitive flexibility had a mediating role in the relationship between post-traumatic growth and death attitude in people with cancer.

Conclusion: Based on this study, the relationship between post-traumatic growth and death attitude in people with cancer, cognitive flexibility had a mediating role. Therefore, post-traumatic growth through increasing the level of cognitive flexibility can help to improve the attitude towards death in people with cancer.

Keywords: Post-traumatic growth, Death attitude, Cancer, Cognitive flexibility

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Please cite this article as: Vahidi P, Agahheris M, Dousti A. Relationship between Posttraumatic Growth and Death Attitudes in People with Cancer with Mediating Role of Cognitive Flexibility. Int. J. Appl. Behav. Sci. 2023;10(1):37-44.

Introduction

Cancer is one of the various types of chronic diseases, despite medical advances, the development of treatments, and the increase in the number of survivors, the feeling of helplessness and deep fear that creates in a person is still unknown

(1). This chronic and life-threatening disease has psychological and physical effects on patients and damages many dimensions of patients' lives such as family relationships, sexual desires, work and self-care (2). The report of the World Cancer Statistics Center states that the incidence of cancer is alarmingly increasing, so that in 2012, about 14.1 million new

cases of cancer were diagnosed worldwide, and by the year 2030, the number of people suffering from this disease will reach the level of 28 million new cases with a 50% increase (3).

However, in spite of the above-mentioned damages, cancer patients also experience positive changes in their life satisfaction and meaningfulness, in self-confidence and a sense of personal resistance, in life priorities and goals, in a sense of spirituality and religiosity, and in loving others, friends and family. These findings led to a new attitude change towards traumatic events. This change of attitude, instead of paying attention to the harmful aspect of accidents, focused on the positive and growing aspect of the increase of accidents (4).

Therefore, in the background of clinical research related to traumatic events, a new term called post-traumatic growth was introduced. This term, coined by Tedeschi in 1998 (5), refers to the positive psychological changes experienced by people as a result of coping with major challenges and adverse life events. This term describes the positive changes in the performance of people who were successful before the trauma and shows that such people, when they face the trauma, have grown; and in the levels of performance, they reach the initial performance and even beyond of it. Experiencing positive psychological changes, which are called post-traumatic growth, refers to positive personal and psychological changes that occur after a trauma or a traumatic event, such as contracting an incurable disease, and the result of a person's struggle against this stressful event. (6). Tedeschi *et al.* (7), in their creative post-traumatic growth model, believe that trauma causes the collapse of people's fundamental beliefs. Post-traumatic growth is often divided into five categories: understanding larger than life and feeling a change in priorities, warmth and more intimate relationships with others, a greater sense of personal power, developed spirituality and new abilities (4).

Post-traumatic growth manifests itself in different ways, including realizing the value of life in general, more meaningful interpersonal behaviors and relationships, feeling stronger, changing priorities, and enriching spiritual life (8). In the form of the concept of post-traumatic growth, by acquiring a new attitude towards traumatic events and their difficult

circumstances, some people show positive changes in life satisfaction and meaningfulness, self-confidence, sense of individual resistance, spirituality and religiosity, love others, friends, and family (9). People who experience post-traumatic growth show positive and constructive changes in their cognitive and emotional lives that have a positive effect on their behavior and performance (3). These positive changes can facilitate the process of recognizing the stressful event for people and create a positive view in them, the people around them and their lifestyle (10). In this case, it seems that post-traumatic growth in these patients can help improve psychological flexibility and attitude towards death. A person's ability to simultaneously consider contradictory representations of a thing or an event and control the situation have been defined as cognitive flexibility (11).

Cognitive flexibility means a person's awareness of their choices, potential alternatives and appropriateness in any given situation, the desire to be flexible in order to adapt to the situation and the feeling of self-efficacy in being flexible (12). The most important feature of cognitive flexibility can be considered as the change of cognitive attitudes in the direction of better adaptation of the person with the surrounding environment. People who have cognitive flexibility can better control the environment mentally (13). Usually, people are not aware of their choices and are not able to adapt themselves to new situations, they do not feel adequate and competent in the situation of threat or challenge such as fatal disease (14). Cognitive flexibility is also defined as a person's ability to refrain from a dominant but ineffective and inappropriate response and the ability to reach more distant alternative responses (15). In this view, people suffering from a fatal disease often have poor cognitive flexibility and are unable to investigate new problems and situations at different levels and present alternative options and ideas (16). This group can hardly forget their early learning and they insist on their previous learning which has negative consequences for them, and this insistence harms their adaptation to new conditions (17). As a result, if a person has higher cognitive flexibility, he can better protect himself against external and internal stimuli and manages the situation mentally (13).

According to the findings of previous studies, diagnosis and suffering from a fatal disease, including cancer,

leads to impairment in the ability of cognitive flexibility (16). Also, the attitude towards death refers to the set of cognitive, emotional and behavioral responses of a person towards the truth of death (18). It has been reported that subjective experience of death, acceptance of death, belief in the world after death, fear of death and desire for long life are shared by all people (19). These attitudes can be positive or negative. Negative attitudes about death include fear of death or avoidance of death; while positive attitudes towards death include beliefs related to the ability to cope with death and acceptance of it (20). Coping with death is based on a set of cognitive responses, for example, recently, "I have found that thinking about death is good", behavioral, for example, "I can talk about my death with family and friends", and emotional, for example, "Thinking about death disturbs me." (21). The attitude towards death is gradually learned during a social process and is influenced by factors such as ethnicity or race and the ruling culture of the person's birthplace, the family's educational system, the person's position in the life cycle, awareness and beliefs, as well as age, gender, and social class, life experiences and the personality system (22). It has been found that coping with death has a negative correlation with indicators of fear of death, patients' expectations of illness and positive or negative attitudes towards illness and death, in mortality rates, compliance with medical orders, length of hospitalization and recovery affects patients (23).

It seems that post-traumatic growth and cognitive flexibility can predict the attitude towards death in people with cancer. In fact, it seems that post-traumatic growth can affect the attitude towards death in people with cancer through the effect on cognitive flexibility scores. Because the findings of some studies show that in people faced with trauma as a fatal disease, the occurrence of post-traumatic growth can have a positive effect on performance, thoughts, cognition, and attitude (7). On the other hand, it has been shown that people with higher scores in cognitive flexibility appear better when dealing with problems and sufferings and report more adaptability and less psychological damage (16). Based on this, the present study was conducted with the aim of investigating the mediating role of cognitive flexibility in the

relationship between post-traumatic growth and death attitude in people with cancer.

Methods

The current study was applied in terms of purpose and descriptive-correlation in terms of data collection method and structural equation modeling. The statistical population of the current study included all cancer patients in Tehran in the year 2022. Among these patients, 120 people were selected as a sample and they were asked to answer the cognitive flexibility inventory, death attitude scale and post traumatic growth questionnaire. The inclusion criteria were diagnosis of cancer, age between 20-60 years, no history of acute mental and physical illness other than cancer, and willingness to participate in the study. The exclusion criteria were unwillingness to continue participating in the study. Before conducting the research and filling out the questionnaires, the subjects were briefly informed about the subject of the research and its goals. Also, the subjects were reminded that the results of the research will remain confidential and will be used only for research purposes. Next, the subjects were given a brief explanation about how to complete the questionnaires. At the end, while thanking the respondents, their possible questions were answered.

Materials

Cognitive Flexibility Inventory

Cognitive flexibility inventory was created by Dennis and Vander Wal in 2010 (24), it is a short self-report tool that includes 20 questions and is used to measure a type of cognitive flexibility that is necessary for a person's success in challenging and replacing ineffective thoughts with more efficient ones. The scoring method is based on a 7-point Likert scale from 1 to 7 measure three aspects of cognitive flexibility: a) the desire to perceive difficult situations as controllable situations (perception of controllability), b) the ability to understand several alternative explanations for events, human life and behavior (perception of the justification of behavior), c) the ability to create several alternative solutions for difficult situations (perception of different options). The range of scores in this

questionnaire is between 20 and 140 in which the higher scores indicate greater flexibility. In the study of Dennis and Vander Wal (24), the concurrent validity of this questionnaire with the Beck depression questionnaire was equal to -0.39 and its convergent validity with Martin and Robin's cognitive flexibility scale was 0.75. In Iran, Share, Farimani and Soltani (25), reported the test-retest reliability coefficient of the whole scale as 0.71, and Cronbach's alpha coefficients as 0.90, for the whole scale and for the sub-scales as 0.87, 0.89, and 0.55 respectively; in general, the results obtained from Share et al.'s study indicate the factorial validity, convergent validity, and favorable simultaneity of the Persian version of this scale. The value of Cronbach's alpha coefficient for the cognitive flexibility questionnaire in the present study was equal to 0.79.

Death Attitude Scale

Wong, Peker and Gesser developed this test in 1994 (26). This questionnaire is a 32-question scale that evaluates 5 dimensions of death attitude, including fear of death, death avoidance, active acceptance, grudging acceptance, and neutral acceptance. They include both positive attitudes towards death (acceptance subscales) and negative attitudes towards it (fear and avoidance subscales). Answering this questionnaire is based on a 7-point Likert scale (completely disagree = 1 to completely agree = 7). To obtain the average score for each sub-scale, the scores of all statements related to that sub-scale are added and divided by the number of items. In a research, internal consistency reliability for subscale and total score was reported with Cronbach's alpha coefficient in the range of 0.77 to 0.93. The test-retest reliability of this test was also obtained after a 4-week period for the subscale and the total score in the range of 0.63 to 0.86 (18).

Post-Traumatic Growth Questionnaire (PTGI)

The post-traumatic growth questionnaire was created by Tedeschi and Kallan (27), which consists of 21 items and evaluates post-traumatic growth in five dimensions: appreciation of life, adjustment to new situations, sense of personal empowerment, better

communication with others, and spiritual changes. This questionnaire is a self-assessment tool that the person must answer on a 6-point Likert scale (0 = I have not experienced any change to 5 = I have experienced a lot of change). Scores range from zero to 105, and higher scores indicate higher post-traumatic growth in the individual. Tedeschi and Kalon (27), reported the internal consistency value of this questionnaire to be 0.90. Also, in their research, Rahimi, Haydarzadeh and Hassanzadeh (28), obtained the Cronbach's alpha value of this questionnaire for the whole scale of 0.87, and for its subscales in the range of 0.57 to 0.77.

In the present study, Pearson's correlation coefficient and structural equation model methods were used for data analysis using AMOS and SPSS version 22 software.

Results

The average age of the participating group was 51.66, with a standard deviation of 9.95. Out of 120 participants, 89 (74%) were women and 31 (26%) were men. Table 1 shows the correlation matrix between the variables. The correlation coefficient between death attitude with cognitive flexibility (0.38) and post-traumatic growth (0.27) is significant at 0.01 level.

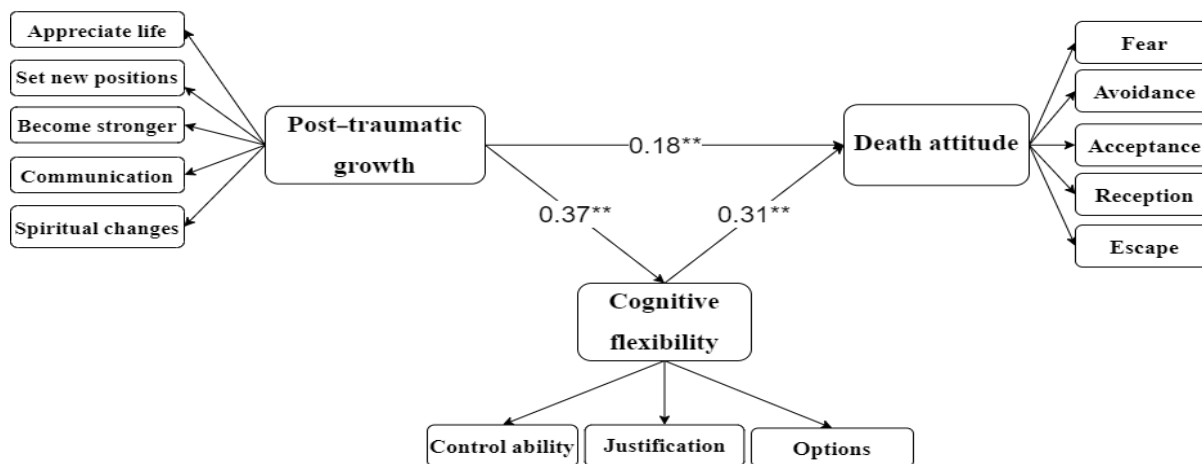
Before analyzing the data, they were examined to ensure that the data estimate the underlying assumptions of the structural equation model. In order to check the outlier data, the Z scores of the variables were calculated and the results showed that the scores of 3 subjects had a standard deviation higher or lower than the average, and therefore, these people were excluded from the hypothesis analysis. To check the

Table 1: Correlation matrix of death attitude, cognitive flexibility, and post-traumatic growth.

variables	1	2	3
Post-traumatic growth	1	-	-
Cognitive flexibility	0.32**	1	-
Death attitude	0.27**	0.38**	1

Table 2: Fit indices of the conceptual model.

NFI	IFI	TLI	CFI	AGFI	GFI	RMSEA	X ² /df	P value	df	X ²
0.94	0.92	0.93	0.90	0.98	0.91	0.009	2.55	<0.05	13	33.18

Figure 1. Path coefficients of the hypothesized model of the mediating role of cognitive flexibility in the relationship between post-traumatic growth and attitude towards death.**Table 3:** Standard and unstandardized coefficients of direct and indirect paths of the hypothesized model of the mediating role of cognitive flexibility in the relationship between post-traumatic growth and death attitude.

Directions	B	β	The standard error	Critical ratio	P value
The direct effect of post-traumatic growth on flexibility	0.89	0.37	0.015	10.21	0.001
The direct effect of flexibility on death attitude	0.97	0.31	0.022	8.39	0.001
The direct effect of post-traumatic growth on death attitude	0.63	0.18	0.014	5.42	0.007

Table 4: Standard and unstandardized coefficients of the indirect paths of the hypothesized model of the mediating role of cognitive flexibility in the relationship between post-traumatic growth and death attitude.

Directions	B	β	Low limit	High limit
The indirect effect of post-traumatic growth on attitudes toward death	0.31	0.17	-0.309	-0.016

normality of the variables, the Skewness and kurtosis of the variables and the Kolmogorov Smirnov test were used. The results of the Skewness coefficient and elongation coefficient showed that according to the normality criterion, the research variables all have absolute values of the Skewness coefficient and elongation coefficient smaller than 3, and therefore, no violation of the normality of the data could be observed. The results of the Kolmogorov Smirnov test also indicated the normality of the dispersion distribution of the research variables ($P < 0.05$). The model fit indices of the mediating role of cognitive flexibility in the relationship between post-traumatic growth and attitude towards death in people with

cancer are reported in Table 2.

According to the information shown in Table 2, the chi-square value was 33.18, which was significant at the $P < 0.05$ level. Due to the high sample size of the research, the chi-square ratio was used for the degree of freedom, which was equal to 2.55, and less than 3, so the obtained data were consistent with the hypothetical model. According to the evaluation indices of the model in Table 3, it can be said that the model has a good fit. Figure 1 shows the paths of the hypothesized model of the mediating role of cognitive flexibility in the relationship between post-traumatic growth and death attitudes in people with cancer. According to the results of Table 3 and based on the results of the path analysis,

the coefficients of all the paths of this model were significant.

After examining and verifying the model, two partial indices of the critical ratio CR and P, have been used to test the significance of the hypotheses. Based on the significance level of 0.05, the critical value must be greater than 1.96 or less than -1.96, and the value of the parameter other than this is not considered important in the model. Also, values smaller than 0.05, for the P value indicate a significant difference between the value calculated for the regression weights and the zero value at the 95% level. Based on the mentioned indicators, as the results of Table 3 show, the regression weights related to the results of this table are all significant at the level of less than 0.05.

To determine the significance of the indirect effect of the independent variable on the dependent variable through the intermediary variable, the bootstrap method was used, the results of which are shown in Table 4. The evaluation of indirect effects using the bootstrap method shows that the effect of post-accident growth on the attitude towards death, considering that the upper and lower limits do not include zero (zero is not within this confidence interval), are mediated through cognitive flexibility; Therefore, the indirect relationship between post-traumatic growth and attitude towards death in cancer patients with the mediation of cognitive flexibility, is significant. In other words, in the relationship between post-traumatic growth and attitude towards death, cognitive flexibility has a mediating role.

Discussion

The aim of the present study was to investigate the mediating role of cognitive flexibility in the relationship between post-traumatic growth and attitude towards death. The results of the current showed that cognitive flexibility has a significant positive relationship with the attitude towards death in people with cancer. Basinska and Saltiz (16), in their study on cancer patients showed that cognitive flexibility is associated with reducing stress and improving coping strategies. Erisi- Ozkan et al. (12), showed in their study that people with higher cognitive flexibility are more prepared to face life's

challenges and have better resilience against them. In explaining the relationship between cognitive flexibility and attitude towards death in people with cancer, it should be stated that people who can think flexibly, use alternative justifications, positively reconstruct their thinking framework and situations and they accept challenging or stressful events (12). Compared to people who are not flexible, these people show more psychological resilience, which makes a person appear with a kind of softness and flexibility in their behavior in the face of adversity and illness, and by accepting unchangeable things, they try to modify and reconstruct the type of perception and interpretation of the existing reality (14). Also, more cognitive flexibility allows people to focus more on alternative methods of cognitive changes, which is the ability to use cognitive restructuring, which is a way to reduce emotional distress and evoke positive emotions. So that the person gets involved with his surroundings and the process of cognitive reconstruction and change of attitude and seeing various issues including life and death is facilitated (13). On the other hand, people with weak cognitive flexibility are more involved in the negative aspects of the upcoming problem, repeated negative thinking and interpretation, and excessive processing of unpleasant feelings, and this is accompanied by consolidating negativity, reducing the controllability of the situation, and increasing anxiety, and ultimately strengthening the negative attitude (15). The results of the research showed that post-traumatic growth has a significant positive relationship with death attitude in people with cancer. Also, flexibility has a mediating role in the relationship between post-traumatic growth and death attitude in people with cancer. In their study, Parikh et al. (4), showed that cancer patients with higher scores in post-traumatic growth compared to patients with lower scores in post-traumatic growth had more adaptation to the disease, higher quality of life, more hope and motivation, and more mental and physical health. In their study on cancer patients, Marzianella et al. (3), showed that post-traumatic growth can be a facilitating factor in improving emotion regulation strategies and increase a person's ability to adaptively regulate emotion. In explaining the relationship between post-traumatic growth and death attitude in people with cancer, it should be stated that a traumatic event such as cancer,

acts as a catalyst; in such a way that a person comes to a new worldview with the occurrence of that event, which causes a positive change in him (3). The feeling of hopelessness and despair in people who are facing a difficult disease like cancer is a common phenomenon, and against it, hope can help to facilitate the process of physical and mental recovery and increase the level of well-being by creating the right feelings in the person (4). Some patients consider cancer as a complex and difficult experience, and some consider it a kind of challenge with resilience and toughness, and after facing this trauma, they have a new attitude towards themselves, the world and the phenomenon of life and death acquires; As a result, they create a new meaning in their lives and report compassion for themselves and others more than before. In fact, stressful events can be a facilitating factor for positive psychological changes (10). Cancer can be existential confrontations for a person and challenges his beliefs, and sometimes these challenges lead to a person's cognitive, attitudinal, emotional, and perceptive growth. Therefore, getting cancer can be an opportunity, because facing this phenomenon can change people's views and attitudes about the world (9). Also, post-traumatic growth can reduce the negative view of the disease, reduce depression, and improve the quality of life and mental well-being in cancer patients (7). Therefore, despite the various physical, psychological, and social problems of people with cancer, facing this incident can lead to positive and pleasant consequences, although some people with cancer consider it as an unsolvable problem at first, but then they consider it as a factor that increases their personal growth. In fact, having cancer can increase self-confidence, resilience, problem-solving skills, and positive thinking in a person, and this along with appreciating life, better communication with others, and have stronger priorities and spiritual (6). This research also faced certain limitations. Among other things, the sample of this research is made up of cancer patients in Tehran and can limit the generalizability of the results to other cancer patients. Also, the data collection was done through a questionnaire, so the subjects may have been biased in their answers. It is suggested that this study be conducted on a wider population and considering other data collection tools.

Conclusion

According to the results of the present study, post-traumatic growth and cognitive flexibility have a consistent relationship with the attitude towards death in people with cancer, and the attitude towards death improves with the increase of individual scores in these variables. Also, flexibility had a mediating role in the relationship between post-traumatic growth and death attitude in people with cancer.

Acknowledgment

The researchers thank the participants who cooperated in this study.

Conflict of Interest

The authors declare that they have no conflict of interest.

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