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*Original Article*

# The role of humor in hope and posttraumatic growth among patients with leukemia

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## **Abstract**

**Introduction:** The increasing incidence of leukemia is one of the problems of modern medical science. People diagnosed with cancer need to stay hopeful during the process of treatment. Moreover, the diagnosis of cancer sometimes leads to posttraumatic growth. In this regard, this study aimed to investigate the role of humor in hope and posttraumatic growth among leukemia patients in Zahedan.

**Materials and Methods:** This descriptive-correlational study was conducted in Imam Ali (AS) Hospital in Zahedan in 2015. The sample consisted of 70 patients selected by the convenience sampling method. The measurement tools were the Khashoui et al. Sense of Humor Questionnaire (SHQ), the Snyder et al. Hope Scale, and the Tedeschi and Calhoun Posttraumatic Growth Inventory. To analyze the relationships among the variables and to predict variances in hope and posttraumatic growth, the correlation tests and the stepwise regression analysis were used.

**Results:** The results showed that the total score of humor ( $r= 0.37, P<0.01$ ) and the subscales of enjoying humor ( $r= 0.34, P<0.01$ ) and having a sense of humor in stressful conditions ( $r= 0.28, P<0.05$ ) were significantly and positively related to hope. Additionally, the results of the stepwise regression analysis indicated that the total score of humor was able to significantly predict hope ( $\beta= 0.37, P<0.01$ ). Moreover, the results demonstrated that there was a significant and positive relationship between the total score of humor and posttraumatic growth ( $r= 0.46, P<0.001$ ) and the results of regression analysis showed that the total score of humor was able to significantly predict posttraumatic growth ( $\beta= 0.46, P<0.01$ ).

**Conclusion:** The findings of this study confirmed the role of humor in predicting hope and posttraumatic growth among the leukemia patients.

**Keywords:** Humor, Hope, Posttraumatic growth, Leukemia

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### Introduction

Cancer is one of the major health problems in the world and many people die of cancer every year. After cardiovascular disorders, this disease is the second leading cause of death in developed countries (1). Cancer is the third cause of death in Iran. Over 40,000 people die of cancer and more than 70,000 new cases are diagnosed annually (2). Among various types of cancer, leukemia is among the first 10 deadly cancers in the United States (3). In a study, researchers concluded that the incidence rate of leukemia had increased from 2000 to 2011 (4). In addition, it was estimated that nearly 60000 new cases of leukemia be diagnosed in the United States of America in 2016. Furthermore, 24,000 leukemia deaths are predicted (1). This increase in the incidence of leukemia was mentioned in several studies conducted in other countries. As an instance, the estimated incidence rate of cancer in China was 4.2 million new cases in 2015, while this rate was 3.4 million cases in 2012 (4). According to the National Cancer Registry Report conducted through collecting the reports of pathology centers in Iran and released in 2008 by the Ministry of Health and Medical Education, leukemia was the sixth most prevalent cancer in Iran (5). Diagnosis of acute leukemia can be a very stressful experience for most patients (6). Consequences of adapting to the new situation vary in different people. Due to several factors including socio-economic status, age, disease severity, type of treatment, and personality traits, patients, compared to each other, adapt themselves better or worse to the new condition (7).

Empirical research have shown that many survivors of trauma experienced positive psychological changes after dealing with traumatic events. Indeed, posttraumatic growth is a description of the experience of people who not only have recovered after a period of emotional distress and return to the normal condition, but also use this experience as an opportunity for personal growth. It can be noted that posttraumatic

growth represents significant changes in an individual's cognitive and emotional life (8).

Tedeschi and Calhoun reported that these positive changes occur in three different areas including self-perception, interpersonal relations, and the philosophy of life. Therefore, posttraumatic growth has been accepted as a multi-dimensional doctrine. According to this model, posttraumatic growth is not merely coping strategies used to deal with traumatic events; however, it also includes changes in perceptions, feelings, and/or behaviors that challenge, refine, and alter the existing schemas. Adverse effects caused by traumatic events may lose their severity by applying cognitive adaptations through which the ideas of self, others, and the world are restored. The results of this process can be positive and be perceived as posttraumatic growth (9). Events that lead to posttraumatic growth must lead to significant changes. The diagnosis of cancer is often stressful enough to act as catalysts of this type (10). Factors that enhance posttraumatic growth are associated with personal, environmental, and occupational aspects. Among personal aspects, positivity, humor, self-confidence, and active coping strategies can be mentioned (11,12).

Hope is a feature that helps people to deal with stressful situations, such as cancer, and to pursue their goals (13). According to Snyder's hope theory, hope is composed of three main structures: 1) Pathways- pathways to reach the desired goals, and 2) Agency- the ability to comprehend the objectives via pathways (14). To achieve goals, people can rely on external or internal factors (e.g., humor, family, peers, and spirituality) and the production of internal and external pathways (e.g., a source of hope) (15).

Hopeful people benefit from more "agencies" and "pathways" to pursue their goals. Whenever they encounter an obstacle, they can stay motivated and use other available pathways. Hopeful cancer

patients focus more on the problem, attempt to get a proper treatment, and show great resistance to the disease in the course of treatment (13). Based on previously conducted studies, hope is a protective factor against long-term hopelessness or frustration that may threaten people's well-being and health (16). Subjective well-being and hope are significantly correlated. Hope can predict physical and mental health (17). Additionally, hope is significantly and positively correlated with posttraumatic growth (18).

One of the personality traits that plays a key role in stressful life events is humor. Humor is a cognitive, emotional, behavioral, psychological, and social phenomenon. Humor is an integral part of daily life and is considered as a means of dealing with problems. Humor is generally regarded as a positive experience for people of different cultures and societies in the world (19). Humor can stimulate respiratory and circulatory systems, increase the production of endorphins, reduce stress hormone levels, and enhance the level of activity of the immune system (20). The diagnosis of cancer is very stressful. In such a situation, humor may reduce physical or psychological pain caused by the shock of a cancer diagnosis (21). A study indicated that humor is associated with positivity (22). Humor is an adaptive evolutionary tool and is effective in reducing social isolation and in coping with hopelessness, depression, and anxiety (23). Sultanoff, in his study, reported that people who had a great sense of humor, compared to those with a low sense of humor, had higher personal, familial, and social performance, suffered less from physical problems and mental distress, and were more socially adapted and hopeful. Based on the results of this study, humor aided people to resolve some communication barriers including negativism and extreme sensitivity and helped them to experience less interpersonal problems (24). Moreover,

humor is associated with positive changes and posttraumatic growth (25-27).

In total, due to the increasing growth of cancer in the world and Iran, given the fact that diagnosing and dealing with cancer is often very stressful for patients, and since very few studies were conducted in the world, and particularly in Iran, to examine the effects of psychological variables on patients with leukemia, the significance of carrying out such studies was quite obvious. In addition, since, in the recent years, a great attention was paid to the positive psychology movement which, instead of negativity, lays emphasis on positive issues in life, the necessity of conducting a study aimed to examine the role of humor in hope and posttraumatic growth among patients with leukemia was evident. Such a study can aid patients to improve their conditions through identifying factors affecting their lives.

#### **Materials and Methods**

The method of the current study was descriptive followed by a correlational design. The statistical population included all patients with leukemia (under treatment) referred to Imam Ali (AS) Hospital in Zahedan from November to December 2015. The statistical population included 89 patients with leukemia of whom 70 people were selected through convenient sampling, based on Morgan table. The criteria for including people include: net diagnosis of cancer, the commonality of received treatment, absence of a history of neuropsychiatric and psychological disorders, lack of psychological treatment, substance abuse, and age of at least 18 years all of which were provided considering the medical records of patients in the hospital and the question of the therapist, as well as the question of the patients themselves to ensure the validity of these inclusion criteria. In this regard, only those leukemic patients were diagnosed in the last 12 months and treated for at least 6 to 12 months were considered. After explaining the main objectives of carrying out this

study and ensuring the participants that their information would remain confidential, those who were eager to take part in this study completed the questionnaires. All the participants filled out the questionnaires voluntarily and expressed their full consent to participate in this study. To avoid bias, the questionnaires were completed by the patients individually and whenever a question seemed vague, some additional explanations were provided by the researcher. To aid illiterate patients to complete the questionnaires, the questions were read to them and their answers were marked by the researcher. Because of moral considerations, the researcher introduced himself and explained the objectives and methodology for the patients to obtain informed consent from them. The sample group was assured that their information would remain confidential. Before submitting the questionnaires, they provided also information about the research with clear explanations and the researcher told the subjects that they could withdraw from the research at any time. In addition to satisfying patients in order to participate in the research, a briefing session was held for each participant. For this study, sampling was done by approving Sistan and Baluchestan University and obtaining agreement from Zahedan University of Medical Sciences. A total of 70 patients filled out all three questionnaires. Afterwards, the obtained data was analyzed.

#### Research instruments

*A) The Sense of Humor Questionnaire:* This questionnaire was developed by Khoshouei, Oreizy, and Aghaei (28). It has 25 items and is based on a seven-point Likert scale (strongly agree, agree, somehow agree, no idea, somehow disagree, disagree, and strongly disagree). This inventory was analyzed using the principle component analysis with varimax rotation. This analysis indicated a five-factor structure (enjoyment of humor,

laughter, verbal humor, sense of humor in social relations, and sense of humor in stressful conditions). Each of these subscales is assessed by five items. In this regard, the first five questions assess the first subscale, questions 6 to 10 evaluate the second subscale, questions 11 to 15 examine the third subscale, questions 16 to 20 relate to the fourth subscale, and the last five questions investigate the fifth subscale. Using the internal consistency (Cronbach's alpha), the reliability of the questionnaire was examined on a sample of 40 people. The results indicated that the Cronbach's alpha coefficients of the subscales were respectively 0.74, 0.80, 0.77, 0.74, and 0.79 and the alpha coefficient of the total questionnaire was 0.92. Therefore, the results obtained from the reliability coefficients (Cronbach's alpha) indicated that this questionnaire was reliable (28). In the present study, the Cronbach's alpha of this scale was 0.74.

*B) The Snyder Hope Scale:* This 12-item scale was designed by Schneider et al. in 1991 to examine hope among people aged 15 years old and older. To answer each question, a 4-point Likert-type scale is used. Four items (3, 5, 7, and 11) are not scored and are considered as fillers. Four items (1, 4, 6, and 8) measure pathways thinking and the other four items (2, 9, 10, and 12) measure agency thinking. The total score ranges from 8 to 32 (17). Using the Cronbach's alpha coefficient, the calculated validity of agency thinking, pathways of thinking, and the total scale was respectively 0.82, 0.84, and 0.86 (29). In a study conducted in Iran, the Cronbach's alpha coefficient was used to investigate the internal consistency of this scale. The results of this study demonstrated that the internal consistency of the total scale, agency thinking, and pathways thinking was respectively 0.76, 0.71, and 0.68 (30). In the present study, the Cronbach's alpha coefficient of this scale was 0.72.

*C) The Posttraumatic Growth Inventory (PTGI):* This Inventory was designed by

Calhoun and Tedeschi in 1996 to evaluate changes in self-perception of people who have experienced traumatic events. The theoretical foundations of this inventory are designed based on positive outcomes (including self-perception and philosophy of life) reported by a person who has experienced a traumatic event such as cancer. This inventory includes 21 items and is developed based on a five-point Likert-type scale. It was reported that the Cronbach's alpha coefficient of the total score was 0.91 (31). In a study carried out by Nikmanesh, Mirabdollahi, and Emamhadi, the Cronbach's alpha coefficient of the Posttraumatic Growth Inventory was 0.98 (32). In the current study, the Cronbach's alpha coefficient of this scale was 0.85.

In this study, to examine the relationships among the variables and to determine their predictive roles, the Pearson correlation coefficient and the stepwise regression analysis were used. Moreover, to analyze the obtained data, SPSS version 20 was applied.

**Results**

The sample consisted of 70 patients with leukemia with an age range of 18-81 years and the mean age was 43.71 years. In this sample, 57.1% of the participants were male and 42.9% of them were female. 25.7% of the participants were illiterate, 20% of them had finished elementary school, 27.1% of them had finished middle school, and 27.1% of them had diplomas or higher levels of education.

To analyze the data related to the first research question, the Pearson correlation coefficient was initially used. As can be seen in Table 1, the total score of humor and the subscale of enjoying humor were significantly and positively correlated with hope at the 99% confidence level. Furthermore, having a sense of humor in stressful conditions and hope were significantly and positively correlated at the 95% confidence level (Table 1).

**Table 1.** The correlation matrix of humor and its subscales with hope and posttraumatic growth

Variable	1	2	3	4	5	6	7	8
Total score of humor	1							
Enjoyment of humor	0.66***	1						
Laughter	0.61***	0.22	1					
Verbal humor	0.61***	0.18	0.26*	1				
Sense of humor in social relationships	0.69***	0.41***	0.28*	0.25*	1			
Sense of humor in stressful conditions	0.63***	0.36**	0.20	0.18	0.32*	1		
Hope	0.37**	0.34**	0.16	0.18	0.21	0.28*	1	
Posttraumatic growth	0.46***	0.07	0.20	0.16	0.23	0.10	0.48***	1

\* $P < 0.05$  \*\* $P < 0.01$  \*\*\* $P < 0.001$

Furthermore, to predict hope via the total score of humor and the subscales of enjoying humor and having a sense of

humor in stressful conditions, the stepwise regression analysis was applied. The results of which are presented in Table 2.

**Table 2.** The results of the stepwise regression analysis conducted to predict hope via the total score of humor

Hope	df	F	R	R <sup>2</sup>	Adjusted R-square	Beta	T	P
Total score of Humor	1	10.60	0.37	0.14	0.12	0.37	3.26	0.002

68

The results presented in Table 2 showed that the total score of humor entered the regression equation and its subscales were

removed from the equation. These results indicated that humor was able to predict hope significantly ( $P < 0.01$ ). Moreover, the

results demonstrated that humor with a beta coefficient of 0.37 was effective in predicting the results of hope (Table 2).

To analyze the data related to the second research question, the Pearson correlation coefficient was initially used. As Table 1 shows, only the total scale of humor was

significantly and positively correlated with posttraumatic growth at the 99% confidence level. Additionally, to predict posttraumatic growth via the total score of humor, the stepwise regression analysis was used, the results of which are shown in Table 3.

**Table 3.** The results of the stepwise regression analysis conducted to predict posttraumatic growth via the total score of humor

Posttraumatic growth	df	F	R	R <sup>2</sup>	Adjusted R-square	Beta	T	P
Total score of Humor	1	9.95	0.46	0.21	0.20	0.46	2.57	0.01

68

The results presented in Table 3 showed that the total score of humor entered the regression equation and its subscales were removed from the equation. These results indicated that humor was able to predict posttraumatic growth significantly ( $P<0.01$ ). Moreover, the results demonstrated that humor with a beta coefficient of 0.46 was effective in predicting the results of posttraumatic growth (Table 3).

**Discussion**

The results of stepwise regression showed that only the total score of the humor scales significantly predicted hope, which is consistent with the results of several previously conducted studies. In a study carried out on adolescents with cancer, the researchers concluded that hope and humor were significantly and positively related (16). Moreover, in studies conducted on several groups including the elderly, the results revealed a positive relationship between humor and hope (23,33,34). However, none of these studies specifically determined the relationship between these two variables and examined the predictive role of humor in leukemic patients.

To explain this finding based on the stress reduction theory by the humor, suggested by Lefcourt and Martin (35), humor reduces the physiological excitability; in addition, it changes the person's perception in such a way that the person does not feel negatively aroused. Humor changes the person's attitude and makes the person

more capable of coping with stress, based on this view. The mentioned viewpoint believes that humor is as effective as faith, happiness and courage in mental health. Humor plays an important role in interpersonal relationships as a way of promoting positive interaction, facilitating self-esteem, reducing tension and conflict, and so on.

To explain the significant relationship between having a sense of humor in stressful conditions and hope, it can be said that since cancer diagnosis causes changes in patients' personal lives, daily activities, occupations, relationships, and family roles and is accompanied with high levels of psychological stress, patients who believe in humor as a method of coping with various issues or consider it as an effective tool to deal with life stressors have higher levels of hope. The results of stepwise regression showed that only the total score of the humor scales significantly predicted posttraumatic growth, which is consistent with the results of several previously conducted studies. Many researchers concluded that having a sense of humor was directly related to posttraumatic growth among patients with cancer and was also able to predict posttraumatic growth (18,25,27). Kuiper concluded that humor aided people to deal with trauma (26). However, it was stated in the research that humor does not have a significant relationship with posttraumatic growth and only helps to cope with trauma (36). To

explain this contradictory finding, one can use a sample other than cancer patients (those who lost a person) and a different measuring tool for the sense of humor scale.

Schaefer and Moss (37) proposed the model of life crisis and personal growth stating that post-traumatic growth is a positive result of the crisis in life. They considered growth to be influenced by factors such as cognitive assessment processes and coping responses that effectively determine the outcome of the crisis. Some of these components are: personal and social traits such as: self-confidence, flexibility, optimism, sense of humor, assimilation, motivation, health status before crisis experiences, and environmental factors including personal relationships, receiving support from the family, friends and social environment, as well as funds and other aspects of the status of life.

To explain these findings, it can be mentioned that a subscale of humor is having a sense of humor in social relations. This subscale indicates people's opinions about humor as an effective method of influencing other people and as a method to establish relations with others or control them. On the other hand, one of the dimensions of posttraumatic growth is establishing relations with others. In this regard, aiding a person to act as one who can be trusted, have compassion towards others, and accept other people's help is of significant importance. In a study conducted on cancer patients by Morris et al., the researchers concluded that the greatest posttraumatic growth occurred in two dimensions of life appreciation and establishing relations with others (38). Moreover, posttraumatic growth was significantly and positively correlated with

having strong relations with family members and therapists (39).

This was a cross-sectional study; therefore, reaching a conclusion about the causality of the issue is difficult. Since the present study was only conducted on patients with leukemia in Imam Ali (AS) Hospital in Zahedan, the results can be generalized to other leukemia patients in this hospital; however, cautious should be exercised when generalizing these findings to other patients. Although, considering the psychometric properties, the measurement tools applied in this study were all valid, using tools that have different cultural foundations may somehow affect the internal validity of the study.

To generalize the results of this study, it is recommended that further studies be carried out in other cities and the role of intervening factors including economic status, marital status, gender, and level of education be examined among cancer patients. Moreover, through applying humor-based psychological therapies, along with medical therapies, in cancer patients, the increasing number of cancer patients can return to the community and create more hopeful lives for themselves.

### **Conclusion**

The findings of this study confirmed the role of humor in predicting hope and posttraumatic growth among the leukemia patients.

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