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Evaluation of the Relationship between Post-traumatic Stress Disorder and Post-traumatic Growth in Women with Breast Cancer

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ABSTRACT

Background: Coping with life-threatening illnesses such as cancer leads to the comprehension of its positive outcomes along with its negative consequences. However, the exact relationship between these positive and negative outcomes in female patients with breast cancer is unknown. Therefore, this study aimed to determine the relationship between post-traumatic stress disorder and growth (PTSD and PTG) in women with breast cancer referred to Chemotherapy Ward of Ali Ibn Abi Talib Hospital in Zahedan, Iran, 2017.

Methods: This correlational study was conducted on 136 patients with breast cancer referred to the Chemotherapy Ward of Ali Ibn Abi Talib Hospital in 2017. The samples were selected through the convenience sampling method during 3 months. Data were collected using Post-traumatic Growth Inventory and PTSD Checklist. Data analysis was performed in SPSS, version 21 using descriptive statistics, Pearson's correlation coefficient test, and linear regression.

Results: According to the results of Pearson's correlation coefficient, there was a significant and indirect correlation between PTG and PTSD and its dimensions (r=-0.34). Moreover, a significant and indirect relationship was observed between PTG and all dimensions of PTSD. Regarding the results of linear regression, PTSD and its dimensions determined only 16% of PTG (P=0.001).

Conclusion: Considering the fact that the variable of PTSD and its dimensions is a predictor of PTG in patients with breast cancer, it is recommended to pay more attention to PTSD in order to increase the PTG in these patients.

1. Introduction

Trauma is defined as a sudden, unexpected, shocking, and uncommon experience.[1] There are various types of trauma that can cause serious morbidity and mortality.[2] One of these traumas is cancer, which its potential traumatic nature has significantly drawn attentions in the past decade.[3] Cancer, as a stressful and traumatic experience is increasing, which affects various aspects of the life of patients.[4, 5] According to the annually-updated cancer statistics from the National Cancer Institute, about 1.5 million new cancer cases are diagnosed every year.[6] More than half of the cancer cases and 60% of the mortalities occur in less developed countries.[7] Meanwhile, breast cancer is the most common cancer among women in both developed and developing countries. In 2012, about 1.67 million new cases of breast cancer were diagnosed.[8]

Diagnosis of cancer is a major stressful life event, which negatively affects the socio-psychological condition and the quality of life of patients due to adverse symptoms and outcomes such as anxiety and depression, fear of cancer recurrence and metastasis, fear of future, fatigue, pain, physical limitations, and the possibility of social isolation.[9] Cancer is among the disorders that can cause post-traumatic stress disorder (PTSD). This disorder usually occurs after an extremely stressful and emotional accident, which is not considered as an ordinary life event and is often traumatic and unbearable for most people.[10, 11]

Psychosocial adaptability to cancer can be regarded as a psychosocial process, which occurs when the patients face with disease- and treatment-related changes. Therefore, it is recommended to consider cancer diagnosis as a facilitator of life changes with both negative and positive outcomes instead of considering cancer as a major stress.[9] In fact, cancer is a life-threatening situation, which causes suffering and fear of death in affect the

physical and psychological performance of patients.[12]

Although cancer diagnosis is associated with the symptoms of PTSD and can bring about the sense of fear, destruction, and lack of control, it can provide an opportunity for growth and compatibility.[13] People experience two responses to critical incidents including a negative reaction that is associated with PTSD symptoms and a positive response that is known as PTG.[14] The structure of PTG was first introduced by Tedeschi and Calhoun in 1996 and refers to positive psychological changes caused by dealing with the challenging conditions of life and traumatic events. On the other hand, growth does not necessarily mean the end of pain and chaos or a favorable attitude toward crisis, loss, or trauma.[15] The PTG is defined as more appreciation of life, improved interpersonal communications and personal strength, changed life priorities, identification of possible new coping options, and spiritual evolution.[13]

It is nearly two decades that the post-traumatic model developed by Tedeschi and Calhoun in 1996 has been considered as the most comprehensive model with an emphasis on spiritual factors. They beleive that PTG involves change in three areas of perception, knowledge, and skills, which enable individuals to recognize the positive changes in their interpersonal relationships, self-perception, and philosophy of life.[15] Feeling stronger, higher level of self-confidence, more experience and confrontation with the challenges of the future are among the perceptual changes in oneself. On the other hand, relationship and cooperation with others, and increased emotional expression and individual emotions are related to interpersonal communications, and change in values and life priorities are among the changes in the dimensions of spirituality and philosophy of life.[11] There is a close association between increasing interest in the positive effects of a disaster and positive psychology movement. Seligman et al. in 2005 stated that happiness is dependent on the ability to understand bad conditions as a good condition and sense of happiness to a certain extent.[16]

Over the past 20 years, there has been significant scientific interest in the evaluation of not only the negative effects of traumatic events, but also the positive changes that occur after dealing with trauma.[10] According to the literature, PTG was assessed in patients with cancers, spinal cord damage, brain injury, stroke, cardiovascular events, thyroid diseases, multiple sclerosis, lupus, and acquired immune deficiency syndrome.[17, 18] More than 83% of individuals who experienced life-threatening diseases, natural disasters, and accidents reported at least one positive.[14] The PTG was observed in females with breast cancer even five years after the cancer diagnosis.[19] Patients with cancer start a journey that begins with diagnosis and is determined by the activation of unknown life schemes, interaction with healthcare professionals, therapeutic regimens, and physical and mental stressors. However, a positive approach to evaluation of the world and people appears along with these distresses.[9]

Despite the high incidence rate of cancer, the relevant mortality rate is declining due to the development of screening, diagnosis, and treatment modalities. Therefore, many people live with this disease. Formerly, there was a high emphasis on negative dimensions of cancer. On the other hand, there are controversial results regarding PTSD and PTG. Several studies demonstrated the indirect relationship between these variables, whereas other studies determined the simultaneous and independent occurrence of these two variables. In addition, assorted studies indicated no association between them.[20] To the best of our knowledge, no study was conducted to simultaneously assess these two variables in patients with breast cancer. With this background in the mind, this study aimed to evaluate the relationship between PTSD and PTG in women with breast cancer referred to the Chemotherapy Ward of Ali Ibn Abi Talib Hospital in Zahedan, Iran, 2017.

2. Methods

2.1. Design

This descriptive- analytic, and correlational study was conducted on patients with breast cancer referred to the Chemotherapy Ward of Ali Ibn Abi Talib Hospital in Zahedan, Iran, 2017.

2.2. Participants and settings

Regarding the limitations of these patients due to surgery, problems caused by chemotherapy, and deterioration and relapse of the disease, the eligible patients were selected through convenience sampling method during 3 months. The patients aged 20 years old and older, whose diseases were diagnosed from 6 month to 5 years ago without metastases, according to the medical record, cognitive impairments, known psychological disorders, and experience of recent streeful life event (except for cancer) were included in this study. On the other hand, the most important items of the exclusion criteria entailed the lack of consent for participation in the study and deteroriation of the disease during the intervention. Finally, 136 eligible

patients participated in this study and asked to complete the questionnaires.

2.3. Instruments

Data were collected using Post-traumatic Growth Inventory that consists of three parts of demographic characteristics, 21 items on PTG, and 17 items on PTSD. This questionnaire is designed as a self-assessment tool that includes 21 items to estimate PTG. Additionally, the items are scored based on the 6-point Likert-scale from 0 (experiencing no change) to 5 (experiencing significant changes).

Accordingly, the total score ranged from 0 to 105, the low scores demonstrated less growth and vice versa. The original form of this questionnaire consists of five subscales including relating to others, new possibilities, personal strength, spiritual changes, and value of life. It is worth mentioning that the reliability of this tool was confirmed by Tedeschi and Calhoun in 1996 as the Cronbach's alpha of 0.90.The range of Cronbach's alpha for each subscale was estimated to be 0.67-0.85. According to the results of a study performed by Tedeschi and Calhoun, the individuals who experienced a psychological trauma achieved higher scores compared to others.[21] In Iran, discriminant and convergent validity and reliability (α=0.92) of the questionnaire were approved by Seyed Mahmoudi et al.[22] In the current study, the reliability of the tool was calculated as the Cronbach's alpha of 0.88.

The PTSD Checklist (PCL) is a self-report scale, which is used as a diagnostic support tool for assessing the level of disorder and screening of patients to separate them from normal population and other patients. This checklist contains three dimensions of signs and symptoms of recurrent experience of trauma (five items), emotional numbing (seven items), and avoidance or hyperarousal symptom (five items).

The items were scored based on a 5-point Likert scale from 1 (never) to 5 (very often). The total score ranged from 17 to 85, the low scores were indicative of low perceived stress and vice versa.

Two studies have been carried out into this checklist. The first study was conducted on 123 veterans of the Vietnam War and indicated that the coefficients were 97% and 96% for the total scale.[23] In Iran, the reliability and validity of the checklist were confirmed by Goudarzi in 2003 in the University of Shiraz, Iran, using the data obtained from the implementation of the list on 117 subjects.

In this regard, the test –retest reliability and split-half reliability of the scale were estimated to be 0.93 and 0.97, respectively. In order to provide an indicator of the validity of this scale, its correlation with the Life Events List was eveluated (P=0.0001, n=117, r=0.37), which demonstrated the simultaneous validity of the scale.[24] In the present study, the reliability of the list was estimated as the Cronbach's alpha of 0.91.

2.4. Data Collection

Prior to the study, the researcher referred to the Chemotherapy Ward of Ali Ibn Abi Talib Hospital in Zahedan, Iran. Regarding the ethical considerations, the objectives of the study were explained to the patients, the eligible patients who met the inclusion criteria were selected through convenience sampling method. In addition, the participants were ensured of the confidentiality terms regarding their personal information, and they could withdraw from the study anytime, which had no impact on their treatment process.

Thereafter, the subjects were asked to complete the questionnaires. The researcher was present during the completion of the questionnaires to eliminate any ambiguity.

2.5. Ethical considerations

Prior to the study, the researcher referred to the Chemotherapy Ward of Ali Ibn Abi Talib Hospital in Zahedan, Iran. Regarding the ethical considerations, the objectives of the study were explained to the patients, the eligible patients who met the inclusion criteria were selected through convenience sampling method. In addition, the participants were ensured of the confidentiality terms regarding their personal information, and they could withdraw from the study anytime, which had no impact on their treatment process.

2.6. Statistical analysis

Data analysis was performed in SPSS, version 21 using Kolmogorov-Smirnov test (to determine data normality), descriptive statistics (mean, standard deviation, percentage, frequency), Pearson's correlation coefficient, and linear regression. In all the measurments, P-value less than 0.05 was considered statistically significant.

3. Results

According to the results, the mean age of the patients was 42.77±9.30 years old ranging from 24 to 63 years old. In addition, 67.6%, 79.4%, 79.4%, and 74.3% of the subjects were Fars, married, housewives, and residents of cities, respectively; furthermore 79.4% of them had a diploma or lower

degrees. Moreover, mean duration of the disease was 2.43±1.13 years. In terms of disease progression, 44.1% of the subjects had grade 2 and the same number of the participants had grade 3 breast cancer.

Furthermore, 89.7% of the subjects had a negative family history of cancer (Table 1). The mean and standard deviation of total PTSD score was 58.87±15.92 out of 85, whereas the mean and standard deviation of PTG score was 50.25±18.97 out of 100. The mean and standard deviation of other dimensions of PTSD are shown in Table 2.

According to the results, a significant and indirect correlation was observed between PTG and PTSD in patients with breast cancer (P=0.0001, r=-0.349). In addition, a significant and indirect orrelation was found between all dimensions of PTSD and the age of the patients and PTG. Meanwhile, there was a significant and direct correlation etween all dimensions of PTSD and the duration of the disease. Out of all dimensions of PTSD, hyperarousal and PTG had the most correlation (Table 3).

In this study, a linear regression model was applied to evaluate the ability to predict PTG score from PTSD and its dimensions and demographic characteristics, such as age of the patients and the duration of the disease. According to the results of this modeling, a significant correlation was observed between PTG and PTS and its dimensions (P=0.001, r=0.26). The PTSD dimensions were able to predict only 16% of changes in PTG score.

Moreover, hyperarousal was the most powerful predictor for PTG score changes; and reducing 1 standard deviation in the arousal variable increased PTG of the patients to 0.35 standard deviation. Although other dimensions of PTSD, age, and the duration of the disease had a significant linear significant relationship with PTG, none of them were able to predict the variable of PTG in women with breast cancer (Table 4).

Table 1. Demographic characteristics of the participants

Variable		N(%)
Educational level	Illiterate	32(23.5)
	Below diploma	39(28.7)
	Diploma	48(35.3)
	Above diploma	17(12.5)
Occupational status	Housewife	94(69.1)
	Employee	22(16.2)
	Self-employed	20(14.7)
Marital status	Single	6(4.4)
	Married	108(79.4)
	Widow	22(16.2)
Ethnicity	Fars	92(67.6)
	Baluch	44(32.4)
Place of residence	Urban	101(74.3)
	Rural	35(25.7)
Grade	One	16(11.8)
	Two	60(44.1)
	Three	60(44.1)
Family history of cancer	Positive	14(10.3)
	Negative	122(89.7)
	Total	136(100)
Age	Mean±SD (year)	42.77±9.30
Duration of cancer	Mean±SD	2.43±1.13

Table 2. Mean and standard deviation of post-traumatic growth and stress scores and its dimensions in women with breast cancer

Index (variable)	Mean±SD	Range of scores
Post-traumatic growth	50.25±18.97	11-100
Hyperarousal	18.31±5.04	5-25
Emotional numbing	21.75±6.62	7-35
Recurrence	18.80±5.53	5-25
Total score	58.87±15.92	17-85

Table 3. Matrix of correlation coefficient between post-traumatic growth and the components of post-traumatic stress disorder and some demographic characteristics of women with

Variable		Arousal	Emotional numbing	Recurrence	Total stress	Age	Duration of the disease	Post-traumatic growth
Arousal	R	1						
Emotional numbing	R	*0.79	1					
	P	0.0001						
Recurrence	R	*0.77	*0.78	1				
	P	0.0001	0.0001					
Total stress	r	*0.91	*0.94	*0.91	1			
	p	0.0001	0.0001	0.0001				
Age	r	-0.11	-0.03	-0.06	-0.07	1		
	P	0.19	0.6	0.4	0.4			
Duration of the disease	r	*-0.21	*-0.28	*-0.31	*-0.29	*-0.9	1	
	p	0.01	0.001	0.0001	0.0001	0.0001		
Post-traumatic growth	r	*-0.36	*-0.33	*-0.26	*-0.349	*-0.19	*-0.14	1
	P	0.0001	0.0001	0.002	0.0001	0.02	0.05	

Table 4. Multivariate regression analysis of post-traumatic growth in women with breast cancer based on predictive variables of the dimensions of post-traumatic stress disorder

Entered variable Dependent variable		Unstandardized regression coefficient	Standard error	Standardized regression coefficient	Correlation	t	P-value
Post-traumatic growth	1.Reoccurrence	0.48	0.48	0.14	-0.24	0.99	0.32
	2- Signs of emotional numbing	-0.39	0.42	-0.13	-0.3	-0.92	0.35
	3- Signs of hyperarousal	-1.33	0.54	-0.35	-0.35	-2.45	0.01
	4- Age	-0.33	0.17	-0.16	-0.1	1.78	0.06
	5- Duration of disease	2.03	1.46	0.12	-0.11	1.38	0.16

4. Discussion

According to the results of the present study, the mean PTS score in women with breast cancer was relatively higher than mean PTG score. However, it should be noted that the mean duration of the disease in these patients was higher than country samples. In this regard, Heydarzadeh et al. in 2015 evaluated the dimensions of PTG caused by cancer in cancer survivors and concluded that PTG score was more than 18 scores higher than mean PTG score obtained in the current study.[25] This low level of PTG and high level of PTSD is not expected. In contrast to this finding, in a meta-analysis study conducted by Parikh et al. in 2015 on PTSD and PTG in patients with breast cancer, it was indicated that there was a high level of PTSD signs and low PTG signs during the first stage of the disease diagnosis. Meanwhile, PTG symptoms appeared after the treatment, and the level of PTG was higher than PTSD.[26] Inconsistent with the results of the current study, Xu and Liao in 2011 marked that PTG was 40.1% higher in earthquake survivors compared to PTSD.[27] In addition, Wu et al. demonstrated higher level of PTG compared to PTSD, which is not in line with our findings.[28] This inconsistency might be due to the high level of fear of cancer among the evaluated subjects of the current study or because of low level of implementation of treatment and social interventions in order to increase and accelerate PTG.

Regarding the results, there was a correlation between PTSD- and PTG-related variables, and the total variables of PTSD could indirectly predict changes in the PTG score. Nevertheless, hyperarousal was the only dimension of PTSD with significant impact on PTG. Nonetheless, the majority of studies demonstrated that PTG can increased by diminishing the PTSD.

It seems that the higher the level of anxiety, stress, and mental arousal, the lower emphasis and attention to solutions and the higher possibility of use of emotion-focused coping strategies. Individuals are deliberately subjected to rumination, and there is less opportunity for conscious cognitive processing, which is the main factor for the improvement of PTG.

Globally, several studies have been conducted to assess the relationship between PTG and PTSD with controversial results. In a case-control study carried out by Safa et al. in 2014 with the title of "Determining the Relationship between Disturbing Signs of PTSD and PTG in Three Groups of Pulmonary Patients with Cancer, without Cancer, and Their Family" and demonstrated that the

highest level of PTG was observed in pulmonary patients with cancer and their families, whereas an indirect and significant correlation was found between two psychological consequences of PTG and PTSD.[29] These results were in line with our findings. Consistent with the results of the current study, Levine et al. in 2009 and Ssenyonga et al. in 2013 peformed studies on migrants and refugees and observed an indirect and significant relationship between the signs of PTSD and PTG.[30, 31]

In contrary to the results of this study, Nishi et al. in 2010 executed a cross-sectional study and concluded that despite the indirect correlation between PTSD signs, the sense of solidarity and social support, there was a significant and direct relationship between PTG and the symptoms of PTSD, sense of solidarity, and social support. In addition, they found a significant and direct correlation between PTSD signs and emotional changes and appreciation of life.[32]

Generally, the mentioned studies asserted that PTG-related factors were formed as positive outcomes when trying to deal with PTSD. Despite the indirect and significant correlation between PTG and PTSD in the current study, Xu & Liao in 2011 found a direct relationship between PTG and the symptoms of PTSD and demonstrated that the PTG increased along with the symptoms of PTSD.[27] Inconsistent with our findings, Wu et al. in 2016 and Bensimon in 2012 reported a significant and direct relationship between PTSD signs and PTG.[21, 33] This inconsistency might be due to the nature of the related traumas. Formerly, natural disasters were evaluated as the trauma, while trauma due to incurable disease, which can threaten the lives of people every moment was evaluated in the current study. In this respect, the severity of stress and arousal symptoms can continue during treatment process and the following years.

According to the literatue, there is a third form of association between the PTG and PTSD in addition to the direct and indirect relationships. In a study conducted by Kleim & Ehlers in 2009 on two groups, a U-shaped relationship was observed between PTG and PTSD. In this regard, increased PTSD was associated to elevated PTG, whereas reduced symptoms of PTSD led to decreased PTG.[34]

According to the results of a qualitative study carried out by Fazel et al. in 2016 on patients with cancer using semi-structured interviews, self-actualization was the central issue of PTG model. The actual condition for PTG is dealing with pain from the onset of cancer and factors such as patients themselves, companions and families, and treatment personnel and society are considered as effective factors. In addition, PTG requires specific components and strategies.[35] However, in the current study, regarding the high severity of PTSD symptoms, especially mental arousal, this type of stress reduced the coping mechanism of individuals and their PTG level or positive changes occurred after the onset of cancer and stabilizing effective treatment.

It seems that the role of several intermediating factors must be regarded in the prediction of PTG in cancer patients, which helps to define and determine the quality of the relationship between two areas. In this regard, Kamali et al. in 2014 conducted a correlational study with the title of "Prediction of Severity of PTSD Based on Emotional Intelligence and Coping Strategies" that indicated an indirect and significant relationship between happiness, realism, and demand for social support. Nevertheless, a direct and significant association was found between avoidance coping and ability to predict PTSD. These factors and scales determine about 50% of the variances of change in the severity of PTSD.[36] Not only on PTSD, these factors have reverse impacts on PTG.

In the current study, the predictable variance of PTG from predictive variables was not high. This might be due to the lack of attention to some mediating variables involved in PTSD and PTG including depression, tolerance, social support, and emotional intelligence. Therefore, they must be evaluated in future studies. Another drawback of the current study was specific culture and religion and social variables of people in the country, which limited the generalizability of the final results.

5. Conclusion

According to the results of the current study, a significant and indirect relationship was observed between PTSD and PTG. In addition, a significant association was found between PTG and the dimensions of PTSD, age, and the duration of disease. On the other hand, hyperarousal was the only predictive variable of changes in PTG score. According to the results, reduced arousal of patients can lead to increased PTG. Therefore, it is recommended to focus on that the dimensions PTSD, especially hyperarousal. This can result in increased quality of life of cancer patients during the primary stage of the disease.

Conflicts of interest

The authors declare no conflicts of interest.

Authors' contributions

Ali Navidian: Drafting of the article, analysis of the data, writing and editing the final article, Malieh

Sharmi: participation in research design and implementation, collection of information and drafting the article.

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