



## The Relationship between Fatigue and Psychological Symptoms in Patients with Gastrointestinal Cancer

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### ABSTRACT

**Background:** Cancer can lead to fatigue and the manifestation of psychological symptoms in patients, including depression, anxiety, and stress.

**Objectives:** The aim of this study was to investigate the relationship between fatigue and psychological symptoms in patients with gastrointestinal cancer.

**Materials and Methods:** The study had a descriptive, cross-sectional design. We assessed levels of fatigue and the psychological health of 70 patients with gastrointestinal cancer who had been referred to the cancer institute in Tehran, Iran in 2014. We used the Rhoten Fatigue Scale to assess patients' levels of fatigue and the Depression Anxiety Stress Scale (DASS-21) to assess their psychological symptoms. We performed a correlation analysis and stepwise multiple linear regression to compare the relationship between fatigue and psychological symptoms in the cancer patients.

**Results:** There was a significant relationship between psychological symptoms, including depression, stress, and anxiety and fatigue in patients with gastrointestinal cancer ( $p < 0.05$ ).

**Conclusion:** Our study results demonstrate that the severity of fatigue is related to the extent of psychological symptoms (depression, anxiety, and stress) in patients with cancer. A patient's depression and anxiety predicts the fatigue.

**Keywords:** Anxiety; Depression; Fatigue

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### Introduction

Cancer occurs when there is an abnormal proliferation of cells with loss of their differentiation (1). Cancer constitutes an enormous burden on society in developed and underdeveloped countries. The incidence of cancer is increasing because of population growth and general aging of the population. There is also an increasing prevalence of smoking, obesity,

and physical inactivity, and these factors are tied to an increase in the incidence of cancer. According to GLOBOCAN estimates, about 14.1 million new cancer cases and 8.2 million deaths occurred worldwide in 2012. Over the years, the burden has shifted to poorer nations, which currently account for about 57% of new cancer cases and 65% of cancer deaths worldwide (2). Cancer can threaten

one's independence and limits the ability of people to play an effective role in their family and society. This can lead to a decreasing lack of self confidence in cancer patients. A cancer diagnosis may come with an unpredictable prognosis and the potential for a premature death can contribute to the onset of stress in cancer patients. Cancer is often a debilitating disease that can result in severe physical and psychological ailments (3). Cancer affects each person's emotions and behaviour differently. Patients cope with cancer in different ways. There is a complex interaction between thoughts, feelings, actions, and physical expressions. Negative thoughts can lead to patient depression and reduces one's motivation; depressed patients may leave their social activities and experience low moods. Depression often causes infirmity and is associated with torpor. The physical symptoms can exacerbate misinterpretation of disease and increase one's sense of hopelessness and depression (4). The most common psychological reactions to cancer include denial, anxiety, depression, somatization, and the overall fear of failure, pain, death, and missing out on future opportunities (5). Cancer patients are also often concerned with the loss of social interactions or losing their job and may worry about becoming financially or physically dependent on others (6).

The nervous system and immune system interact in many ways. Evidence increasingly suggests that the immune system affects mental health. Some studies have demonstrated that one's mental health affects immune system function. Changes in one's mental health in turn change the trend of serious disorders such as cancer, infection, or autoimmune diseases (7).

One of the most complex and the most common cancer-related symptoms is fatigue. Between 72 and 99 percent of cancer patients suffer from fatigue. Patient fatigue may be caused by the disease and/or cancer treatments such as chemotherapy (8). Fatigue is the most common symptom among patients receiving chemotherapy and is the one symptom that is perceived as being the most annoying among these patients. Patients with cancer experience severe fatigue more often than healthy people and this situation often does not improve with what would otherwise be adequate amounts of rest and sleep (9).

Chemotherapy treatments can also damage a patient's bone marrow and treatment-related side effects such as nausea, vomiting, diarrhea, and loss of appetite intensify patient fatigue (10). The results of a study conducted in the United States (n=419 cancer patients and 197 oncologists) demonstrated that 80 percent of oncologists feel that fatigue in patients is either ignored or not adequately treated, 50% of patients reported that they spoke about fatigue with their physicians, and only 27% of patients reported that their doctor had considered their fatigue (11).

More understanding is needed in the areas of patient fatigue and psychological health and how the two interact. More research on these subjects could help specialists design appropriate interventions for patients to increase their adaptability and ability to cope with fatigue and psychological distress while undergoing cancer treatment.

The main objective of this study was to obtain more information about the severity of fatigue in cancer patients and how it relates to psychological symptoms in these patients. Our question for this study was as follows: What is the relationship between patient

fatigue and the mental health of patients with cancer?

## Materials and Methods

The methods used in this study were descriptive and cross-sectional in nature and correlation-based. We evaluated 70 patients using purposive sampling techniques in 2014. Patient subjects were being treated in cancer institute in Tehran, Iran. All patients had received a diagnosis of having gastrointestinal cancer. Patients were between 25 and 40 years of age. Patients were excluded from the study if they had an acute form of the cancer, had another debilitating disease, or had severe cognitive problems to the extent that the patient would not have been able to complete the questionnaire.

Data were collected using the Rhoten Fatigue Scale to assess patient fatigue and the Depression Anxiety Stress Scale to measure levels of patient anxiety, depression, and stress. Patients first completed a demographic questionnaire, which included questions pertaining to the patient's age, sex, education level, marital status, employment status, duration of disease after diagnosis, and other information. A trained researcher administered the Rhoten Fatigue Scale. A trained psychologist assessed levels of patient anxiety, depression, and stress in the hospital between 16:00 and 20:00 hours. The items of questionnaires were read to patients with low levels of education, and their verbal responses were recorded.

### *Rhoten Fatigue Scale*

The Rhoten Fatigue Scale was used to quantify levels of fatigue in test subjects. The fatigue scale is a visual scale that ranges from 0 to 10 with the total score interpreted as follows: no fatigue (0), minimal fatigue (1 to

3), medium levels of fatigue (4 to 6), high levels of fatigue (7 to 9), and severe fatigue (10). The test-retest method has shown the reliability of this instrument to be 0.93 (12). Aghebati(13) reported the reliability for this scale as 0.89.

### *Depression Anxiety Stress Scale (DASS-21)*

DASS-21 was designed by Lovibond and Lovibond (14) and includes 21 items with 7 questions used to measure levels of anxiety, stress, and depression. Patients assign a number between 0 and 3 for each question with 0 being not applicable to the patient and 3 being very much applicable to the patient (14). Its reliability and validity was evaluated by Samani and Jokar (15). The retest reliability for the scales of depression, anxiety, and stress were 0.80, 0.76 and 0.77, respectively and Cronbach's alpha for the scale of depression, anxiety, and stress was 0.81, 0.74 and 0.78, respectively. The results of this study indicate DASS-21 is an effective scale for use in Iran (15).

In this study, means and standard deviations were used in descriptive statistics. The Pearson correlation coefficient was used to assess the relevance assumptions and stepwise multiple linear regression analysis was used to predict the criterion variable (fatigue) from the predictor variables (depression, anxiety, stress) using software SPSS 20.

## Results

A total of 70 patients with gastrointestinal cancer (35 males and 35 females) participated in this study. Among the patients, 9 patients were divorced, 23 were single, and 38 were married. The mean age of the patients was  $33.12 \pm 8.32$ . Patients had an average of  $12.3 \pm 4.3$  years of education; this indicates

most patients had at least high school education.

Patient subjects had cancer an average of  $52.79 \pm 43.65$  months. Patient fatigue was  $7.07 \pm 1.64$ ; this indicates these cancer patients were experiencing more than moderate levels of fatigue. Levels of depression and stress were  $54.12 \pm 4.97$  and  $65.60 \pm 3.65$ , respectively. Patient anxiety measured  $37.27 \pm 3.44$  and demonstrated the group had high amounts of stress (Table 1).

**Table 1.** Mean levels of fatigue, depression, stress, and anxiety based on defined scales among study patients with gastrointestinal cancer (n=70)

Variables	Mean (SD*)
Fatigue (Rhoten Fatigue Scale)	$7.07 \pm 1.64$
Depression (DASS-21)	$54.12 \pm 4.97$
Stress (DASS-21)	$65.60 \pm 3.65$
Anxiety (DASS-21)	$37.27 \pm 3.44$

\* Standard Deviation

Table 2 shows there was a significant relationship between psychological variables (depression, anxiety, and stress) and levels of fatigue ( $p < 0.05$ ).

**Table 2.** The correlation between depression, stress and anxiety and fatigue among study patients with gastrointestinal cancer (n=70)

Variables	r
Depression	0.95*
Stress	0.88*
Anxiety	0.64*

\*  $P < 0.0001$

There was a significant correlation between patient depression and levels of fatigue ( $r = 0.95$ ). This multiple correlation coefficient increased to 0.96 after stress and anxiety were added to the analysis (Table 3).

**Table 3.** Stepwise regression analysis to predict fatigue in patients with gastrointestinal cancer (n=70)

Model	R	R2	R. adj	Std. Error of Estimate
1	0.95	0.909	0.908	0.46
2	0.96	0.922	0.920	0.46
3	0.96	0.934	0.931	0.43

There was a significant relationship between patient fatigue and levels of depression ( $F = 681.28$ ,  $\alpha \leq 0.05$ ) (Table 4). Also, after entering stress and calculating the correlation between predictor variables, stress and fatigue, the F-value of 396.06 indicates the significant relationship between patient fatigue and levels of stress and depression. An F-value of 312.18 demonstrates a significant relationship between fatigue and levels of depression, stress, and anxiety in patients.

**Table 4.** Results of stepwise regression analysis – using depression, anxiety, and stress to predict study participants with gastrointestinal cancer (n=70)

Model	Source	Sum of Squares	df	MS	F	p-value
1	regression	169.70	1	169.70	681.28	0.001
	residual	16.93	68	0.24	-	-
	total	186.64	69	-	-	-
2	regression	172.08	1	86.06	396.06	0.001
	residual	14.55	68	0.21	-	-
	total	186.64	69	-	-	-
3	regression	174.35	1	58.11	312.18	0.001
	residual	12.28	68	0.18	-	-
	total	186.64	69	-	-	-

Depression, stress, and anxiety significantly predicted fatigue in cancer patients when considered alone and together in models 1, 2, and 3 ( $p < 0.05$ ). Depression significantly explained the occurrence of fatigue in cancer patients in the Model 1. In the second model, depression and stress significantly predicted fatigue. In the third stage, stress, depression, and anxiety together significantly contributed towards patient the occurrence of fatigue in cancer patients (Table 5).

**Table 5.** Coefficients of predictor variables of fatigue among studied patients with gastrointestinal cancer (n=70) using stepwise regression analysis

Model	variable	B	t	p-value
1	depression	0.315	26.10	0.00
	depression	0.248	10.62	0.00
2	stress	0.105	3.13	0.00
	depression	0.234	10.68	0.00
3	stress	0.077	2.58	0.01
	anxiety	0.071	3.49	0.00

## Discussion

According to our findings, each of the psychological variables analyzed in this study was significantly associated with the patient fatigue. When the predictive value of these factors was assessed using hierarchical regression analysis, all variables were significant predictors of fatigue. Our findings indicate psychological factors such as anxiety, depression, and stress appear to be significant predictors of fatigue, and it has been shown that there is a significant correlation between fatigue and depression, anxiety, and stress.

Despite advances in medical science and treatments, cancer still results in numerous deaths worldwide on an annual basis. The concept of death in cancer launches the process of stress and anxiety to fatigue, depression and despair (16). In addition to enduring the psychological and physical symptoms associated with cancer, patients may experience diminished physical abilities and individual, social, and financial freedom.

Numerous studies, including Zeighami-Mohammadi *et al.* (17), Cella *et al.* (18), Cella *et al.* (19), Cella *et al.* (20), have shown that chemotherapy brings about its own kind of fatigue that is not remedied with regular sleep and rest. Research has documented the existence of stress and anxiety in cancer patients and that these symptoms can adversely affect the brain (21). Cancer patients experience anxiety for various reasons (22), including death being imminent or not having financial or social support systems in place.

The findings of this study should not be generalized to other groups with chronic diseases. There were limitations with the sampling in this study, including inaccessibility and lack of cooperation with some patients and low sample size. In

addition, all study subjects were from Tehran and caution should be used when applying these results to patient groups in other countries.

Finally, it should be considered that all current research data is report one and may increase the risk of bias and also distortion in responses between multiple devices. However, it should be noted that the role of psychological symptoms are only measurable and available by means of self-report tools. Overall, more research is needed to fully assess and understand patient fatigue and its relationship to various psychological symptoms.

Given the limitations listed, it is recommended that future research provide more generalized and more accurate evaluation of variables using more samples. Moreover, in these studies the other psychological variables (such as coping styles and personality patterns) should also be used. Finally, we emphasize on applying the clinical revelations extracted by these findings to reduce the fatigue and mental negative symptoms of cancer patients.

## Conclusion

The results of this study showed that the severity of fatigue is strongly related to psychological symptoms –depression, anxiety, and stress– in patients with cancer and that these variables predict the occurrence of patient fatigue. These results highlight the potential importance interventions to improve and increase the awareness of patient fatigue among specialists so that steps can be taken to aid patients in reducing levels of fatigue, and possibly reducing their levels of stress and depression as a result.



## Conflict of Interest

The authors have no conflict of interest.

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