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Formulation and Testing of a Model of the Relationship between Psychological Characteristics of Depression, Anxiety, and Stress, and Physical Complaints of the Staff of a Military Unit in Tabriz, Iran, with the Mediating Role of Chronic Fatigue

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Quantitative Study

Abstract

Background: Employees of military units in their workplaces often complain of experiencing multiple physical and psychological symptoms that cannot be explained medically. The present study aimed to investigate the relationship between the psychological characteristics of depression, anxiety, and stress, and unexplained physical complaints of the staff of a military unit in the city of Tabriz, Iran, with the mediating role of chronic fatigue.

Methods: For this purpose, 300 employees of a military unit in the city of Tabriz were selected through cluster sampling method in 2019. To measure the variables, the participants completed the Depression, Anxiety, and Stress Scale (DASS-21), Chalder Fatigue Questionnaire (CFQ), and Symptom Checklist-90 (SCL-90). Cronbach's alpha was used to assess the validity and reliability of these scales and the results indicated the desirability of these scales. The data were analyzed using Amos software and bootstrapping test.

Results: The results showed that the total effect of psychological characteristics on chronic fatigue ($\beta = 0.85$ $P < 0.001$), chronic fatigue on physical complaints ($\beta = 0.54$; $P < 0.001$), and psychological characteristics on physical complaints ($\beta = 0.30$; $P < 0.001$) was statistically significant. Moreover, the indirect effect of chronic fatigue and psychological characteristics on physical complaints was significant ($\beta = 0.096$; $P = 0.020$).

Conclusion: The identification of psychological characteristics helps authorities to think about ways to provide counseling and treatment for mental disorders and chronic fatigue among the work force that can improve physical complaints among the personnel of military units.

Keywords: Psychological characteristics; Chronic fatigue; Physical complaints

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Introduction

The military force is an important sector that keeps the peace and security of a part of the city, and the main task of every military unit is to prevent the occurrence of crime. The military unit within the city and the units outside the city maintain the order and security of each district. The military force is a public commander of the judiciary system that, in case of observing visible crimes, has to directly intervene and introduce the criminals to the judiciary system. Criminals, as part of the society, are individuals with behavioral problems. The problems related to anger in criminals are one of the concerns of military unit and correctional instructors who are always looking for ways to control and deal with this phenomenon; and since military unit officers spend long intervals with offenders and criminals, they lose much energy which leads to fatigue and unexplained physical complaints. These problems also result in severe physical harms in both the staff and criminals (Nemati, Babazadeh, & Fakhri, 2013). Previous studies have reported a relationship between working environments and a wide range of illnesses and mental health disorders (Rollings, Wells, Evans, Bednarz, & Yang, 2017; Morton, Michalak, & Murray, 2017). Millitary personnel regularly face insults, threats, and beatings by criminals and prisoners who often suffer from mental disorders. Therefore, in such working environments, the employees, especially caregivers, are at high risk of mental health problems including unexplained physical complaints and mental complaints (Ghaddar, Mateo, & Sanchez, 2008). The employees may also face injuries due to the escaping of criminals which leads to physical complaints and fatigue from working and the environment. Physical complaints are reoccurring emotional and psychological symptoms for which careful medical examinations often fail to provide a clear physical cause. These disorders, which may emerge in one of the internal or external organs of the body, are associated with perceived stress and various psychosocial-social variables (Golparvar & Sadeghi, 2016). Mental disorders can be masked by physical complaints such as headaches, back pain, chest pain, and digestive problems (Haftgoli et al., 2010). Physical complaints such as exhaustion, general pain, poor ventricular function, tremor, and confusion are commonly observed, and the progression of physical complaints such as exhaustion and pain in practice are associated with depression (Shakoor et al., 2010). In fact, it seems that depression also has an effect on employees' physical complaints. Depression is a common mental disorder with various symptoms, often accompanied by physical symptoms. Moreover, 69% of depressed patients may show physical symptoms for their major complaints (Demyttenaere et al., 2004). In the study by van Hooren, Vermeiren, and Bolman (2008), it was found that there is a significant positive relationship between depression symptoms and physical complaints and patients who use more problem-focused effective factors or have emotion-focused explicit experiences have fewer symptoms of depression. In addition, anxiety is defined as a feeling of unreasonable fear and discomfort as well as a response to an unknown, ambiguous, or conflicting threat, and may also result in physical complaints (Sadock & Sadock, 2010). Studies show that anxiety and depression have significant relationships with physical complaints (Hekmat Ravan, Samsam Shariat, Khani, Khademi, 2012). Nielsen and Einarsen (2012), in their study, found that workplace bullying at the employee level results in consequences such as depression, anxiety, stress, pressure, exhaustion, and post-traumatic stress disorder (PTSD), and has a significant relationship with physical health implications such as mental complaints and physical health problems.

Stress can also have detrimental effects on people's physical and mental health, for example, occupational stress can cause anxiety, mental strain, and emotional tension. Moreover, it can cause exacerbation of physical and cardiovascular problems, musculoskeletal disorders (MSDs), and psychophysical pains (Nakao, 2010). In addition to psychological characteristics, chronic fatigue syndrome (CFS) appears to have a mediating role in employees' physical complaints. CFS is a complex and disabling disorder the most common symptoms of which are asthenia, muscle pain, memory deficits and lack of concentration, insomnia, chest pain, dizziness, night sweats, weight loss, and psychological problems such as depression and irritability (Sadock, Sadock, & Ruiz, 2015). The exact incidence rate and mode of CFS are not known, but its incidence rate in the general adult population is estimated to be 0.70 to 2.8%. Women are two times more likely to have it than men. The average age of the incidence of this disorder is 33 years, although it has also been seen in people younger than 10 years of age and older than 70 years of age (Committee on the Diagnostic Criteria for Myalgic Encephalomyelitis/Chronic Fatigue Syndrome, Board on the Health of Select Populations, & Institute of Medicine, 2015). Researchers have reported the prevalence of this disorder to be even higher than the prevalence of cancer and AIDS (Carruthers et al., 2003). Numerous studies have pointed out that military personnel are more likely to be exposed to exhaustion, acute stress, and traumatic stress (Gadermann et al., 2012: Shahhosseini & Vaez Mousavi, 2017) because they deal with many accidents and stressful incidents during their service. Long-term exposure to stressful conditions can in turn lead to fatigue and burnout, asthenia, lethargy, and laziness (Maslach, Schaufeli, & Leiter, 2001). When fatigue lasts more than 6 months, it is considered as chronic fatigue. Symptoms of CFS are often associated with other diseases such as fibromyalgia and irritable bowel syndrome (IBS) (Sadock et al., 2015). The effects of this syndrome on the work force are costly and reduce production, efficiency, and motivation, and increase absences and unemployment (Haddadi, Zakerian, Mahmoodi, Nasl Seraji, Parsa Yekta, & Ali Yari, 2014). Moreover, the human being is a biological, psychological, and social being (Mehdad, Rahimi, & Atashpour, 2011), and at least one-third of his/her life is spent in the workplace. Therefore, work is considered a very important factor in health (Aghaei, Jalali, Aslan, & Hasanzadeh, 2011). Fatigue is the most common symptom of CFS which is characterized by severe mental and physical fatigue and is responsible for a 50% decrease in all activities of the affected person (Haddadi et al., 2014). Most employees who have the diagnostic criteria of CFS also have some psychiatric diagnostic criteria, especially anxiety, depression, and stress disorders (Taheri & Sajjadian, 2018). Examination of these diagnostic criteria indicates that the physical symptoms of anxiety are similar to the physical symptoms of CFS (Tyrer, 1976). Anxiety is a very unpleasant diffuse feeling that is often accompanied by symptoms of the autonomic apparatus (such as diarrhea, dizziness and lightheadedness, excessive sweating, intensification of reflexes, hypertension, pupillary edema, restlessness, shaking, gastric distress, and slow urination) (Ahmadi, Mohammadi Sartang, Nooraliee, Veisi, & Rasouli, 2013). Studies have also shown a close relationship between depression and CFS. However, despite the similarities of these two disorders, the exact relationship between them is still unclear, and 66% of people with fatigue syndrome also have symptoms of major depressive disorder (MDD) and 50% of them have reported at least one episode of MDD (Committee on the Diagnostic Criteria for Myalgic Encephalomyelitis/Chronic Fatigue Syndrome, Board on the Health of Select Populations, & Institute of Medicine, 2015). Depression

is a widespread disorder that most people experience at some period in their lives (Farhadi, Yarmohamadi Vasel, Zoghi Paidar, & Chegini, 2017). The high correlation between these two disorders is such that many psychiatrists believe that all cases of this syndrome are depressive disorders; however, patients with CFS rarely feel guilty, think about suicide, or lack feeling of enjoyment, and they do not lose much weight. Furthermore, these patients usually do not have a family history of depression or other mental disorders, and there are not many stressful events in their lives that justify or facilitate depression. In addition, although some patients respond to treatment for depression, many eventually become resistant to all psychotropic drugs (Sadock et al., 2015). In the previous studies, the relationships between the variables of the present study have been separately investigated; however, we found no integrative research that examines the relationships between these variables in the form of a holistic model. This is why the present study is an important step toward providing a coherent structural model of the intrinsic relationships between the variables of depression, anxiety, and stress as the independent variables, and chronic fatigue as the mediating variable and physical complaints as the dependent variable. The present study was conducted to determine whether the model of the relationship between the psychological characteristics of depression, anxiety, and stress and the physical complaints of employees of a military unit in the city of Tabriz, Iran, with the mediating role of chronic fatigue is well fitted or not.

Methods

The present descriptive, correlational research was conducted in 2019. The statistical population of the study consisted of all employees of a military unit in the city of Tabriz from among whom 300 people were selected through random cluster sampling. To do this, from among all military units in the city of Tabriz, 8 units were randomly selected, and in the next stage, a number of staff from the selected units were randomly selected. After presenting the related permit to the selected units in the city of Tabriz, the questionnaires were distributed among the staff. The employees were assured of the observance of ethical principles, anonymity in completing the questionnaires, and confidentiality of information. The employees who answered the questionnaires incompletely were excluded from the statistical sample. The instruments used in this study included the Depression, Anxiety, and Stress Scale (DASS-21), Chalder Fatigue Questionnaire (CFQ), and Symptom Checklist-90 (SCL-90).

Symptom Checklist-90: This SCL-90 was introduced by Derogatis, Rickles, and Rock Derogatis and it indicates 9 dimensions of disease symptoms including physical complaints, obsession and compulsion, sensitivity in interpersonal relations, depression, anxiety, aggression, morbid fear, paranoid thoughts, and psychosis (Derogatis, Lipman, & Covi, 1973). The scoring of the SCL-90 is based on a 5-point Likert scale ranging from 0 (never) to 4 (strongly). It is necessary to note that in this study only the component of physical complaints was used and the questions related to physical complaints are questions 1, 4, 12, 27, 40, 42, 48, 49, 52, 53, 56, and 58. The validity and reliability of the SCL-90 were assessed by Derogatis et al. (1973), who reported the internal validity of the test using Cronbach's alpha coefficient to be satisfactory and higher than 0.5. Moreover, in Iranian studies, the Cronbach's alpha coefficient of the physical complaints component has been reported to be 0.78 (Mohammadi, 2018).

Chalder Fatigue Questionnaire: Chalder, Berelowitz, and Hirsch developed a short

14-item instrument that measures the mental and physical symptoms of fatigue. The scoring of the CFQ is based on a Likert scale ranging from 1 (never) to 4 (very high). The validity and reliability of this scale were evaluated by Chalder et al. (1993) using the clinical interview symptom list, its sensitivity was 75.5% and its specificity was 74.5%. The internal consistency coefficient was 0.85 and 0.82 for the physical exhaustion question and mental exhaustion questions, respectively.

Depression, Anxiety, and Stress Scale: The DASS-21 was developed by Lovibond and Lovibond (1995) and it consists of 3 self-report measures for the evaluation of negative emotional states in depression, anxiety, and stress. This scale consists of 21 questions and each of its subscales has 7 questions. Each question is scored on a scale ranging from 0 (does not apply to me at all) to 3 (totally applies to me). Foreign studies have assessed this scale using factor analysis and their results indicated the presence of the 3 factors of depression, anxiety, and stress. The results of the present study showed that 68% of the total variance of the scale is measured by these 3 factors. Specific values of the factors of stress, depression, and anxiety in the study by Lovibond and Lovibond (1995) were 9.07, 2.89, and 1.23, and alpha coefficients for these factors were 0.97, 0.92, and 0.95, respectively. The validity and reliability of this questionnaire were evaluated in some Iranian studies, which have reported the test-retest reliability of the depression, anxiety, and stress subscales to be equal to 80%, 76%, and 77%, respectively (Mofidirad, & Shareh, 2014). The collected data were analyzed using structural equation test in Amos (version 24; IBM Corp, Armonk, NY, USA) and SPSS software (version 22; IBM Corp, Armonk, NY, USA).

Results

The present study was performed on 300 employees of a military unit in the city of Tabriz. The participants' mean age was 33.97 years, and the range of their service experience was 1-29 years and their mean service experience was 13.16 years.

Table 1 shows the mean and standard deviation of the variables and the skewness and kurtosis indices. According to the results presented in table 1, it can be stated that the indices of skewness and kurtosis are appropriate, that is, the assumptions necessary for path analysis, including the assumption of normality of distribution, were verified. Mardia's test was used to test the multivariate normality of distribution. The results of this analysis verified the assumption of multivariate normality (multivariate kurtosis of -2 and -2).

The Pearson correlation test illustrated a significant correlation between the physical complaints variable and the variables of depression (r = 0.675), anxiety (r = 0.717), stress (r = 0.729), psychological characteristics (r = 0.743), physical fatigue (r = 0.790), mental fatigue (r = 0.764), and chronic fatigue (r = 0.812) (Table 2).

Moreover, the variable of chronic fatigue was found to have a significant correlation with the variables of depression (r = 0.749), anxiety (r = 0.731), stress (r = 0.775),psychological characteristics (r = 0.790), and physical complaints (r = 0.812).

Table 1. The mean ± standard deviation of the studied variables

Variables	Mean ± SD	Skewness	Kurtosis
Depression	1.91 ± 3.73	1.020	-0.115
Anxiety	1.73 ± 3.27	1.107	-0.067
Stress	2.80 ± 4.88	1.115	0.434
Psychological characteristics	6.44 ± 11.88	1.147	0.253
Physical fatigue	3.27 ± 9.55	0.963	0.521
Mental fatigue	3.57 ± 12.10	0.788	0.004
Chronic fatigue	6.56 ± 21.65	0.889	0.076
Physical complaints	3.05 ± 6.82	0.976	-0.272

SD: Standard deviation

Table 2. Pearson correlation matrix for the research variables

	1	2	3	4	5	6	7	8
1	1							
2	0.675**	1						
3	0.717**	0.836**	1					
4	0.729**	0.878**	0.868	1				
5	0.743	948**	0.941**	0.967**	1			
6	0.764**	0.727**	0.693**	0.768**	0.769**	1		
7	0.790**	0.707**	0.706**	0.719**	0.746**	0.834**	1	
8	0.812**	749**	0.731**	0.775**	0.790**	0.954**	0.961**	1

1: Physical complaints; 2: Depression; 3: Anxiety; 4: Stress; 5: Psychological characteristic; 6: Mental fatigue; 7: Physical fatigue; 8: Chronic fatigue
** Significance: P < 0.01

Table 3 shows the fit indices of the output model. Given the results shown in table 3, the chi-square index ($\chi 2 = 345.751$), relative chi-square ($\chi 2/df = 2.98$), goodness of fit index (GFI = 0.95), normalized fit index (NFI = 0.913), comparative goodness of fit index (CFI = 0.936), and root mean square error of approximation (RMSEA = 0.08) indicate the average fit of the output model. After making sure of the observance of the regression assumptions, the results of structural equation modeling can be seen in figure 1 and tables 3 and 4.

According to figure 1 and table 4, the standard coefficients of psychological characteristics on chronic fatigue ($\beta = 0.85$; $P < 0.001$), chronic fatigue on physical complaints ($\beta = 0.54$; $P < 0.001$), and psychological characteristics on physical complaints ($\beta = 0.30$; $P < 0.001$) were statistically significant. With the increase in psychological characteristics scores, fatigue in employees also increased, which in turn resulted in an increase in physical complaints in employees; thus, psychological characteristics affect and increase employees' physical complaints. Then, to test the mediating relationships of the structural model and to obtain the significance of the indirect coefficients, the Amos software bootstrap test with the sample number and default confidence interval (CI) in the program were used (Table 4). As shown in table 4, chronic fatigue, through increasing psychological characteristics, affects physical complaints ($\beta = 0.096$; $P = 0.020$), that is, as a result of the increase in psychological characteristics, employee fatigue is increased, which in turn increases employees' physical complaints.

Discussion

The present study showed that the psychological characteristics of depression, anxiety, and stress with the mediating role of chronic fatigue affect the physical complaints of employees in military units. The other results suggest that psychological characteristics are correlated with chronic fatigue, which is consistent with the results of some previous studies (Sadock et al., 2015; Committee on the Diagnostic Criteria for Myalgic Encephalomyelitis/Chronic Fatigue Syndrome, Board on the Health of Select Populations, & Institute of Medicine, 2015; Gadermann et al., 2012; Shahhosseini & Vaez Mousavi, 2017; Maslach et al., 2001; Haddadi et al., 2014; Taheri & Sajjadian, 2018; Tyrer, 1976).

Table 3. Fit indices of the output model

Indices	χ^2	df	χ^2/df	GFI	NFI	CFI	RMSEA	P-value
Output model	345.751	116	2.98	0.95	0.913	0.936	0.08	< 0.001

GFI: Goodness of fit index; NFI: Normed fit index; CFI: Comparative fit index; RMSEA: Root mean square error of approximation

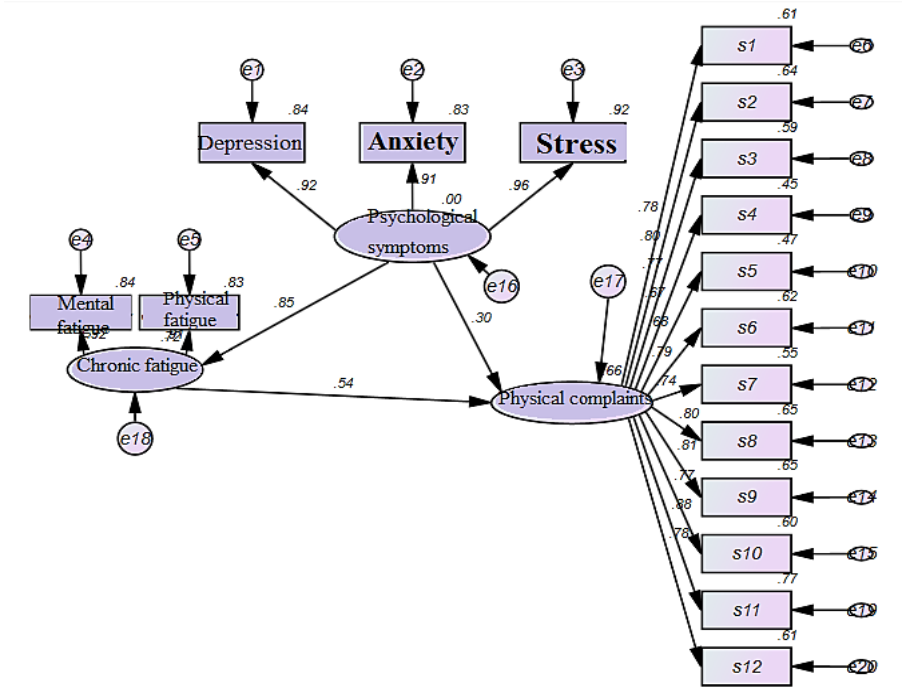

Figure 1. The output model of the mediating role of chronic fatigue in the relationship between psychological characteristics and physical complaints

In explaining the results of the present study, it can be stated that unfavorable health and working conditions in military units, heavy responsibilities and the inappropriate status of employees in the units, increased number of criminals, intensive work shifts, and job insecurity cause psychological symptoms such as depression, anxiety, and stress among employees. Moreover, with the increase in employees' psychosocial problems, the prevalence of CFS will increase among employees. According to studies, most of the employees who have the diagnostic criteria for CFS also have some psychiatric diagnostic criteria, especially anxiety and depression disorders (Taheri & Sajjadian, 2018; Tyrer, 1976; Sharpe, 1997). According to Sharpe (1997), there is a strong relationship between MDD and CFS. Furthermore, the examination of diagnostic criteria shows that the physical symptoms of anxiety are similar to that of CFS (Sharpe, 1997).

Table 4. Direct and indirect effects of the mediating role of chronic fatigue in the relationship between psychological characteristics and physical complaints

Research variables	Total effect (standard)	Direct effect	Indirect effect	Results
Psychological characteristics → Chronic fatigue	β = 0.85 P < 0.001	β = 0.713 P = 0.043		Direct effect
Chronic fatigue → Physical complaints	β = 0.54 P < 0.001	β = 0.135 P = 0.029		Direct effect
Psychological characteristics → Physical complaints	β = 0.30 P < 0.001	β = 0.063 P = 0.021		Direct effect
Psychological characteristics → Chronic fatigue → Physical complaints			β = 0.096) P = 0.020	Mediating role

According to Baker's theory, it can be said that due to the persistence of criminals, repetition of crimes, and continuous encounter with criminals for prolonged periods of time in military units, their guards more than others suffer from stress and mental fatigue (Baker, 1997). If a person is exposed to stressors for a long period, he/she will use a great deal of energy to adapt to this situation, and thus, his/her energy may not be sufficient to respond to his/her needs, thus may place the individual at risk of illness or mental balance disturbance (Navidian, Salar, Hashemi Nia, & Keikhaei, 2001). This is why CFS occurs in employees of military units.

Another result of the present study was that there was a relationship between psychological characteristics and physical complaints which is consistent with the results of some other studies (Ghaddar et al., 2008; Golparvar & Sadeghi, 2016; Haftgoli et al., 2010; Shakoor et al., 2010; Demyttenaere et al., 2004; van Hooren, Vermeiren, & Bolman, 2008; Sadock & Sadock, 2010; Hekmat Ravan et al., 2012; Nielsen & Einarsen, 2012; Nakao, 2010; Sadock et al., 2015; Committee on the Diagnostic Criteria for Myalgic Encephalomyelitis/Chronic Fatigue Syndrome, Board on the Health of Select Populations, & Institute of Medicine, 2015). In explaining this result it can be said that employees with psychological symptoms (depression, anxiety, and stress) also have physical complaints, and the physical complaints that are related to depression include joint pain, limb pain, back pain, gastrointestinal problems, fatigue, and changes in psychomotor activity. The primary complaints of a high percentage of patients with depression are only related to physical symptoms (Shakoor et al., 2010). Experiencing psychological symptoms can have detrimental effects on a person's physical and mental health. For example, occupational stress can cause nervous, mental, and emotional stress, and exacerbate physical and cardiovascular problems, musculoskeletal pains, and psychosomatic disorders (Nakao, 2010). Moreover, employees in military units who have a poor security attitude, due to helplessness and lack of self-confidence in dealing with issues, experience more physical and psychological harms. These employees do not trust in the procedures and safety measures of the workplace and do not believe that one can reduce physical and psychological hazards by adherence to principles and rules. Thus, they get involved in situations that cause them psychological and physical distress and this causes them to have more complaints about physical and psychological hazards (Kiani & Khodabakhsh, 2015). From a cognitive perspective, a person's judgment, or in other words, his/her cognitive evaluation of a situation affects his/her adaptation to the mentioned situation. A cognitive factor, which is also one of the major cognitive errors of individuals, is physical complaints which are mainly affected by depression and anxiety (Arnow et al., 2011).

The researcher also found that there is a relationship between chronic fatigue and physical complaints and this is consistent with the results of some previous studies (Sadock et al., 2015; Carruthers et al., 2003; Gadermann et al., 2012; Saeedi Dhaghani, Babapoor, & Esmaeelpoor, 2014; Aggarwal, McBeth, Zakrzewska, Lunt, & Macfarlane, 2006). In explaining this result, it can be said that chronic fatigue is caused by sleep disturbances and distresses caused by the pressure of difficult working conditions. Some of the employees of military units, due to being responsible for difficult and supervisory missions, have chronic fatigue; this has caused their nervous system to become inflamed, which has caused cardiovascular diseases (CVDs), back pain, gastrointestinal disorders, and eventually, physical complaints. CFS can get worse with physical activities. Researchers have shown that patients with CFS have a cognitive bias toward threatening stimulus and information

received about their physical health (Saeedi Dhaghani et al., 2014). This is consistent with the findings of Aggarwal et al. (2006) who reported that people with chronic fatigue have many concerns about their health scares.

The present study had some limitations, one of which is that the research population consisted of the employees of only one military unit in the city of Tabriz, and thus, caution should be taken in generalizing the results. It is also suggested that authorities plan and consider strategies with the help of psychologists and counselors to reduce psychological characteristics and improve chronic fatigue and adaptation to the working environment in military units in order to reduce physical problems and pains, including physical complaints, among the employees.

Conclusion

The present study showed that people with fatigue due to anxiety and stress are typically tired and distressed during sleep and work activities, and thus, the incidence rate of physical complaints is high among them. While fatigue due to depression varies among different cases, it is almost always accompanied by other symptoms of depression (including a persistent low mood along with pessimism, cognitive changes, and mental disorders). Patients with fatigue report that they are unable to perform specific activities due to lack of energy or power. This is while the descriptions provided by depressed individuals is more general, for example, they mention that they are not able to do anything. However, fatigue can be both a cause of depression and imitate symptoms of depression. Therefore, employees with fatigue complain of lack of energy, mental fatigue, poor muscle endurance, back pain, delayed recovery after physical activity, and lack of restful sleep. Therefore, chronic fatigue causes increased physical complaints including muscular pain, gastrointestinal pain, and headache. Hence, these common physical complaints and their alleviation methods should be seriously investigated.

Conflict of Interests

Authors have no conflict of interests.

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At all stages of this research, ethical considerations such as the ethical principle of scientific trusteeship, the intellectual property of authors, confidentiality, and informed consent have been respected.

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