

# Major depression and anxiety: another presentation (correlation with fatigue)

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## Background

Patients suffering from major depressive disorder and different types of anxiety disorders sometimes present to nonpsychiatrists complaining of atypical presentations, for example, fatigue, which leads us to the question: does chronic fatigue represent another clinical presentation for depression and anxiety?

## Design and methods

This study was a cross-sectional comparative study that included 100 adults presenting with fatigue without an evident medical cause and 50 controls presenting with fatigue associated with anemia to a general internal medicine outpatient clinic. All patients underwent a detailed clinical medical evaluation and were assessed by the Multidimensional Fatigue Inventory (MFI), the Mini International Neuropsychiatric Interview (MINI), the Hamilton Anxiety Rating Scale, and the Hamilton Depression Rating Scale.

## Results

The most common primary psychiatric diagnoses of the 'nonorganic fatigue' group were depressive disorders (43%), somatization/hypochondriasis (31%), and anxiety disorders (27%). Physical fatigue, reduced activity, and mental fatigue were higher among the patients having organic fatigue than in those having nonorganic fatigue. The severity of depressive disorders was significantly correlated to reduced motivation and mental fatigue.

## Conclusion

Fatigue is a presentation not uncommonly pointing to an underlying psychiatric condition. Sometimes psychiatric complaints cannot be expressed verbally by the patient although he is suffering from different psychiatric symptoms, usually those of depressive disorders.

## Keywords:

anxiety, depression, Egypt, fatigue, major depressive disorder

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## Introduction

The symptom of fatigue is a poorly defined subjective feeling, and careful inquiry is needed to clarify the complaints of 'fatigue', 'tiredness', or 'exhaustion' and to distinguish lack of energy from loss of motivation or sleepiness, which may be pointers to a specific diagnoses (Sharpe and Wilks, 2002).

Physically, fatigue is characterized by a profound lack of energy, feelings of muscle weakness, and slowed movements or central nervous system reactions. Fatigue can also trigger serious mental exhaustion. Persistent fatigue can cause a lack of mental clarity, difficulty concentrating, and in some cases, memory loss (Christodoulou, 2005).

Population-based studies confirm that fatigue is one of the most common somatic symptoms. About 20–30% of the population complains of chronic fatigue, and about a third of both male and female patients experience substantial fatigue four or more times a week (Viner and Christie, 2005).

The relationship between chronic fatigue and psychiatric illness has generated significant interest in recent years. A preponderance of research on medical facility samples has established that individuals with chronic fatigue tend to receive higher rates of psychiatric diagnoses compared with control patients. Other reports demonstrate that psychiatric variables do not play a primary role in the development and course of chronic fatigue (Taylor *et al.*, 2003).

Somatic symptoms are the leading cause of outpatient medical visits and are the predominant reasons why patients with common mental disorders such as depression and anxiety initially present in primary care. At least 33% of somatic symptoms are medically unexplained, and these symptoms are chronic or recurrent in 20–25% of patients. Unexplained or multiple somatic symptoms are strongly associated with coexisting depressive and anxiety disorders. Other predictors of psychiatric comorbidities include recent stress, lower self-rated health, higher somatic symptom severity, high healthcare utilization, difficult patient

encounters as perceived by the physician, and chronic medical disorders (Kronke, 2003; Harvey *et al.*, 2008).

## Design and methods

This was a cross-sectional study. The sample was selected as a convenient sample from among patients attending the General Internal Medicine Outpatient Clinics of Ain Shams University Hospitals, Cairo, Egypt. These clinics are located in Eastern Cairo and serve a catchment area of about one-third of Greater Cairo. They serve both urban and rural areas, including areas around Greater Cairo. The General Internal Medicine Outpatient Clinics provide services to patients through two outpatient clinics. They work 6 days per week, each clinic serves a range of 50–100 patients per day.

The study included two groups of patients. Group 1 comprised 100 patients presenting with fatigue without evident medical causes. Group 2 comprised 50 patients presenting with fatigue due to iron deficiency anemia. The sample size was calculated using the EPI-info version 6.0. Program (Bennett *et al.*, 1996). The calculations were performed by a senior staff expert in statistics.

All the patients of group 1 were selected from among those attending the General Internal Medicine Outpatient Clinics of Ain Shams University Hospitals every week on Wednesday over the 12-month study period (7 November 2007 to 29 October 2008). The flow of patients fulfilling the criteria ranged from 0 to 3 patients per clinic.

### Inclusion criteria:

- (1) Age range, 18–45 years.
- (2) Diagnosis of fatigue according to the definition of Cella *et al.* (1998), that is, 'A subjective state of overwhelming and sustained exhaustion and decreased capacity for physical and mental work that is not relieved by rest'.
- (3) Duration of the complaint of least 1 month.

### Exclusion criteria:

- (1) Being on any medication (as some medications may have fatigue as a side effect).
- (2) Presence of substance-related disorders (to avoid cases of fatigue caused by either intoxication or withdrawal).
- (3) Presence of concomitant medical diseases (which may be a cause of fatigue).

Group 2 consisted of 50 patients complaining of fatigue and diagnosed with iron deficiency anemia (nonhemolytic nonmalignant anemia), as proven by laboratory investigations (i.e. complete blood count). They were selected from the hematology outpatient clinics of Ain Shams University Hospitals. They had no apparent physical or neuropsychiatric morbidity. They were matched for age, sex, and other demographic variables as far as possible with the patients of group 1.

The patients of this group were chosen for the diagnosis of iron deficiency anemia because, clinically, the relationship between anemia and fatigue is universally accepted, and fatigue is considered the primary and cardinal symptom of anemia (Krishnan *et al.*, 2006). Meanwhile, anemia shares with psychological factors common predisposing factors leading to fatigue: more often observed in middle-aged patients, in women, and in poor countries with a lower socioeconomic status (nutritional deficiency, crowding, and imperfect housing circumstances).

This wide interface between anemia and psychiatric disorders allowed a clear comparison between the two groups of the study. Meanwhile, Iron deficiency anemia is less debilitating compared with other medical illnesses that may cause fatigue (e.g. hepatic diseases, cancer, renal diseases, etc.).

The ethical committee of the Faculty of Medicine, Ain Shams University approved the study design.

### Informed consent

Written informed consent was signed by the patients after a discussion on the aim of the study. The general principles that were explained to all participants in this study were:

- (1) Participation in this study is totally free and voluntary.
- (2) Participation in this study does not imply a direct benefit for the patient, although the data obtained could be used for the benefit of other patients.
- (3) The patient may decide to withdraw from this study at any moment without giving any justification.
- (4) The results of the study could be used for scientific publication, but the identity of the patient would be absolutely confidential.

### Procedure

All patients involved in the study were assessed using the following:

- (1) The Multidimensional Fatigue Inventory (MFI) to assess the symptoms and evaluate fatigue from different aspects (Smets *et al.*, 1995).
- (2) A clinical medical evaluation to exclude any underlying or contributing organic medical conditions that may cause fatigue. The following items were included in the clinical evaluation:
  - (a) Thorough history exploring the possible medical causes, alcohol or other substance abuse, and current use of prescribed and over-the-counter medications and nutritional supplements.
  - (b) Thorough physical examination.
  - (c) Laboratory screening tests including a complete blood count (CBC) with a differential leukocyte count; erythrocyte sedimentation rate (ESR); serum levels of alanine aminotransferase (ALT), total proteins, albumin (Alb), fasting blood glucose (FBS), blood electrolytes, and creatinine, and thyroid-stimulating hormone (TSH); and urine analysis.

- (3) When medical causes of fatigue were excluded, the patients were subjected to the following:
- The Mini International Neuropsychiatric Interview (MINI), which is a structured interview that was tested for reliability and validity on Egyptian patients (Ghanem *et al.*, 2002).
  - Patients diagnosed with anxiety or depression were subjected to the following:
    - The Hamilton Anxiety Rating Scale (Hamilton, 1959) to assess the severity of anxiety.
    - The Hamilton Depression Rating Scale (Hamilton, 1967) to assess the severity of depression.

### Statistical analysis

Statistical analysis was carried out using statistical package for social sciences (SPSS) version 15 (2007; IBM Armonk, New York, USA). The following statistical procedures were used.

### Descriptive statistics

Data were expressed as mean  $\pm$  SD for qualitative measures and as number and percentages for categorized data.

#### Mean (arithmetic average) ( $M$ )

The sum of the scores or values was divided by their number.  $M$  is a 'point of balance' between the highest and lowest scores or values in a distribution.

$$X = \frac{\sum X}{N},$$

where  $\Sigma$  is the sum,  $X$  the individual values, and  $N$  the number of cases.

#### Standard deviation ( $\pm$ SD)

It is the square root of the variance. It gives an estimate of the average deviation around the mean.

The analytical statistical procedures that were used in the study are as follows:

- Pearson's  $\chi^2$ -test ( $\chi^2$ ).

- Fisher's exact test.
- Student's  $t$ -test.
- Mann-Whitney  $U$ -test.
- Kruskal-Wallis test.

### Results

Women outnumbered men in this study sample, with highest percentage of them being married and unemployed. Only 5% of the nonorganic fatigue patients had a positive family history of psychiatric conditions (Table 1).

A statistically significant difference was found between nonorganic fatigue patients and organic fatigue patients as regards the psychiatric diagnoses (Table 2). The most common primary psychiatric diagnoses of the nonorganic fatigue group were depressive disorders (43%), somatization/hypochondriasis (31%), and anxiety disorders (27%) (Table 3). In the nonorganic fatigue group, 39% of patients had a major depressive disorder and 4% had dysthymia. As regards the anxiety disorders, 14% of patients had generalized anxiety disorder (GAD), 6% had panic disorders, and 3% had mixed anxiety depression. Moreover, 3% of patients of the nonorganic fatigue group were diagnosed with schizophrenia. In the group of anemic patients with fatigue, 10% of patients had a depressive disorder and 10% were diagnosed with anxiety disorders (Table 3).

The most common comorbid psychiatric diagnoses in the group of nonorganic fatigue patients were a major depressive disorder (10%) and somatization (7%). In the group of organic fatigue patients, 10% of patients had a comorbid major depressive disorder and 2% had a comorbid GAD (Table 4).

Table 5 shows that a statistically significant difference was found in terms of three types of fatigue (physical fatigue, reduced activity, and mental fatigue), with the levels being higher in the patients having organic fatigue than in those having nonorganic fatigue. However, there was no statistically significant difference found at the level of general fatigue and reduced motivation.

**Table 1 Family history of all patients of the study**

Family history	N (%)			Fisher's exact test	P-value
	Nonorganic fatigue (N=100)	Organic fatigue (N=50)	Total		
Positive	5 (5)	0 (0)	5 (3.3)	0.170	0.170
Negative	95 (95)	50 (100)	145 (96.7)		

**Table 2 Distribution of psychiatric diagnoses among all patients of the study**

Psychiatric disorder	N (%)		$\chi^2$	P-value
	Nonorganic fatigue (N=100)	Organic fatigue (N=50)		
No psychiatric disorder	0 (0)	40 (80)	109.374	0.000*
One psychiatric disorder	79 (79)	9 (18)		
Two psychiatric disorders	21 (21)	1 (2)		
Total	100 (100)	50 (100)		

\*High significance.

**Table 3 Distribution of primary psychiatric diagnoses among all patients**

Psychiatric diagnoses	N (%)		$\chi^2$	P-value
	Nonorganic fatigue (N=100)	Organic fatigue (N=50)		
Depressive disorders	43 (43)	5 (10)	121.679	0.000*
Major depressive disorder (bipolar disorder)	34 (34)	5 (10)		
Unipolar depression	5 (5)	–		
Dysthymia	4 (4)	–		
Anxiety disorders	23 (23)	5 (10)		
Generalized anxiety disorder	14 (14)	–		
Panic disorder	6 (6)	–		
Mixed anxiety depression	3 (3)	5 (10)		
Somatization/hypochondriasis	31 (31)	–		
Somatization	27 (27)	–		
Hypochondriasis	4 (4)	–		
Schizophrenia	3 (3)	–		

\*High significance.

**Table 4 Distribution of comorbid psychiatric diagnoses among all patients**

Psychiatric diagnoses	N (%)		$\chi^2$	P-value
	Nonorganic fatigue (N=100)	Organic fatigue (N=50)		
Depressive disorders	10 (10)	5 (10)	13.258	0.021
MDD	10 (10)	5 (10)		
Anxiety disorders	4 (4)	1 (2)		
Generalized anxiety disorder	3 (3)	1 (2)		
Panic disorder	1 (1)	–		
Somatization/hypochondriasis	7 (7)	–		
Somatization	7 (7)	–		

**Table 5 Comparison between nonorganic fatigue and organic fatigue patients as regards different types of fatigue**

Types of fatigue	N (%)		P-value
	Nonorganic fatigue	Organic fatigue	
General fatigue	93 (93)	50 (100)	0.9
Physical fatigue	61 (61)	49 (98)	0.00*
Reduced activity	70 (70)	49 (98)	0.00*
Reduced motivation	37 (37)	17 (34)	0.7
Mental fatigue	60 (60)	44 (88)	0.00*

\*High significance.

In the nonorganic fatigue group, as shown in Table 6, there was a positive correlation of the psychiatric diagnoses with four types of fatigue (physical fatigue, reduced activity, reduced motivation, and mental fatigue):

- (1) Physical fatigue was significantly higher in the somatization/hypochondriasis group.
- (2) Reduced activity was significantly higher in the anxiety disorders and somatization/hypochondriasis groups.

- (3) Reduced motivation was significantly higher in the schizophrenia and depressive disorders group.
- (4) Mental fatigue was significantly higher in the anxiety disorders and schizophrenia group.

In Table 6, we included only 82 of 100 patients, because we excluded patients having more than one psychiatric diagnosis in order to avoid contamination of the results.

As shown in Table 7, the organic fatigue patients (with and without psychiatric diagnosis) showed no statistically significant difference as regards the five types of fatigue (general fatigue, physical fatigue, reduced activity, reduced motivation, and mental fatigue).

There was a statistically significant correlation between the degree of severity of depressive disorders with reduced motivation and mental fatigue, whereas there was no statistically significant correlation between the degrees of severity of depressive disorders with general fatigue, physical fatigue, and reduced activity.

There was no statistically significant correlation between the degrees of severity of anxiety disorders in the patients as regards the different types of fatigue (Tables 8 and 9).

## Discussion

This study hypothesized that there is an underlying psychiatric morbidity in patients presenting with nonorganic fatigue. This study aims to provide information about the underlying psychiatric disorders among patients with nonorganic fatigue.

### Sociodemographic characteristics

In the present study, female participants outnumbered the male ones, with highest percentage of them being married and unemployed. Similar to these results, a community-based study by Taylor *et al.* (2003) found that individuals with chronic fatigue were significantly more likely to be female, middle-aged, married, and unemployed. Another study by Darbishire *et al.* (2003) found that fatigue is more common among women as well as among middle-aged and unemployed individuals with a past history of psychiatric disorders.

Arnold (2008) found that a significantly higher percentage of women experience severe fatigue and poor functional capabilities during their youth, which was significantly associated with childhood neglect and sexual abuse.

As regards sex and marital status, it is frequently reported that Arab women in general and Egyptian women in particular are more vulnerable to psychological disorders compared with men. Several theories have been proposed to explain the increased somatic symptoms reported among women: it may be because of the higher prevalence of anxiety disorders and depression in women, which is strongly related to symptom reporting. The other factors may be sex-based differences in social roles

**Table 6 Correlation of psychiatric diagnoses with types of fatigue among nonorganic fatigue patients**

Psychiatric diagnosis	Types of fatigue [median (range)]				
	General	Physical	Reduced activity	Reduced motivation	Mental
Depressive disorder	18 (14–20)	14 (7–20)	16 (8–20)	17 (8–20)	15 (10–20)
Anxiety disorder	19 (18–20)	16 (6–20)	18 (9–20)	8 (5–17)	19 (11–20)
Somatization/hypochondriasis	19 (14–20)	19 (14–20)	18 (13–20)	7 (4–20)	12 (6–20)
Schizophrenia	19 (19–20)	14 (11–17)	14 (13–16)	19 (19–19)	18 (17–20)
P-value	0.78	0.00*	0.04	0.00*	0.00*

\*High significance.

**Table 7 Correlation of psychiatric diagnoses with types of fatigue among organic fatigue patients**

Psychiatric diagnoses	MDFI [median (range)]				
	General fatigue	Physical fatigue	Reduced activity	Reduced motivation	Mental fatigue
No psychiatric diagnoses	19 (16–20)	19 (14–20)	19 (13–20)	9 (3–20)	19 (9–20)
Depressive disorders	19 (18–20)	19 (17–20)	20 (19–20)	17 (6–19)	18 (17–20)
Anxiety disorders	20 (17–20)	20 (18–20)	18 (17–20)	17 (4–20)	20 (19–20)
P-value	0.561	0.686	0.178	0.806	0.080

MDFI, multi dimensional fatigue inventory.

**Table 8 Correlation of the severity of depressive disorders with types of fatigue**

Severity of depressive disorder	N (%)				
	General fatigue	Physical fatigue	Reduced activity	Reduced motivation	Mental fatigue
Mild	10 (19.6)	6 (22.2)	6 (17.1)	2 (18.2)	1 (9.1)
Moderate	1 (37.3)	11 (40.7)	16 (45.7)	14 (73.7)	9 (47.4)
Severe	22 (43.1)	10 (37)	13 (37.1)	15 (68.2)	10 (81.8)
Total	33 (100)	27 (100)	35 (100)	31 (100)	20 (100)
P-value	0.15	0.72	0.14	0.006*	0.000*

\*High significance.

**Table 9 Correlation of the severity of anxiety disorders with types of fatigue**

Severity of anxiety disorder	N (%)				
	General fatigue	Physical fatigue	Reduced activity	Reduced motivation	Mental fatigue
Mild	1 (5)	0	1 (5.9)	1 (5.3)	1 (5)
Moderate	8 (40)	5 (45.5)	6 (35.3)	7 (36.8)	9 (45)
Severe	11 (55)	6 (54.5)	10 (58.8)	11 (57.9)	10 (50)
Total	20 (100)	11 (100)	17 (100)	19 (100)	20 (100)
P-value	0.49	0.56	0.34	0.23	0.62

and responsibilities, lower thresholds for seeking health-care, and amplification of the somatic symptoms.

With regard to the educational level, other studies revealed similar results. Fink *et al.* (1999) and Alqahtani and Salmon (2008) reported that more than the half of their studied samples had received limited education (i.e. finished intermediate school or less). A tendency for a significant difference was found in terms of the education level: less educated patients were more likely to develop psychological disorders.

The present study revealed that fatigue is more commonly seen in unemployed, married women, with a high association with psychiatric comorbidities, mainly depression, somatization, and anxiety disorders. These results are more beneficial in the field of liaison psychiatry as they increase the awareness of physicians

on the fact that fatigue is a common somatic symptom in our culture and is not only caused by medical conditions but also by psychological and psychiatric etiologies that may affect the quality of life of such patients.

### Psychiatric morbidity

#### Organic fatigue

As regards patients experiencing organic fatigue, the results of the present study show that the most prevalent psychiatric diagnoses were a major depressive disorder (10%) and mixed anxiety depression (10%). Further, 12% of patients were suffering from comorbid conditions. Comorbidity diagnoses were mostly a major depressive disorder (10%) and to a lesser extent a GAD (2%).

This study also revealed that physical fatigue, reduced activity, and mental fatigue were higher among organic

fatigue patients than among nonorganic fatigue patients, implying that chronic anemia, through its pathology (defective oxygen transportation, ATP production, DNA synthesis, mitochondrial function, and protection of cells from oxidative damage), will lead to the development of both peripheral and central fatigue, which are represented as physical fatigue and reduced activity on one hand and as mental fatigue on the other.

The underestimation of the score on the general fatigue subscale may be attributed to its role in measuring the comprehensive aspects of fatigue (screening scale). This attribution was supported by Smets *et al.* (1995) and Hagelin *et al.* (2007).

Haggag and Soliman (1997) reported that chronic renal disease (another organic cause of fatigue) had a high correlation coefficient with physical fatigue and reduced activity and, to a lesser extent, with reduced motivation. In the chronic medically ill group, the reduced activity and/or motivation might be consequences of their physical fatigue.

Moreover, Lou *et al.* (2001) examined patients with Parkinson's disease frequently complaining of fatigue. These patients scored higher in all five dimensions of fatigue including general fatigue, physical fatigue, reduced motivation, reduced activity, and mental fatigue.

A study carried out by Breslin *et al.* (1998) showed that, in patients with chronic obstructive pulmonary disease, depression was significantly correlated with the general fatigue and mental fatigue subscales scores but not with physical fatigue.

In another study, Wessely and Powell (1989) found physical fatigue and fatigability to be prominent in chronic fatigue syndrome and depressive and neuromuscular disorders, implying that subjective complaints of physical fatigue have little use diagnostically. This is not the case with mental fatigue, which is equally common in both depression and chronic fatigue syndrome but only occurs in peripheral neuromuscular disorders if there is a coexisting psychiatric illness. Mental fatigue is observed in chronic fatigue syndrome irrespective of the psychiatric disorder, suggesting that it is not simply due to lack of diagnostic precision.

#### *Nonorganic fatigue*

A study by Nater *et al.* (2009) revealed that current and lifetime psychiatric disorders commonly accompany chronic fatigued patients in the general population. In their study, most chronic fatigued patients with comorbid psychiatric conditions had not sought appropriate help during the past 6 months. These results demonstrate an urgent need to address psychiatric disorders in the clinical care of any chronic fatigue cases.

In the present study, the most prevalent psychiatric diagnoses, among the patients presenting with nonorganic fatigue, were depressive disorders (43%), somatization disorders (31%), and anxiety disorders (27%). A relatively high percentage of patients suffered from another psychiatric comorbidity (21%); the most common comorbid psychiatric diagnoses in the group of nonorganic

fatigue were major depressive disorder (10%), somatization disorder (7%), and GAD (3%).

An Egyptian study carried out by Haggag and Soliman (1997) revealed that a psychiatric condition was the most significant factor contributing to fatigue. Another study by Rashed *et al.* (2001) estimated fatigue to be the most frequent symptom in Egyptian patients presenting with somatoform disorders; most of these patients also suffered from depression or anxiety disorders. In the United Arab of Emirates, depression was found to be strongly associated with fatigue in women only (its prevalence in females was 45.8%) (McIlvenny *et al.*, 2000).

In a study carried out by Okasha and Okasha (1999), fatigue represented 90% of the somatic symptoms of a sample of Egyptian patients; depressive disorders represented 32% of the inpatient group and 25% of the outpatient group. In Egyptian patients, depression seems to be masked by multiple somatic symptoms, which occupy the foreground, and the affective component of their illness recedes to the background. This may be because of the greater social acceptance of physical complaints compared with psychological complaints, which are either not taken seriously or are believed to be cured by rest or extra praying. The increase in somatic symptoms can be explained by the seriousness with which people in a given culture view psychological stresses compared with physical illness (Okasha, 2004).

Taylor *et al.* (2003) studied chronic fatigue and socio-demographic characteristics as predictors of psychiatric disorders in a community-based sample. They reported that patients with chronic fatigue demonstrated significantly higher rates of current (32%) and lifetime (60%) mood disorders when compared with controls (7% for current and 22% for lifetime) and significantly higher rates of current (29%) and lifetime (36%) anxiety disorders when compared with controls (10% for current and 15% for lifetime).

Several explanations have been suggested for these associations:

- (1) The overlapping criteria for chronic fatigue and psychiatric disorders, especially depression.
- (2) A causal association, that is, fatigue could be viewed as a neurotic symptom, and patients with unexplained chronic fatigue could suffer from a primary psychiatric disorder,
- (3) Viewing the psychiatric symptoms as a secondary reaction to a chronic physical illness (reverse causality).
- (4) Occurrence of confounding effects if the common factors contribute to the etiology of both psychiatric disorders and chronic fatigue (Hadlandsmyth and Vowles, 2009).

#### *Differences in nonorganic fatigue from different psychiatric diagnoses*

In this study, all dimensions of fatigue were positively correlated to the psychiatric diagnoses of nonorganic

fatigue patients, except for those with general fatigue. Physical fatigue was significantly higher in somatoform disorders; reduced activity was significantly higher in patients with anxiety disorders and somatoform disorders. Although reduced motivation was significantly higher in patients with schizophrenia and depressive disorders, mental fatigue was significantly higher in those with anxiety disorders and schizophrenia.

Skapinakis *et al.* (2000) reported that patients from well-developed countries are more likely to report fatigue in response to direct questions but are less likely to present with fatigue to physicians compared with patients from less-developed countries. In addition, in less-developed countries, the complaint of fatigue might be an indicator of a hidden psychiatric morbidity. In contrast, in more-developed countries, although syndromes of fatigue are common, they should not be always considered as evidence of an unmet need as they might represent a common expression of psychosocial distress.

#### *Depression and nonorganic fatigue*

Reduced motivation was significantly higher in depressed patients. There was a positive correlation between the degree of severity of depressive disorders with reduced motivation and mental fatigue, whereas there was a negative correlation between the severity of depressive disorders with general fatigue, physical fatigue, and reduced activity.

In the United Arab of Emirates, McIlvenny *et al.* (2000) reported that depression was strongly associated with the female sex and that it caused mental not physical fatigue. In the Danish general population, Watt *et al.* (2000) found that the general fatigue and physical fatigue scales showed the highest fatigue levels, whereas the reduced motivation scale showed the lowest levels; the respondents with depression had high fatigue scores on all scales, whereas those with a chronic somatic disease had an independent direct effect on mental fatigue. However, for the rest of the scales, the effect of somatic disease depended on age, sex, and/or whether the person was living alone.

Lavidor *et al.* (2002) found that depression levels were positively and significantly related to all aspects of fatigue, except fatigue that responds to rest and sleep (i.e. tiredness). When high levels of depression were coupled with somatization, fatigue complaints were more severe. Somatization and depression had interactive effects on fatigue – somatization increased the fatigue level for relatively dysphoric individuals.

In comparison with our results, Lin *et al.* (2009) found that depression was highly correlated with reduced motivation but only moderately correlated with other fatigue subscales. A study carried out by Schwarz *et al.* (2003) showed that the five aspects of the MFI were correlated with the hospital anxiety and depression scale and the global quality of life scale.

#### *Anxiety and nonorganic fatigue*

In the present study, there was a negative correlation between the degrees of severity of anxiety disorders in all subtypes of nonorganic fatigue patients.

In contrast, McIlvenny *et al.* (2000) reported that fatigue was strongly associated with anxiety, especially in young adults (its prevalence in men was 25.8% and was 47.1% in women), whereas patients with an anxiety disorder have affections of both physical and mental fatigue.

Kaiya *et al.* (2008) used the MFI to assess the characteristics of fatigue in panic disorder patients. They found the scores for general fatigue and reduced activity to be significantly higher among patients compared with controls. A study carried out by Lin *et al.* (2009) revealed that the trait anxiety score had stronger correlations compared with state anxiety with all subscale scores.

Non-western cultures emphasize on social integration rather than autonomy. When affiliation is more important than achievement, how one appears to others becomes vital and shame becomes more of a driving force than guilt. In the same way, physical illness and somatic manifestations of psychological distress are more acceptable and likely to evoke a caring response when compared with vague complaints of psychological symptoms, which can be either disregarded or considered a stigma of being soft or, even worse, insane (Okasha *et al.*, 1977; Gawad and Arafa, 1980).

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### Conflicts of interest

There are no conflicts of interest.

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