

## Original Article

# Prevalence and Patterns of Psychiatric Co-morbidity among Adult Medical Inpatients: A Cross-sectional Study

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**ABSTRACT**

**Objective:** Psychiatric and medical conditions tend to co-occur, with each potentially complicating the course and treatment outcome of the other. However, the data regarding psychiatric co-morbidity among medical patients in Saudi Arabia is scarce. This study was designed to assess the prevalence and patterns of psychiatric co-morbidity in adult medical inpatients and to look at the rates of various psychiatric disorders by type of medical illness.

**Design:** Cross-sectional observational study

**Settings:** The King Khalid Hospital Majmaah and the Zulfi General Hospital from November 2016 to February 2017

**Subjects:** This study was conducted among 400 medical inpatients that were selected by convenience sampling

**Interventions:** The General Health Questionnaire was administered as a screening tool to identify "cases". All other

participants were considered "non-cases". The identified cases then had the Mini International Neuropsychiatric Interview Plus and the Hospital Anxiety and Depression Scale questionnaires administered.

**Main outcome measure(s):** The prevalence of psychiatric disorders in the sample was analyzed using Statistical Package for Social Sciences version 23 software.

**Results:** Psychiatric disorders were present in 28% of the included medical inpatients. In general, chronic diseases were associated with higher psychiatric co-morbidity.

**Conclusions:** Psychiatric disorders are prevalent among medical inpatients. Identifying psychiatric disorders among in-patients is important because appropriate treatment can improve treatment outcomes for the co-morbid medical illness.

**KEY WORDS:** adjustment disorder, anxiety, depressive disorder, psychiatric disorders

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**INTRODUCTION**

Psychiatric co-morbidity refers to the co-occurrence of psychiatric and physical disorders in the same person, regardless of the chronological order in which they occurred or the causal pathway linking them. The mind was once seen as the domain of religion, with the body seen as the concern of physicians, and this distinction led to the separation between psychiatric and physical health. However, research now shows that psychological stress can affect the body at the cellular and molecular level, and thereby diminish a person's physical health and quality of life<sup>[1,2]</sup>. This is particularly important when one considers that psychiatric co-morbidity is prevalent in medical patients<sup>[3]</sup>. Moreover, the negative implications of this untreated co-morbidity have been documented

in relation to the prognosis of the medical condition, the patient's quality of life, and the costs of medical treatment<sup>[4]</sup>. It is, therefore, essential that we understand the nature and prevalence of psychiatric disorders among physically ill patients.

People with physical illness have at least twice the rate of psychiatric illness than the general population. The most common co-morbidities are depressive and anxiety disorders, which are present in approximately one-third of medical patients. In addition to the personal suffering of the patient, psychiatric co-morbidity is strongly associated with increase in disability, healthcare costs, and mortality risk<sup>[5]</sup>.

Psychiatric co-morbidity can also affect treatment adherence. Obviously, diagnosing psychiatric disorders is insufficient to improve outcomes if used in

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isolation, but if the recognition of a psychiatric disorder is closely linked to the initiation of adequate treatment, patient outcomes may improve significantly. Despite this clinical significance, only 30 - 50% of patients with psychiatric co-morbidity are identified by medical doctors<sup>[6]</sup>. Few hospitals have any formal services to meet the psychological needs of their patients, instead relying on a mixture of informal provision in some areas and neglect in others.

To date, very few studies have investigated the true prevalence of psychiatric disorders among hospitalized patients in the Kingdom of Saudi Arabia and neighboring countries<sup>[7,8]</sup>. Hence, in the present study, the aim was to expand our knowledge of psychiatric co-morbidity in medical patients. Such research may expand efforts to recognize and treat psychiatric co-morbidity.

## SUBJECTS AND METHODS

This was a cross-sectional, questionnaire-based study of in-patients at The King Khalid Hospital, Majmaah, and in the Zulfi General Hospital from November 2016 to February 2017. Convenience sampling was used to obtain a sample of 400 participants. The study was approved by the ethical committee of Majmaah University, and written informed consent was a requirement of inclusion.

For inclusion, individuals were required to be admitted to medical and specialty wards, aged between 18 and 65 years, able to read and write Arabic, and willing to participate in the study. Patients were excluded if they were critically ill or were unwilling to participate in the study.

A general proforma was prepared to collect the socio-demographic details and clinical characteristics of each subject. The General Health Questionnaire (GHQ) was used to screen patients, and those who had a score of five and above were considered "cases." These patients were then interviewed using the Mini International Neuropsychiatric Interview (MINI Plus) and the Hospital Anxiety Depression Scale (HADS). The MINI Plus is a brief, structured interview used to identify major Axis I psychiatric disorders, as defined by the DSM-IV and the ICD-10. It is a more detailed version of the MINI and can be administered in a shorter period. MINI Plus assesses the presence of DSM-IV mood disorders, anxiety disorders, somatoform disorders, substance abuse disorders, psychotic disorders, eating disorders, conduct disorder, and adjustment disorder. Psychometric examination of the MINI-Plus shows acceptable test-retest and inter-rater reliability. The MINI-Plus was selected over other screening instruments because of its ease of administration, the relatively brief training needed for its use, its broad coverage, and its reported

quick administration time. The mean duration of the interview was 21 minutes. A validated translated version of MINI plus was used in this study<sup>[9]</sup>.

The HADS scale was administered to all subjects who were diagnosed as having psychiatric disorders using MINI Plus. For patients with more than one medical diagnosis, the reason for the current admission was taken as the main diagnosis. Acute medical illness was defined as that less than one month, while chronic medical illness was defined as that more than one month.

A previously validated Arabic copy of the HADS-anxiety (HADS-A) was used in this study<sup>[10]</sup>. The HADS is a 14-item questionnaire that consists of seven items for HADS-A and seven items for depression (HADS-D). Anxiety and depression items are loaded as separate factors. The anxiety and depression sub-scales shared 54% of the explained variance. These were then scored and the data were entered for analysis.

Data were analyzed using IBM SPSS, Version 23 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to describe the sample characteristics. Percentages and frequencies are used to describe the distribution of psychiatric disorders across various medical illnesses, socio-demographic variables, and clinical characteristics. For group comparisons, Pearson's chi-square tests or Fischer's exact tests were used for categorical variables and independent t-tests were used for continuous variables. The level of statistical significance was set at  $p < 0.05$ .

## RESULTS

Table 1 shows the distribution of the sample by socio-demographic variables. Participants were aged 39.24 years (range: 18 - 65 years) and most were males (68%). Overall, the highest percentages of psychiatric disorders were seen in those aged 18 - 30 years (41.4%), women (40%, compared to 29% in men), single patients (43.4%), and the unemployed (60%). There were equivalent numbers with acute (51%) and chronic (49%) medical illness, but the rate of psychiatric disorders in the chronic group (38.8%) was more than double that in the acute group (17.6%).

The test results by illness duration were compared by the Pearson chi-square test or Fisher's exact test and are summarized in Table 2. The GHQ score ( $t = 3.57$ ,  $p = 0.001$ ), HADS-D score ( $t = 2.09$ ,  $p = 0.045$ ), and MINI diagnoses ( $p = 0.042$ ) were all significantly higher in patients with chronic illness compared to those with acute illness. Anxiety, depression, adjustment disorder, and mixed anxiety and depression were all significantly higher in patients with chronic illness, and psychiatric disorders were more common in those with a family history of psychiatric illness (30%) than in those who did not (27.6%).

**Table 1:** Distribution of sociodemographic variables across the sample

Medical inpatients (%) (n = 400)	Non-cases n = 268, Mean(SD) / n(%)	Cases n = 132, Mean(SD) / n(%)	t/ $\chi^2$	p-value
Age (years)				
18-30	68 (58.6)	48 (41.4)	14.84	0.001
Mean(SD)=39.21(13.21) Range: 18 – 65				
31-50	160 (78.4)	44 (21.6)		
51-65	60 (75)	20 (25)		
Sex			4.95	0.026
Male	192 (70.8)	80 (29.2)		
Female	76 (59.4)	52 (40.6)		
Education			4.777	0.091
Primary	56 (20.9)	40 (30.3)		
Secondary	120 (44.8)	48 (36.4)		
College	92 (34.3)	44 (33.3)		
Marital status			Fisher's exact p = 0.015	
Single	52 (19.4)	40 (30.3)		
Married	200 (74.6)	80 (60.6)		
Widow/widower/ divorced	16 (6)	12 (9.1)		
Residence			0.626	0.428
Urban	48 (17.9)	28 (21.2)		
Rural	220 (82.1)	104 (78.8)		
Socioeconomic status			Fisher's exact p = 0.027	
LSES	112 (41.8)	72 (54.5)		
MSES	152 (56.7)	60 (45.5)		
USES	4 (1.5)	0 (0)		
Occupation			Fisher's exact p = 0.031	
Self employed	200 (74.6)	92 (69.7)		
Unemployed	8 (3)	12 (9.1)		
Employed	60 (22.4)	28 (21.2)		
Duration of current medical illness			0.001	
Less than a month	168 (82.4)	36 (17.6)		
More than a month	120 (61.2)	76 (38.8)		
Family history of psychiatric illness			P = 0.55 $\chi^2 = 0.340$	
Absent	204 (72.9)	76 (27.1)		
Present	84 (70)	36 (30)		

The General Health Questionnaire was used to screen patients, and those who had a score of five and above were considered cases.

The distribution of medical illness by psychiatric diagnosis is shown in Table 3. Infections (53%) were the most common reason for admission, but gastrointestinal (12%), respiratory (8%), cardiovascular (7%), neurological (7%), endocrine (6%), and renal (4%) disorders were other prominent reasons. By contrast,

only 1% were admitted because of cancer and only 2% were admitted because of attempted suicide. The prevalence of each major psychiatric illness identified by the MINI Plus is also shown in Table 3 (overall prevalence, 28%). Of these, most had either a depressive disorder (14%) or an anxiety disorder (9%). Adjustment

**Table 2:** Comparison of test results by illness duration

Duration	GHQ	HADS-A	HADS-D	MINI diagnosis			
				Anxiety Disorder	Depressive Disorder	Adjustment Disorder	Mixed Anxiety Depression
Short duration n=196 Mean (SD)/n(%)	2.86 (3.09)	6.92 (2.78)	6.58 (2.06)	16 (7.8)	12 (5.9)	4 (2)	4 (2)
Long duration n=204 Mean (SD)/n(%)	5.82 (5.03)	7.10 (2.32)	9.33 (4.26)	20 (10.2)	44 (22.4)	12 (6.1)	0 (0)
t/ $\chi^2$	3.57	1.98	2.09	-	-	-	-
p	0.001**	0.844	0.045*	Fisher's exact p = 0.042*			

\*p < 0.05, \*\*p < 0.01 (2-tailed)

GHQ: General Health Questionnaire; HADS-A: Hospital Anxiety Depression Scale-Anxiety; HADS-D: Hospital Anxiety Depression Scale-Depression; MINI: Mini International Neuropsychiatric Interview

Acute medical illness was defined as that less than one month, while chronic medical illness was defined as that more than one month.

**Table 3:** Distribution of psychiatric disorders by medical illness

Medical diagnosis categories	No MINI Plus diagnosis F (%) (n = 288)	MINI Plus Diagnosis F (%) (n = 112)	f (% within Medical Diagnosis Categories) (n = 112)			
			Depressive disorder	Anxiety Disorder	Adjustment Disorder	Mixed Anxiety Depression
Cardiovascular	24 (85.7)	4 (14.3)	4 (14.3)	0 (0)	0 (0)	0 (0)
Respiratory	24 (75)	8 (25)	4 (12.5)	4 (12.5)	0 (0)	0 (0)
Endocrine	20 (83.3)	4 (16.7)	0 (0)	4 (16.7)	0 (0)	0 (0)
Infection	152 (71.7)	60 (28.3)	20 (9.4)	24 (11.3)	12 (5.6)	4 (1.9)
Neurological	16 (57.1)	12 (42.9)	8 (28.6)	4 (14.3)	0 (0)	0 (0)
Gastrointestinal	36 (75)	12 (25)	8 (16.7)	4 (8.3)	0 (0)	0 (0)
Renal	4 (25)	12 (75)	8 (50)	0 (0)	4 (25)	0 (0)
Cancer	4 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Others	8 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

MINI: Mini International Neuropsychiatric Interview

Psychiatric disorders were diagnosed based on the MINI Plus

disorder and mixed anxiety and depression were present in 4% and 1% of the sample, respectively.

Psychiatric disorders were present at the following rates by type of medical illnesses: 75% (12/16) of patients with renal disorders, 42.9% (12/28) with neurological disorders, 39.5% (60/212) with infections, 25% (8/32) with respiratory disorders, 25% (12/48) with gastrointestinal disorders, 16.7% (4/24) with endocrine disorders, and 14.8% (4/28) with cardiovascular disorders. Four patients with psychiatric illness had cancer. Table 3 also shows that 20% (12/60) of patients suffering from infections had an adjustment disorder. It may also be significant to note that 50% (8/16) of patients suffering from a renal disorder had a comorbid depressive disorder and that 25% (4/16) had an adjustment disorder. Anxiety disorders were also more prevalent than other psychiatric illnesses in patients with endocrine disorders (16.7%; 4/24) and infections (11.32%; 24/212), whereas depression and anxiety disorders were present at equivalent rates among patients with respiratory disorders (12.5%). Only four patients suffering from infection had mixed anxiety and depression.

Table 4 depicts the HADS depression and anxiety scores for cases. As shown, the HADS depression score only indicated that "less than mild" depressive features

were present for most cases (45.5%). By contrast, mild features were seen in 27.3%, moderate features in 24.2%, and severe features in 3%. Similarly, most patients only had anxiety features considered less than mild (57.6%), with mild and moderate anxiety features present in 33.3% and 9.1% of the sample, respectively.

Table 4 shows the results when HADS-A and HADS-D scores were cross-tabulated with psychiatric disorders (Table 4). The HADS-A score for depressive disorders was either less than mild (85.7%) or mild (14.3%); for anxiety disorders, it was mild (66.7%) or moderate (33.3%). Concerning adjustment disorders, 50% each had less than mild and mild scores. The HADS-D score for depressive disorders was either mild (50%), moderate (42.9%), or severe (7.1%); however, all cases of anxiety had depression scores in the less than mild category. Concerning adjustment disorders, most had moderate scores (50%), but 25% each had less than mild or mild scores. Mild HADS-A and HADS-D scores were seen for patients with mixed anxiety and depression.

## DISCUSSION

The key finding of this study was that 28% of medical inpatients had a psychiatric disorder, as diagnosed by using the MINI Plus questionnaire. However, in a

**Table 4:** HADS Depression and Anxiety Scores for subjects who scored >5 on the GHQ

HADS/A HADS/D	Degree of severity	Medical inpatients f (%) (n = 132)	HADS Depression Score f (%) (n = 112)			
			Depressive disorder	Anxiety Disorder	Adjustment Disorder	Mixed Anxiety Depression
HADS Depression Score	Less than mild	60 (45.5)	0 (0)	36 (100)	4 (25)	0 (0)
	Mild	36 (27.3)	28 (50)	0 (0)	4 (25)	4 (100)
	Moderate	32 (24.2)	24 (42.9)	0 (0)	8 (50)	0 (0)
	Severe	4 (3)	4 (7.1)	0 (0)	0 (0)	0 (0)
HADS Anxiety Score	Less than mild	76 (57.6)	48 (85.7)	0 (0)	8 (50)	0 (0)
	Mild	44 (33.3)	8 (14.3)	24 (66.7)	8 (50)	4 (100)
	Moderate	12 (9.1)	0 (0)	12 (33.3)	0 (0)	0 (0)

study conducted in Denmark, a considerably higher prevalence of psychiatric disorders was reported in medical inpatients (38.7%)<sup>[11]</sup>. Whereas, our findings are similar to the prevalence of psychiatric disorders reported in medical inpatients in Nigeria (30.6%)<sup>[12]</sup>. Another study conducted in Kenya had a higher prevalence rate (42.6%), possibly because they considered patients from all medical settings (not only inpatients)<sup>[13]</sup>. In general though, research consistently indicates that psychiatric conditions are more common in medical settings, with up to 40% of medical and surgical inpatients possibly requiring treatment.

The common psychiatric disorders in the present study were depression, anxiety, and adjustment disorder, similar to the finding in other studies<sup>[14]</sup>. In the present sample, depressive disorder was the most prevalent of the psychiatric disorders (14%), which is consistent with the results of studies indicating that depression is common in medical wards and that anxiety is common in emergency wards<sup>[15]</sup>.

Infections (*e.g.*, varicella, brucellosis, influenza) were the most common reasons for admission (53%) in the present sample, with other illnesses accounting for fewer than 15% each. Nevertheless, gastrointestinal disorders (13%) (acid-peptic disease, cirrhosis, pancreatitis) and respiratory disorders (8%) (bronchial asthma, chronic obstructive pulmonary disease) were also common. This is at variance with other studies regarding the distribution of medical illnesses, because these show that cardiovascular diseases are usually the reason for most admissions<sup>[16]</sup>. However, observed variance could be dependent on the sampling method, catchment area of the hospital, available healthcare facilities, type of center (primary, secondary, or tertiary), treatment-seeking behavior, and economic or other related factors<sup>[17]</sup>.

The duration of medical illness was clearly associated with the presence of psychiatric disorders in our study. Patients who had chronic medical illness had a significantly higher rate of psychiatric co-morbidity (38.8%), with significantly higher GHQ ( $p = 0.001$ ) and HADS ( $p = 0.045$ ) scores in this group. This result is consistent with many studies showing that as a physical illness becomes more chronic, the likelihood of developing a co-morbid psychiatric illness increases. This may reflect the association of chronic medical disorders with increasing emotional and financial burdens on the patient and their family<sup>[18,19]</sup>.

Patients with renal disorders accounted for most medical cases with co-morbid psychiatric disorders. This may reflect the fact that renal disorders are usually chronic, requiring multiple admissions. Indeed, most of the patients with renal disorders in the present sample had illness durations more than one month, which could have affected the presence

or absence of psychiatric disorders (75%). It was also shown that neurological disorders were associated with high psychiatric co-morbidity in the present study (42.9%), which is consistent with studies indicating co-morbidity rates of 75% and 39.6%<sup>[19,20]</sup>. In addition, although four patients with cancer did not have any psychiatric illness in this study, and although other research has shown that co-morbidity rates are usually high for cancer<sup>[21,22]</sup>, the very small sample of patients with cancer in this study precludes any meaningful conclusions. Adjustment disorders were the most commonly seen co-morbidity in patients with infections, and were mainly of the depressive type (50%). A similar study showed an association between depressive symptoms and human immunodeficiency virus/acquired immunodeficiency syndrome<sup>[23]</sup>. Regarding respiratory disease, 25% had co-morbid psychiatric illness in this study, which is similar to results from India where there was 28% psychiatric co-morbidity in patients with chronic obstructive pulmonary disease<sup>[24]</sup>.

Major depression is a frequent psychiatric presentation of patients with endocrine disorders<sup>[25,26]</sup>, which is in contradiction to the high co-morbidity rate for anxiety disorders (16.7%) in this study. The small sample size, geographic variation and social cultural factors of the participants in this study could be the influential factors for this variation. Consistent with other studies, a co-morbidity of 30.8% was shown for gastrointestinal disorders, with anxiety and depression present in 23.1% and 7.7%, respectively<sup>[27]</sup>. Diseases of the cardiovascular system (*e.g.*, hypertension, cardiomyopathies) have been associated with psychological dysfunction, such as anxiety states, and this research showed that cardiovascular diseases were often associated with co-morbid anxiety (14.3%)<sup>[28]</sup>.

Medical inpatients in this sample tended to have mild psychiatric disorders, which is consistent with the results of a Kenyan study, indicating that most co-morbid psychiatric disorders may only be mild<sup>[29]</sup>. Despite this mild nature, psychiatric disorders should still be considered an important factor when assessing prognosis and treatment outcomes. This study also highlighted the fact that specific medical conditions and chronic conditions have higher rates of psychiatric co-morbidity, indicating that such groups should be identified for regular psychiatric evaluation.

However, it should be noted that this study employs a cross-sectional design with convenience sampling method, which has its own limitations. The sample size was relatively small and was taken from a general hospital setting, in which most admissions were to general medical wards rather than specialty wards. Therefore, psychiatric co-morbidity was not adequately documented among patients suffering

from malignancies and similar conditions, and this should be addressed in future research. Equally, such research should include emergency wards so that the prevalence of co-morbid psychiatric conditions can be assessed in acute conditions.

## CONCLUSION

Based on this observational cross-sectional study, it can be concluded that psychiatric illness was prevalent enough among medical inpatients to warrant clinical attention. Therefore, consultation-liaison psychiatry should be encouraged, specific training should be given to help medical doctors identify psychiatric conditions, and psychiatric care should be administered at the same time as medical treatment when psychiatric comorbidity is identified. In particular, groups at high risk should be screened periodically, and a holistic approach of treating mind and body should be emphasized. Future research is needed to confirm the findings of this study in a broader range of inpatient settings and hospitals.

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