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Prevalence and gender differences in psychiatric disorders and DSM-IV mental disorders: a population-based study

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Abstract

Background: The early diagnosis of psychiatric disorders is critical as it improves the chance of recovery for patients. The aim of this study was to determine gender disparities in psychiatric and mental disorders in adult persons and to examine the validity of the 28-item General Health Questionnaire (GHQ-28; Persian version) in the diagnosis of patients with suspected psychiatric disorders, along with receiver operating characteristic (ROC) analysis. **Materials and Methods:** The cross-sectional study was conducted using cluster random sampling method in three steps. Subjects were screened by GHQ-28 and then evaluated by Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR) for diagnosis/classification of mental disorders. Chi-square test and independent t-test were used for statistical analysis. The ROC curve was used to assess cut-off points. **Results:** Of the 763 participants (aged 15 and above), 25.8% of responders demonstrated characteristics of psychological distress; the prevalence in males and females were 20.9% and 29.8%, respectively. The common mental disorders in males were anxiety disorder (18.2%), followed by any major depressive disorder (MDD) (17.4. %), and compulsive disorder (10.0%). In females, the common mental disorders were anxiety disorder (23.6%), followed by any MDD (22.7%), compulsive disorder (13.9%), phobia disorder (10.4%) and psychotic disorder (6.1%). ROC analysis showed that 91.7% of suspected persons had a mental disorder as assessed by DSM-IV-TR.

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Conclusion: The present study verifies the validity of the Persian version of the GHQ-28 as a screening tool to determine psychiatric disorders in persons of age 15 and above. The rate of psychiatric disorders in this study is higher than the mean national rate.

Keywords

DSM-IV-TR, Gender, General health questionnaire, Mental disorders, Prevalence, Psychiatric disorders

Introduction

Screening programs are the key element to monitor and achieve mental health (Andrade et al., 2002; Blum and Nelson-Mmari, 2004). Caring of people with mental disorders can help improve their well-being (Jason B. Luoma et al., 2002). It is estimated that in 2030 mental disorders will become the second leading cause of burden of disease worldwide; thus, the disability-adjusted life years (DALYs) associated with mental disorders is expected to increase. Among mental disorders, depression and anxiety are more the two most prevalent (Nock et al., 2010). For mental disorders, co-morbidity is a prognostic factor for some outcomes, according to previous findings (Veisani et al., 2017). Indeed, 90% of people who die from suicide have had a diagnosable mental disorder (Halvorsen et al., 2011). The prevalence of mental disorders varies in populations due to differences in sampling methods, interview techniques, employed tools and diagnostic classifications (Veisani et al., 2017).

Three nationwide studies have been done to estimate the prevalence of mental disorders in Iran in the last decade. Noorbala *et al.*, in 1999, enrolled 35,014 participants in his study; it was reported that the prevalence rate of mental disorders was 20.1%; the lowest prevalence was reported in the Yazd province (1.7%) and the highest prevalence was seen in the Chaharmahal and Bahkhtiari provinces (38.9%) (Noorbala A.A and S., 2015). In two other studies, conducted by Mohammadi et al. in 2001 and Rahimi et al. in 2011, the prevalence rates of mental disorders were reported as 17.1% and 23.6%, respectively (Mohammadi et al., 2005; Rahimi-Movaghar et al., 2014). The reason for the high prevalence was unclear. However, some significant factors included gender (higher prevalence in females) and urban living (Mohammadi et al., 2003; Noorbala et al., 2004).

The Ilam province (where the present study took place) has one of the highest rates of depression and suicide among the 31 provinces in Iran (Taherifard et al., 2013; Veisani et al., 2016). In this study, the aim was to determine the efficacy of

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diagnosis of psychiatric and mental disorders (based on GHQ questionnaire and DSM-IV-TR classification) and if there were any gender differences.

Materials-Methods

Study Design

In this current cross-sectional study, we administered screening and clinical interview tools to evaluate the mental health status of responders. The study was constructed in two separate stages; in the first stage, all participants were evaluated using the GHQ-28 (*detailed in supplement*) by 20 trained clinical psychologists and in the second stage, suspected responders were evaluated by structured psychiatric interview to diagnose DSM-IVTR mental disorders. This study was undertaken with the approval of the Ethical Committee of the Ilam University of Medical Sciences (code: ir.medilam.rec.1395.135).

Samples

The population of Ilam province, according to statistics provided by the health system, was 623,235 in 2016; 80% of the population live in urban areas. According to initial estimates, 763 subjects or residents (aged 15 years and older) were selected from urban settings. Subjects were enrolled using the clustered random sampling method in three steps. In the first step, the percentage of samples from total samples in each city was determined. In the second step, clusters of geographic regions were selected. In the final step, from each cluster, 2 persons (15 and more year's age) were selected and enrolled.

Diagnostic Tools and Assessments

The 28-item General Health Questionnaire (GHQ–28)

Data were collected from a survey of household assets and from the GHQ-28, and applied in the initial screening of participants. Goldberg and Hillier (since 1979) conducted the GHQ-28 for screening based on four categories (severe depression, distress somatic symptoms, social dysfunction, and anxiety and insomnia). The validity and reliability of the Persian version of the GHQ -28 tool have been approved in Iran by Noorbala *et al.*, in 1999. In Noorbala's study the sensitivity and specificity for a 6 cut-off score was 84.7% and 93.8%, respectively (Noorbala et al., 1998). In our study, we considered participants who attained a score of 24 or higher as suspect cases. A score of 6 and above represents detection of any mental disorder of the four categories above.

Structured Clinical Interview for DSM-IV-TR

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After the first stage, all contributors who have earned a score of 2 or higher were selected for further screening by DSM-IV-TR in the second stage. At this stage, the prevalence rates for psychiatric disorders, epilepsy, and mental retardation were determined. The reliability and validity indices of the Persian-translated DSM-IV-TR had been previously approved (Dodangi et al., 2014).

Statistical Analysis

After data collection and summarization, analysis on the data was performed using STATA software (version 11.2) and SPSS 21. Kolmogorov-Smirnov (K-S) test was conducted to explore normality by the Explore procedure in SPSS (Analyze → Descriptive Statistics → Explore → Plots → Normality plots with tests). Chi-square test and independent t-test were used for statistical analyses. The ROC curve was used to verify the cut-off points for psychiatric disorders in the GHQ-28 questionnaire.

Results

In this cross-sectional study, 763 persons (of ages 15 years and above) were screened; for all participants the GHQ-28 questionnaire was advised for evaluation. The Mean±SD age of respondents was 37.90±14.2, with a range from 15 to 88 years (**Table 1**). The majority of participants were females (423; 55.4%), in the 26-45 age group (373; 48.9%), married persons (579; 75.9%), and unemployed (461; 60.4%). According to educational level, 11.0% were literates, 12.5% were in elementary level, 14.4% were in secondary school, 29.0% had diplomas, and 33.2 had above diploma education.

Table 1. Frequency of psychiatric disorder suspect ion in term of demographic characteristics

Variable	N (%)	Suspected cases (N)	Prevalence rate (%)	Confidence interval	p-value
Gender					0.003
Male	340 (44.6)	71	20.9	19.6-22.2	
Female	423 (55.4)	126	29.8	28.6-31.0	
Age group					0.872
15-25	143 (18.7)	33	23.1	21.0-25.4	
26-45	373 (48.9)	100	26.8	24.7-28.9	
46-65	216 (28.3)	55	25.5	23.7-27.2	
65+	31 (4.1)	9	29.0	25.8-32.2	

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Marital status					0.035
Married	579 (75.9)	153	26.4	25.3-27.5	
Single	184 (24.1)	44	23.9	22.8-25.0	
Educational level					0.011
Illiterate	84 (11.0)	23	27.4	26.1-28.7	
Elementary	95 (12.5)	33	34.7	32.5-36.9	
Secondary	110 (14.4)	36	32.7	30.1-35.3	
Diploma	221 (29.0)	57	25.8	22.7-28.9	
Above diploma	253 (33.2)	48	19.0	15.3-22.7	
Occupation					<0.001
Employed	302 (39.6)	53	17.5	16.4-18.6	
Unemployed	461 (60.4)	144	31.2	30.1-32.3	
Total	763 (100)	197	25.8	25.1-26.5	

Our results showed that the prevalence of psychiatric disorders in females was significantly greater than in males ($p<0.003$) (**Table 1**). As well, married subjects had a significantly higher prevalence rate of psychiatric disorders when compared with singles ($p<0.035$). The prevalence of psychiatric disorders was associated significantly with unemployment status of the subjects ($p<0.001$). For educational background, the prevalence of psychiatric disorders showed differing patterns among the various educational levels of the subjects (**Table 1**).

The mean score of the GHQ-28 in all respondents for the 28 items was 0.98±0.34 (Min 0.25, Max 2.54). The mean score of the items in suspected persons was 1.41, and in non-suspected persons was 0.75. The frequency and mean score of the items by gender are shown in **Table 2**. Overall, 25.8% of responders had a cutoff score of 23 that demonstrated they displayed suspected psychological distress and needed to be further evaluated.

Table 2. GHQ-28 means for cases vs. non-cases

	Male		Female		Total	
	M±SD	N	M±SD	N	M±SD	N
Cases	1.41±0.31	71	1.42±0.27	126	1.41±0.29	197
Non-cases	0.73±0.32	269	0.77±0.32	297	0.75±0.14	566

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In this study, according to traditional scoring of the Persian GHQ-28 version, we used a cut-off score of 23 to determine suspected patients. The aforementioned cut-off in the ROC corresponded to area under ROC curve of 0.9173 (sensitivity of 91.0% and specificity of 51%) with respect to second evaluation by DSM-IV-TR for mental disorders (Fig. 1).

The suspected cases on sub-scales of GHQ-28 by gender are shown in Table 3. According to the table, 21.4% of all responders were suspected of somatization (26.2% of females; 15.3% of males) (p<0.001), 20.1% were suspected of anxiety (21.0% of females; 18.8% of males) (p=0.252), 30.3% were suspected of social dysfunction (28.1% of females; 32.9.50% of males) (p=0.087), and 24.8% were suspected of severe depression (24.6% of females; 25.0% of males) (p=0.481).

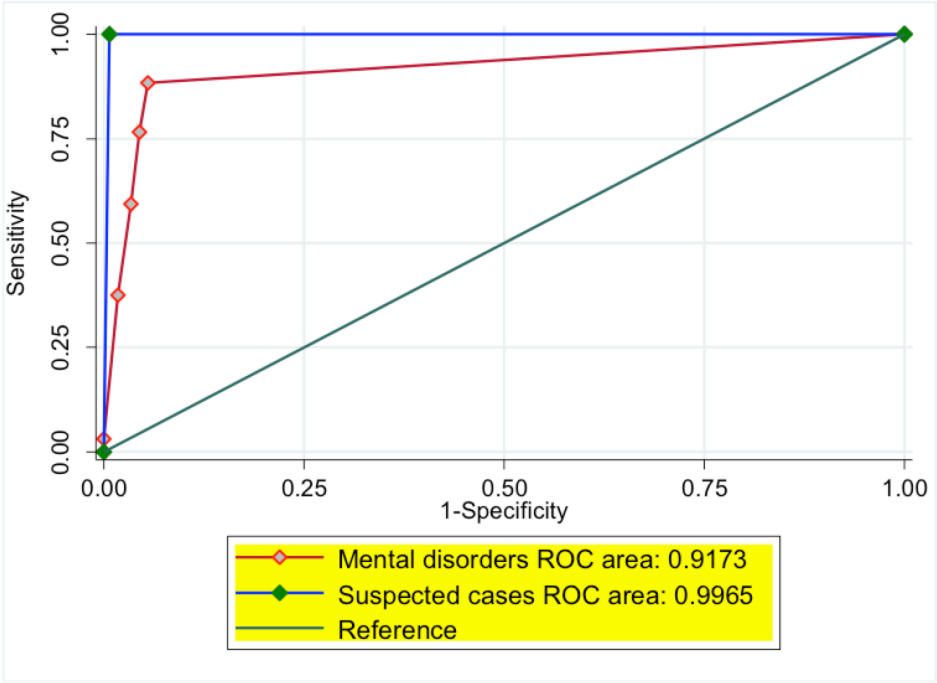

Figure 1. Receiver operating characteristic (ROC) curve for GHQ-28 for mood disorders (area under ROC curve = 0.9173).

Table 4 shows the prevalence rates of DSM-IV-TR mental disorders by gender. According to the table, in males the most prevalent mental disorders were: anxiety disorder (18.2%), any major depressive disorder (MDD) (17.4. %), compulsive disorder (10.0%), and phobia disorder (5.0%). In females, the most prevalent mental disorders were: anxiety disorder (23.6%), MDD (22.7%), compulsive disorder (13.9%), phobia disorder (10.4%), and psychotic disorder

ISSN: 2198-4093
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(6.1%). Among all the mental disorders, anxiety disorder and MDD showed the highest prevalence in males (18.2% and 17.4%, respectively) and in females (23.6% and 22.7%, respectively).

Table 3. Frequency of GHQ-28 subscales in term of gender

GHQ-28 subscales	Male N(P)	Female N(P)	Total N(P)	P-value
Somatization				< 0.001
Cut off 6 ≤	52 (15.3)	111 (26.2)	163 (21.4)	
Cut off 6 >	288 (84.7)	312 (73.8)	600 (78.6)	
Anxiety				0.252
Cut off 6 ≤	64 (18.8)	89 (21.0)	153 (20.1)	
Cut off 6 >	276 (81.2)	334 (79.0)	610 (79.9)	
Social dysfunction				0.087
Cut off 6 ≤	112 (32.9)	119 (28.1)	231 (30.3)	
Cut off 6 >	228 (67.1)	304 (71.9)	532 (69.7)	
Depression				0.481
Cut off 6 ≤	85 (25.0)	104 (24.6)	189 (24.8)	
Cut off 6 >	255 (75.0)	319 (75.4)	574 (75.2)	

Table 4. DSM-IVTR Disorders and mean GHQ-28 scores

DSM-IVTR Disorders	Male N(P) N=340	Female N(P) N=423	Total N(P) N=763	GHQ-28 M±SD
Major Depressive Disorder	59 (17.4)	96 (22.7)	155(20.3)	1.410.32
Mania disorder	9 (2.6)	20 (4.7)	29 (3.8)	1.450.31
Anxiety Disorder	62 (18.2)	100 (23.6)	162 (21.2)	1.420.33
Panic disorder	11 (3.2)	39 (9.2)	50 (6.6)	1.510.36
Compulsive disorder	34 (10.0)	59 (13.9)	93 (12.2)	1.420.32
Phobia disorder	17 (5.0)	44 (10.4)	61 (8.0)	1.420.36
Psychotic disorder	8 (2.4)	26 (6.1)	34 (4.5)	1.440.27

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Discussion

In psychiatry, it is important to accurately determine signs of psychiatric disorders in persons so the individuals can be further evaluated and diagnosed through clinical interviews. The GHQ-28 questionnaire and DSM-IV-TR classification of mental disorders were applied in the two-step evaluations of the present study. According to ROC analysis, the traditional cut-off point in the Persian version of the GHQ-28 could specify 91% of suspected persons. Therefore, ROC analysis in our present study verified and supported the validity of the GHQ-28 questionnaire as a screening tool for psychiatric disorders in adults, ages 15 and older.

After the primary evaluation the total rate of suspected psychiatric disorders was 25.8 % and, thus, a secondary evaluation was advised for these cases. In our study, the prevalence rates in males and females were 20.9% and 29.8%, respectively. In similar studies in Iran, the prevalence rate of mental disorders was 21% (14.9% in males; 25.9% in females), as reported by Noorbala *et al*. (Noorbala et al., 1998). Moreover, Mohammadi *et al*. reported a prevalence rate of 17.1% (10.86% in males; 23.4% in females) (Mohammadi et al., 2003), and Rahimi and colleagues reported a prevalence rate of 23% (Rahimi-Movaghar et al., 2014).

The higher prevalence of psychiatric disorders in females observed in this study is consistent with other studies. When we evaluated suspected persons for DSM-IV-TR mental disorders, we found that the common mental disorders were MDD, manic disorder and anxiety disorder; moreover, we found that these disorders are more prevalent in females. One explanation for this finding is that females are more prone to stress in similar situations as males (Kessler et al., 2005; Nolen-Hoeksema, 2001), which may attributable to biological reactions and socio-cultural factors in females (Parker and Brotchie, 2010).

Indeed, our results also showed that there is a significant relationship between lower educational level and higher prevalence of psychiatric disorders in responders. Reports in other countries are in accordance with results in this study. The impact of educational level on prevalence of psychiatric disorders has been previously reported (Kebede et al., 1999; Lin, 1953). Our results also show that unemployment significantly impacts psychiatric disorders, which is consistent with findings observed from a Brazilian study that concluded that unemployed respondents were more likely to have a lifetime (mental) disorder (Andrade et al., 2002).

Some limitations of this study are that the diagnostic instrument (summary form of DSM-IV-TR) did not include an assessment of all DSM-IV disorders and that the study was limited to persons of age 15 and above. As the diagnostic validity

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of the Persian GHQ-28 included only this age group, the results of the present study cannot be generalizable to the whole population.

Conclusion

This study verifies the validity of the Persian version of the GHQ-28 as a screening tool to determine psychiatric disorders in persons of age 15 and above. The GHQ-28 can be a useful instrument to identify individuals with high risk of mental disorders for referral for subsequent interventions.

Abbreviations

AD: Anxiety Disorder
DSM: Diagnostic and Statistical Manual of Mental Disorders
GHQ-28: General Health Questionnaire- 28 Items
MDD: Major Depressive Disorder
ROC: Receiver Operating Characteristic analysis

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Author Contribution

Study concept and design and statistical analysis: FM, YV. The interpretation of data results: YV. The drafting of the manuscript: AD. Final revision of the manuscript for important intellectual content: YV, FM, AD.

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