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THE PREVALENCE OF DEPRESSION, ANXIETY AND STRESS IN NURSES WORKING IN IRANIAN HOSPITALS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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ABSTRACT

INTRODUCTION. Depression, anxiety, and stress are common problems among nurses.
OBJECTIVE. This meta-analysis was conducted to investigate the prevalence of depression, anxiety, and stress among nurses working in Iranian hospitals.
MATERIALS AND METHODS. Published studies on nurses working in Iranian hospitals were investigated in this meta-analysis. All national and international online databases, including Web of Science, PubMed, Scopus, Embase, Cochrane Library, Scientific Information Database (SID), MagIran, and IranMedex, as well as Google Scholar, were searched using related keywords without any time limits until September 2017. The heterogeneity of studies was assessed using the I2 index. Data were analyzed in STATA version 11.1.
RESULTS. In 28 studies with a sample size of 6581 people, the prevalence of depression was 31% (n=2040) among Iranian nurses (31% in females and 28% in males) according to Beck's Depression Inventory (BDI); 30% (n=1974) (54% in females and 40% in males) according to the 21-Item Depression, Anxiety and Stress Scale (DASS-21); and 9% according to the General Health Questionnaire (GHQ-28). The prevalence of mild, moderate, and severe depression in nurses was 39%, 16%, and 20% according to the BDI; 8%, 24%, and 4% according to DASS-21; and 48%, 36%, and 16% according to GHQ-28, respectively. The prevalence of anxiety and stress was 85% and 67% in Beck's inventory, 28% and 38% in DASS-21, and 46% and 49% in GHQ-28, respectively.
CONCLUSION. According to the BDI and DASS-21, about one-third of Iranian nurses have depression with a female predilection. Nurses play an essential role in improving the quality of treatment; therefore, health policymakers must pay attention to reducing depression among nurses.

Keywords: *prevalence, depression, anxiety, stress, nurse, hospitals, Iran*

INTRODUCTION

Common mental disorders, such as depression, anxiety, and stress, are known to co-occur (1). Following cancer and cardiovascular diseases or traumas, depression is the third most common disease in Iran (2). The prevalence estimates for depression, anxiety, and stress among nurses are higher than those in the general population (3). In recent years, nursing has been considered as one of the most stressful professions in both developed and developing countries (4, 5). Nurses play an important role in improving and promoting health services in a community (6). Factors, such as a high-risk workplace, lack of clinical experience, young age, and history of psychological disorders, can contribute to the development of anxiety and depression among healthcare workers (7-9) .

Evidence suggests that depression has a greater impact on job performance than chronic diseases, such as arthritis, blood pressure, backache, or diabetes (10). Depression among hospital nurses influences their professional function, quality of care, and also their coworkers (11).

OBJECTIVES

The mental status of nurses, as caregivers of patients, is very important. Therefore, in this study, we aimed to examine the prevalence of depression, anxiety, and stress among Iranian nurses. Considering the diversity in statistics on depression among Iranian nurses and the variety of questionnaires, sample size, and setting in different studies, it seems necessary to perform a meta-analysis to provide an accurate estimate of the prevalence of these problems. This study aimed to examine the prevalence of depression, anxiety, and stress among nurses working in Iranian hospitals.

MATERIALS AND METHODS

Study protocol

The present study is a meta-analysis of the prevalence of depression, anxiety, and stress among nurses working in Iranian hospitals. The Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) protocol (12) was used in this systematic review and meta-analysis. This protocol was registered on the International Prospective Register of Systematic Reviews (PROSPERO) website; the documentation is attached (ID: 122560, Date: 30.06.2021).

Search strategy

To obtain the required resources, English-language databases, including Web of Science, PubMed, Scopus, Embase, and Cochrane Library, as well as Persian-language databases, including SID, MagIran, and IranMedex, were searched using the following MeSH terms: “Prevalence”, “Depression”, “Anxiety”, “Stress”, “Nurse”, “Hospital”, and “Iran”. There was no time limitation in our search, and we used the boolean operators (AND/OR); we also searched the Google Scholar search engine. The publications dated from 2004 to August 2017.

Inclusion and exclusion criteria

Each primary research was evaluated based on the Population, Intervention, Comparison, and Outcome (PICO) framework.

Inclusion criteria: Studies examining the prevalence of depression, anxiety, and stress among nurses working in Iranian hospitals were reviewed.

Exclusion criteria: The exclusion criteria were as follows: non-Iranian studies; studies with a non-random sample selection; reports on the prevalence of depression, anxiety, and stress among nursing students; failure to report the required information, such as the sample size or prevalence of depression, anxiety, and stress in nurses; poor quality of studies according to the Newcastle-Ottawa Scale (NOS) checklist (13); and unavailability of the full-text of articles.

Quality assessment

The NOS was used to evaluate the quality of studies; the cutoff point for the study quality was considered to be four. The NOS generally contains eight items, categorized into three dimensions, including selection, comparability, and study outcome (cohort studies) or exposure (case-control studies). For each item, a series of response options was provided. A star system was also used to allow a semi-quantitative assessment of the study quality. Studies with the highest quality were given a maximum of one star for each item, with the exception of the item related to comparability that allows the assignment of two stars. The NOS ranges between zero and nine stars. Two researchers independently assessed the articles; if there was any inconsistency, a third researcher decided about the quality score (13).

Data extraction

Two researchers independently extracted the data from studies to minimize reporting bias and error in data collection. The researchers entered the extracted data into a checklist containing the author’s name, study title, sample size, number of male and female subjects, year of publication, type of questionnaire, place of study, prevalence of depression, prevalence of anxiety, and prevalence of stress. The third researcher reviewed the data extracted by the other researchers to examine and resolve the problems if there was any inconsistency between the files.

Data collection tools

Beck’s Depression Inventory (BDI): This questionnaire consists of 21 questions with four options. The total score of depression is determined by summing the scores of all items. Individuals with a score of 1-15 were considered normal; those with a score of 16-31 had mild depression; those with a score of 32-47 had moderate depression, and those with a score of 48-62 had severe depression (14).

DASS-21: The Depression, Anxiety and Stress Scale-21 Items (DASS-21) is a set of three self-report

scales, designed to measure the negative emotional states of depression, anxiety, and stress. Each of the three DASS-21 scales contains seven items, divided into different subscales with a similar content. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic non-specific arousal. It assesses one's difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive, and impatient. The scores of depression, anxiety, and stress were calculated by summing the scores for relevant items. The cut-off point of this questionnaire was four. It was first introduced by Lovibond in 1995 with the following options: "never", "low", "medium", and "high". The lowest score for each question is zero, and the highest score is three (15).

Goldberg's General Health Questionnaire (GHQ-28): This questionnaire was first developed by Goldberg in 1972. The original form of this questionnaire included 60 questions; currently, there are three forms with 12, 28, and 60 questions. It has been translated into 38 languages and used in 70 countries (16). It is based on a four-point Likert scale with four subscales (seven questions for each subscale), including the presence of somatic symptoms, anxiety and insomnia, social dysfunction, and depression. The score for each question ranges from zero to three, and the maximum score of the 28-question version is 84. A higher score indicates a lower general health on that subscale (17).

In the depression domain of BDI, the scores were rated as follows: 0-13, minimal; 14-19, mild; 20-28, moderate; and 29-63, severe. In the anxiety domain, a score of 0-9 was considered minimal; a score of 10-16 was considered mild; a score of 17-29 was considered moderate; and a score of 30-63 was considered severe. Moreover, the scores of the depression domain of DASS-21 were rated as follows: 0-9, normal; 10-13, mild; 14-20, moderate; 21-27, severe; and +28, extremely severe. In the anxiety domain, the scores were rated as follows: 0-7, normal; 8-9, mild; 10-14, moderate; 15-19, severe; and +20, extremely severe. The scores of the stress domain were also rated as follows: 0-14, normal; 15-18, mild; 19-25, moderate; 26-33, severe; and +34, extremely severe. Moreover, for the subscales of GHQ-28, a score of 0-6 was considered minimal; a score of 7-11 was considered mild; a score of 12-16 was considered moderate; and a score of 17-21 was considered severe. Overall, scores of 0-22, 23-40, 41-60, and 61-84 were considered to be minimal, mild, moderate, and severe, respectively.

Statistical analysis

The variance of each study was calculated using the binomial distribution formula. Studies were combined with sample size and variance. To examine the heterogeneity of studies, Cochran's test and I^2 index were used (I^2 <25%, low heterogeneity; 25-75%, average heterogeneity; and >75%, high heterogeneity). The heterogeneity was high in this analysis, as the I^2 value was very high. The sources of heterogeneity included the climate, year, and age group. To investigate the relationship between the prevalence of obesity and quantitative variables, including the year of study and sample size, a metaregression model was used. Data were analyzed in STATA version 11.1 (KitelyTech, Chicago, IL, USA). The significance level of all tests was considered to be $P<0.05$.

RESULTS

Study selection

According to our search in electronic databases according to the selected keywords, 183 articles were selected. After screening the titles, 89 were duplicates and removed. By screening the titles and abstracts, 50 studies were removed. Also, after reviewing the full-text of articles, nine were removed because the study population included nursing students. Similarly, seven studies were removed because the prevalence or sample size was not mentioned. Finally, 28 articles were included in our meta-analysis (Chart 1).

A total of 6581 nurses participated in 28 studies. The data extracted from the articles are presented in Table 1, and the stages of study selection for the meta-analysis are presented in Chart 1.

In this meta-analysis, the prevalence of depression among nurses working in Iranian hospitals was 31% (95% CI: 19-44%) or 2040 nurses according to BDI; 30% (95% CI: 23%-37%) or 1974 nurses according to DASS-21; and 9% (95% CI: 2%-16%) or 592 nurses according to GHQ-28. The prevalence of depression among nurses based on the questionnaires and the studied subgroups is presented in Table 2. The subgroup analysis showed that the prevalence of depression varied in different climates; one of the reasons for heterogeneity can be the locations of these studies.

According to Figure 1, there was no significant relationship between the prevalence of depression among Iranian nurses and the sample size of studies (p=0.156). In other words, by increasing the sample size, the prevalence of depression in nurses working in Iranian hospitals will not increase.

According to Figure 2, there was no significant relationship between the prevalence of depression among Iranian nurses and the year of study (p=0.271).

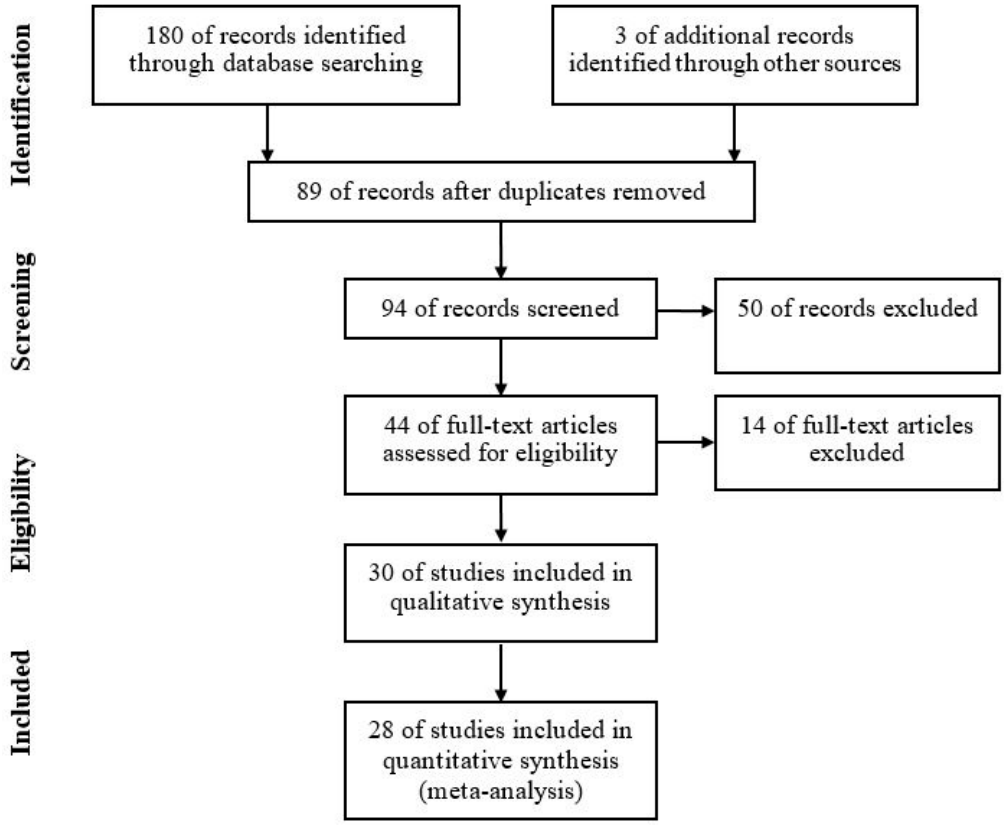

Chart 1: Flowchart of including the studies in metaanalysis.

Table 1. Information extracted from articles entered into the metaanalysis process.

Authors name	City of Study	Year of Study	Name of Questionnaire	Sample Size	Prevalence of Depression in Nurses (%)
(18) Mahmoodi	Kordestan	2012	Beck	314	4.7
(19) Taghva	Tehran	2012	Beck	173	-
(20) Asad Zandi	Tehran	2008	DASS-21	272	24.9
(21) Noroozi Kushali	Tehran	2010	DASS-21	313	30.8
(22) Khaje Nasiri	Tehran	2000	Beck	130	26.9
(23) Kazemi	Tehran	2010	Beck	335	37.3
(24) Khamse	Tehran	2009	DASS-21	416	25.8
(25) Jahani Hashemi	Ghazvin	2005	GHQ-28	350	1.7
(26) Dehghani	Shiraz	2008	Zung	311	-
(27) Khaghanizade	Tehran	2005	GHQ-28	200	17
(28) Naghashpour	Ahvaz	2009	Beck	98	45.9
(29) Yazdi	Yazd	2010	Beck	150	50.7
(30) Alipour.R	Fasa	2014	DASS-21	142	32.3
(31) Khani.H	Neyshabor	2013	Beck	196	26
(32) Kasani.A	Ilam	2011	Beck	191	-
(33) Pournamdarian.S	Hamedan	2012	DASS-21	120	24.4

(34) Behnam.B	Semnan	2014	Beck	182	43.3
(35) Khodadadi	Tabriz	2016	DASS-21	242	50.4
(36) Sistanehei.F	Bam	2004	Goldberg & Williams	86	31.4
(37) Meshak.B	Karaj	2013	GHQ-28	78	-
(38) Rahmani	Tabriz	2010	GHQ-28	59	-
(39) Khalilzadeh.R	Urmia	2005	Beck	200	-
(40) Nourozi-Tabrizi.K	Shiraz	2011	Beck	130	-
(41) Zamanian-Ardekani.K	Shiraz	2006	GHQ-28	1196	11.2
(42) Yazdanshenas.M	Tehran	2016	DASS-21	94	22.4
(43) Taghinezhad.H	Ilam	2014	GHQ-28	86	6.2
(44) Arefian.NM	Tehran	2006	Beck	400	17.5
(45) Mami.S	Ilam	2014	Beck	117	-

Table 2. The results of our meta-analysis of the prevalence of depression among nurses working in Iranian hospitals based on different questionnaires

Name of Questionnaire	Subgroups	Number of Study	Prevalence (95% CI)	p-value	I^2 (%)
Beck	Prevalence of Depression	8	%31(%19-%44)	<0.001	97.9
	Prevalence of Depression in Women	2	%31(%7-%55)	<0.001	96.3
	Prevalence of Depression in Men	2	%28(%0-%58)	<0.001	93.5
	Prevalence of Mild Depression	9	%39(%23-%56)	<0.001	98.7
	Prevalence of Moderate Depression	9	%16(%11-%21)	<0.001	89.9
	Prevalence of Severe Depression	10	%7(%5-%10)	<0.001	82.2
	Prevalence of Anxiety	1	%85(%79-%90)	<0.001	100
	Prevalence of Stress	1	%67(%60-%74)	<0.001	100
DASS-21	Prevalence of Depression	7	%30(%23-%37)	<0.001	88.8
	Prevalence of Depression in Women	1	%54(%46-%61)	<0.001	100
	Prevalence of Depression in Men	1	%40(%28-%53)	<0.001	100
	Prevalence of Mild Depression	2	%8(%2-%15)	0.047	74.6
	Prevalence of Moderate Depression	5	%24(%13-%35)	<0.001	95.7
	Prevalence of Severe Depression	4	%4(%1-%7)	0.003	78.3
	Prevalence of Anxiety	5	%28(%17-%40)	<0.001	95.4
	Prevalence of Stress	6	%38(%19-%57)	<0.001	100
GHQ-28	Prevalence of Depression	4	%9(%2-%16)	<0.001	100
	Prevalence of Mild Depression	2	%48(%39-%56)	0.954	0
	Prevalence of Moderate Depression	2	%36(%28-%44)	<0.001	100
	Prevalence of Severe Depression	2	%16(%10-%22)	<0.001	100
	Prevalence of Anxiety	4	%46(%28-%64)	<0.001	95.7
	Prevalence of Stress	1	%49(%36-%62)	<0.001	100

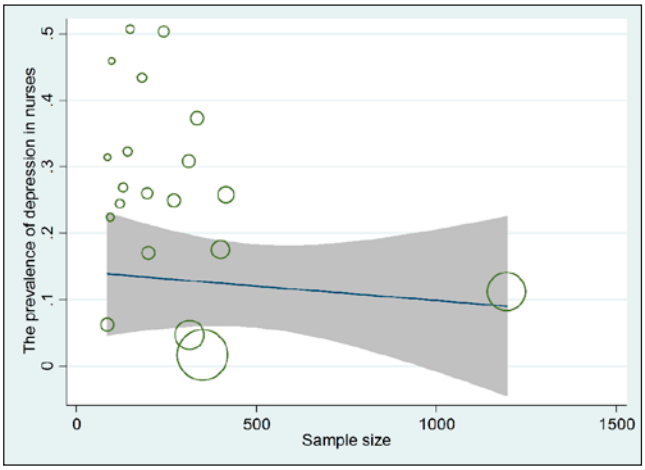

Figure 1. The relationship between the prevalence of depression among nurses working in Iranian hospitals and sample size in the metaregression model

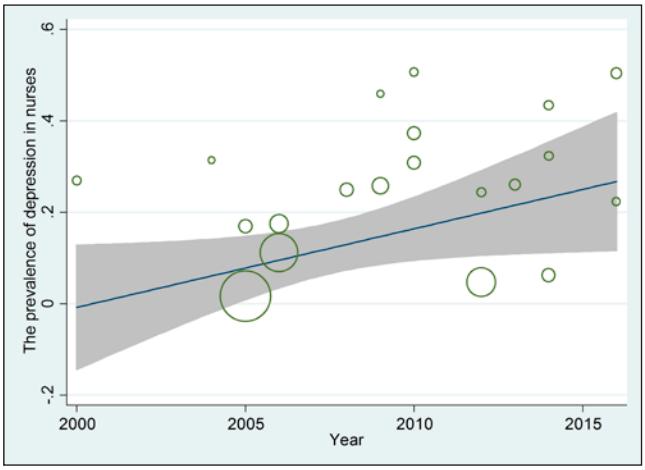

Figure 2. The relationship between the prevalence of depression among nurses working in Iranian hospitals and the year of study in the metaregression model

During the years studied (2004-2017), the prevalence of depression among nurses working in Iranian hospitals increased; however, it was not significant.

The Egger's test showed that the publication bias effect was not significant (p=0.290). Therefore, studies conducted in this area had a chance to be published; all published studies in this field were covered in the source search step.

DISCUSSION

The sample size of 28 reviewed articles was 6581 in this meta-analysis. The prevalence of depression among nurses working in Iranian hospitals was 31% (n=2040) according to BDI, 30% (n=1974) according to DASS-21, and 9% (n=592) according to GHQ-28. Therefore, the prevalence of depression among nurses according to BDI and DASS-21 was almost equal and included about one-third of all nurses; however, the prevalence of depression among nurses was low according to GHQ-28. In one of the studies, the prevalence of depression among Iranian nurses (31%) was higher than the general population (25%) (46). This study was the only study in Iran with a large sample size. Also, studies were conducted in different parts of the country; therefore, we can generalize the results to the entire population.

Based on BDI, the prevalence of depression was 31% (n=2040) among female nurses and 28% (n=1843) among male nurses. According to DASS-21, the prevalence of depression was 54% (n=3554) among female nurses and 40% (n=2632) among male nurses. The results of both questionnaires indicated that the prevalence of depression in female nurses was higher than male nurses. Also, the prevalence of anxiety and stress was 85% (n=5594) and 67% (n=4409) according to BDI; 28% (n=1843) and 38% (n=2501) according to DASS-21; and 46% (n=3027) and 49% (n=3225) according to GHQ-28, respectively.

Depending on the questionnaire, depression can be classified into three levels (mild, moderate, and severe). The prevalence of mild, moderate, and severe depression among nurses was 39% (n=2567), 16% (n=1053), and 20% (n=1316) according to BDI; 8% (n=526), 24% (n=1579), and 4% (n=263) according to DASS-21; and 48% (n=3159), 36% (n=2369), and 16% (n=1053) according to GHQ-28, respectively. Based on the results of BDI and GHQ-28, most nurses had mild depression, while according to DASS-21, most nurses had moderate depression.

Another study from Taiwan by Huey-S Lin on 140 nurses using BDI reported prevalence rates of 12.8%, 7.7%, and 7.8% for mild, moderate, and severe depression, respectively (47). The prevalence of mild to moderate depression among Iranian nurses was higher than that of nurses in Taiwan, while the prevalence of severe depression among Iranian nurses was lower than Taiwanese nurses. Moreover, in a cross-sectional study in Vietnam in 2019, 600 nurses (133 males and 467 females) with an average age of 33 years were screened using DASS-21. The prevalence of depression, anxiety, and stress was 13.2%, 39.8%, and 18.5%, respectively (48). Also, in 2015, 850 nurses (105 males and 745 females) were screened by DASS-21 in Hong Kong, and the prevalence of depression and anxiety was estimated at 35.8% and 37.3%, respectively (1).

Additionally, in an Australian study in 2019, the prevalence of depression, anxiety, and stress was estimated at 32.4%, 41.2%, and 41.2%, respectively in 102 nurses with an average age of 30 years (81 women and 21 men) according to DASS-21 (49). Overall, based

on the mentioned studies, the prevalence of depression in Iranian nurses is higher than Vietnamese nurses and lower than nurses in Hong Kong and Australia. However, the prevalence of anxiety in Iranian nurses was lower than that of nurses in Hong Kong, Vietnam, and Australia. On the other hand, the prevalence of stress in Iranian nurses was higher than Vietnamese nurses and lower than Australian nurses.

In a study by Kim et al. from Korea in 2018 on 7267 female nurses with an average age of 20-45 years, the prevalence of depression was 81.3% based on the Patient Health Questionnaire (PHQ) (normal: 18.7%; mild depression: 38.4%; moderate depression: 23.1%; moderate to severe depression: 13.9%; and severe depression: 5.9%) (50). Also, in a study from Greece in 2016, 110 nurses (39 nurses and 71 nurses) were evaluated using the PHQ-2 questionnaire, and the prevalence of depression and anxiety was 52.7% and 48.2%, respectively (51). Besides, in an observational study in 2020, the prevalence of depression and anxiety was 62% and 44% in the general population, respectively (52), while a cross-sectional study showed that 12% of healthcare workers had depression, and 26% had anxiety (53).

In a meta-analysis by Papa et al. in 2020, a total of 13 studies were included with 33,062 participants. Anxiety was assessed in 12 studies, with a pooled prevalence of 23.2%, and depression was examined in 10 studies, with a prevalence of 22.8% (54). Overall, it is important to assess the mental health of healthcare workers. In this regard, one study from China reported the high prevalence of depression (50.4%), anxiety (44.6%), insomnia (34%), and psychological distress (71.5%) among frontline healthcare providers (55).

Limitations. Due to the diversity of questionnaires, we could not estimate the prevalence of depression among Iranian nurses by age group or geographical area. Another limitation of this study was our inability to combine the keywords in Persian databases. Also, due to the non-uniformity of the questionnaire scoring, we could not report an accurate statistic of the prevalence of depression in Iranian nurses.

CONCLUSION

According to BDI and DASS-21, about one-third of Iranian nurses have depression, with a female predilection. Nurses play an essential role in improving the quality of treatment; therefore, health policymakers must pay attention to decreasing depression among nurses. The prevalence of anxiety and stress in Iranian nurses was remarkably high. Health officials need to reduce the working hours, increase the salaries, and provide welfare facilities for the staff.

Relevance for clinical practice:
The results of this study can be applied in preventive and rehabilitation programs for nurses. Also, health policymakers can use the results of this study for proper planning to increase the nurses' efficiency and performance and reduce the staff absenteeism.

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Conflicts of interest
There are no conflicts of interest.

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