Systematic Review
http://mjiri.iums.ac.ir
Medical Journal of the Islamic Republic of Iran (MJIRI)

Med J Islam Repub Iran. 2017(25 Dec);31.130. https://doi.org/10.14196/mjiri.31.130

Depression among Iranian nurses: A systematic review and meta-analysis

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Received: 24 Aug 2017 Published: 25 Dec 2017

Abstract

Background: Depression is one of the most commonly diagnosed mental disorders. Nurses and other hospital service providers are a group at high risk for developing depression. Thus, knowing the prevalence of depression among nurses can help the health care decision-makers to plan ad hoc prevention programs to control depression in this group. This study was conducted to quantitatively assess the prevalence of depression in nurses by performing a systematic review and meta-analysis.

Methods: ISI/Web of Science (WoS), PubMed/MEDLINE via Ovid, PsychInfo, and Embase, as well as Iranian databases such as Irandoc, SID, and Magiran were searched from January 2000 to March 2017. To calculate the pooled prevalence rate, the random effects model based on the DerSimonian-Laird approach was used. I2 and the Q tests were used to examine heterogeneity among studies. To investigate the causes and sources of heterogeneity, the impact of such variables as quality, sample size, geographic region, and criteria used to diagnose depression was analyzed performing subgroup analyses. The quality of reviewed studies was assessed according to the 22-item STROBE checklist. Sensitivity analysis was performed to investigate the stability and robustness of the obtained results. All data were analyzed using the "meta" package included in the R Software Version 3.4.0.

Results: A total of 30 studies were retained in the current investigation. The overall prevalence of depression was 22% [95%CI 19-27] among nurses, with a high statistically significant heterogeneity (I2= 94% and Q-test= 479.87).

Conclusion: This rate was higher than the prevalence of depression among the general population in Iran. Presence of happy nurses with good mental state at hospitals is essential for promoting the care provided to patients.

Keywords: Depression, Nurses, Iran, Systematic Review, Meta-analysis

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Cite this article as: Saeedi Shahri SS, Ghashghaee A, Behzadifar M, Luigi Bragazzi N, Behzadifar M, Mousavinejad N, Sadat Ghaemmohamadi M, Ebadi F, Seyedin H. Depression among Iranian nurses: A systematic review and meta-analysis. *Med J Islam Repub Iran. 2017* (25 Dec);31:130. https://doi.org/10.14196/mjiri.31.130

Introduction

Depression is one of the most commonly diagnosed mental disorders. According to the World Health Organization (WHO), about 300 million people suffer from depression worldwide, which represents one of the leading causes of disability and global burden of diseases (1). Every year, large amounts of money are spent to treat depressed patients (2). This disorder imposes a considerable economic burden on the society; therefore, prevention plays an important role in saving resources and improving quality of life (3).

By 2030, depression is expected to become the second cause of disability and comorbidities in developing countries (4), profoundly impacting people's performance and quality of life. Furthermore, an anticipation of age-of-onset

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↑What is "already known" in this topic:
Depression is one of the most commonly diagnosed mental disorders. Physicians, nurses, and other hospital service providers represent a group of workers at high risk for developing depression.

→What this article adds:
The overall prevalence of depression among nurses is 22%, and this rate is higher than the prevalence of depression among the general population in Iran. Thus, knowing the prevalence of depression among nurses can help the health care decision-makers to plan ad hoc prevention programs to control depression in this working group.

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[DOI: 10.14196/mjiri.31.130]

is expected (5). From an etiopathogenetic standpoint, hereditary genetic and biochemical causes can cause depression, disturbing communication between nerve cells (6). Social and family problems and employment conditions can be among the causes of depression (7). This disease severely impairs familiar and social sphere, as well as professional working, leading, in some cases, to suicide (8).

Doctors, nurses, and other hospital service providers are among a group at high risk for developing depression (9). It is estimated that depression has a greater impact on job performance than chronic diseases, such as arthritis, blood pressure, backache, and diabetes (10). Nursing is among occupational groups at high risk for depression due to harsh working conditions (11).

Several studies have examined the prevalence of depression among nurses. In 2 studies conducted in the USA, the prevalence of depression was reported to range from 18% to 41% (12, 13). In a study conducted in China, this rate was about 38% (14). In Iran, various studies have investigated the prevalence of depression among nurses. Thus, knowing the prevalence of depression among nurses can help the health care decision- makers to plan ad hoc prevention programs to control depression in this working group.

When nurses have good physical and mental status, they are likely to make less job mistakes and their working motivation increases. The use of psychiatric services for nurses, who are prone to depression, should be considered.

Therefore, this study was conducted to quantitatively assess the prevalence of depression in nurses by systematic review and meta-analysis method in Iran.

Methods

Literature search

The results of the current investigation were reported according to the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses" (PRISMA) guidelines. Several databases including ISI/Web of Science (WoS), PubMed/MEDLINE via Ovid, PsychInfo, and Embase, as well as Iranian databases such as Irandoc, SID, and Magiran were searched from January 2000 until March 2017. The search strategy was as follows: "Prevalence" AND ("Depression" OR "Mental Health Disorder" OR "Major Depression Disorder") AND "Nurses" AND "Iran". Search strategy is reported in Appendix 1. The reference lists of potentially eligible articles were scanned to find further relevant studies. Two authors independently eliminated duplicate studies, screened them based on title and abstract, and finally, identified studies to be retained based on inclusion/exclusion criteria.

Inclusion and exclusion criteria

We included studies if they were:

1. Observational studies (cross-sectional, case-control, cohort investigations) examining the prevalence of depression among Iranian nurses with clear and unambiguous results;
2. Studies published in both English and Persian;
3. Studies published between January 2000 and March 2017;
4. Studies using validated/standardized tools for examining depression.

We excluded studies if they were:

1. Studies designed as randomized clinical trials (RCTs), case-report investigations, case series, reviews, and editorials;
2. Studies reporting overlapping results;
3. Studies whose results were not clear, and in which the possibility of calculating the prevalence was not provided.

Data extraction and quality assessment of articles

Two of the authors extracted the required data after agreeing on selected studies. Disagreements were resolved by discussion. Finally, the name of the first author, year of publication, number of participants, age, city of the study, province of the study, type of test used to assess depression, and the prevalence of reported depression were extracted and collected in ad hoc designed form.

The quality of reviewed studies was assessed according to the 22-item "Strengthening the Reporting of Observational Studies in Epidemiology" (STROBE) checklist (15). This assessment was performed independently by 2 authors, and their eventual disagreements were resolved by discussion.

Statistical analysis

To calculate the pooled prevalence rate, the random-effects model based on the DerSimonian-Laird approach was used. Results were computed with their 95% confidence interval (CI). P-value <0.05 was considered as statistically significant. The I^2 and the Q tests were used to examine heterogeneity among studies (16). To investigate the causes and sources of heterogeneity, the impact of such variables as quality, sample size, geographic region, and criteria used to diagnose depression was analyzed performing subgroup analyses. Sensitivity analysis was performed to investigate the stability and robustness of the obtained results. In addition, cumulative meta-analysis was done based on year of publication. To explore more sources of heterogeneity, meta-regression was used based on the publishing year and sample, according to the previously defined variables. Egger's test was used to analyze publication bias (17). All data were analyzed using the "meta" package included in the R Software Version 3.4.0 (freely available and downloadable at https://www.r-project.org/).

Results

After the initial search and selecting pertinent studies based on inclusion/exclusion criteria, 30 studies were finally included (18-47). Figure 1 displays the process of finding and selecting relevant studies. The overall number of included participants was 5613. The design of all included studies was cross-sectional.

Sample sizes ranged from 60 to 413. The main characteristics of the included studies are presented in Table 1. The overall prevalence of depression among nurses was 22% [95%CI 19-27], with $I^2 = 94\%$ and Q-test = 479.87 (Fig. 2).

The results of the subgroup analyses based on quality, sample size, geographic region, and diagnostic test used are demonstrated in Table 2.

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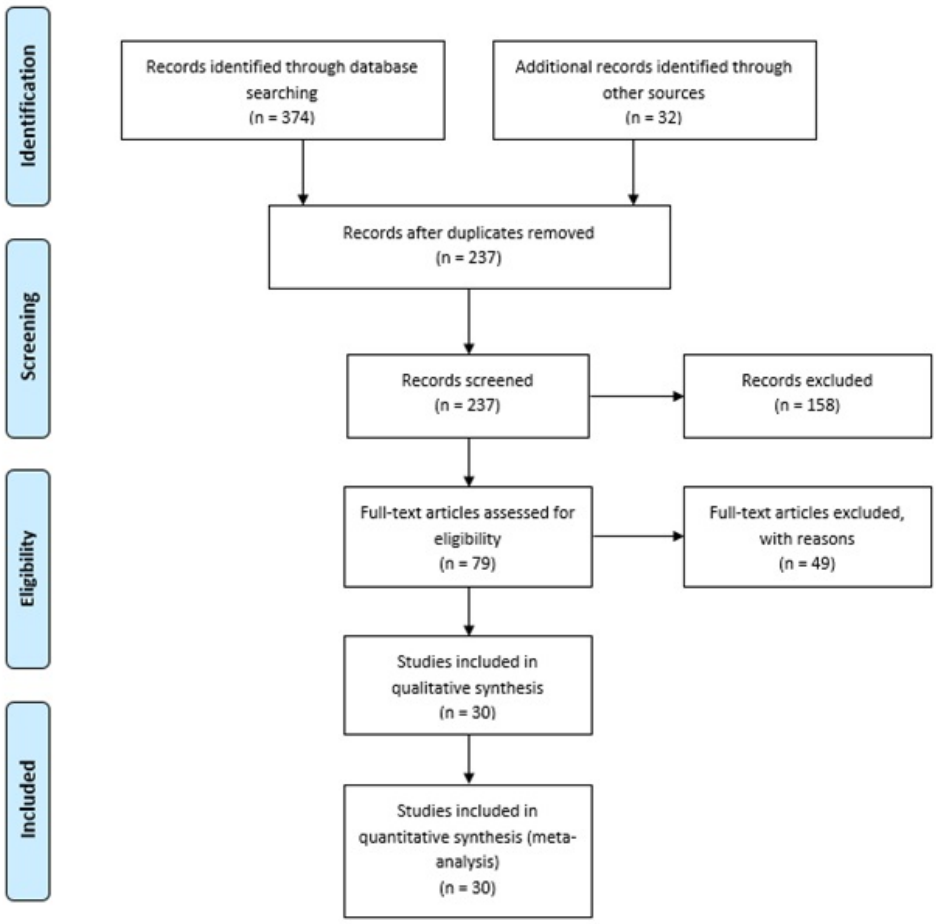


Fig. 1. Flowchart of the current systematic review and meta-analysis

Table 1. Main characteristics of the included studies

First author	Year	Sample	Questionnaire	Quality	City	Age
Khajeh nasiri	2000	130	Beck	High	Tehran	NA
Khalil zadeh	2005	200	Beck	High	Urmia	NA
Habibzadeh	2005	270	Goldberg	Medium	Khoy	NA
Abedini	2007	95	Beck	High	Bandar abbas	21.13±2.03
Arefian	2009	400	Beck	High	Tehran	NA
Karami	2009	208	Beck	High	Kashan	20-24
Dehghani	2009	311	Zung Self-Rating Depression Scale	Medium	Shiraz	31.24±8.21
Mirmohammadi	2009	110	Beck	High	Yazd	38.46±5.48
Asadzandi	2011	272	Dass	High	Tehran	38.69±7.8
Khamseh	2011	413	Dass	Medium	Tehran	NA
Baghiani moghadam	2012	125	Beck	High	Yazd	22±3.2
Ghasemnegad	2012	150	Beck	High	Lahijan	19-27
Masoudi asl	2012	200	Beck	High	Yasouj	NA
Hadavi	2012	64	Beck	High	Rafsanjan	20.10±1.35
Pournamdarian	2012	120	Dass	Low	Hamedan	NA
Mahmodi	2013	314	Beck	High	Sanandaj	NA
Nazemi	2013	244	GDS	Low	Tehran	NA
Mami	2014	117	Beck	High	Ilam	NA
Kassani	2014	191	Beck	High	Ilam	NA
Taghva	2014	173	Beck	High	Tehran	45±6.63
Taghinejad	2014	81	GHQ	Medium	Ilam	NA
Tajvar	2015	72	GHQ	Medium	Bandar abbas	31.57

Sensitivity Analysis

Sensitivity analysis revealed no change in the results, and thus, ensured the stability of the findings (Appendix 2).

Cumulative analysis

Studies were sorted based on year of publication, and no statistically significant change could be noticed in the results (Appendix 3).

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Table 1. Cntd

Alipoor	2015	142	Dass	Low	Fasa	35±8.6
Yasemi	2015	60	Dass	Low	Ilam	31.86±8.35
Bahnam	2016	182	Beck	High	Semnan	29.74±7.919
Khani	2016	196	Beck	High	Neishabour	32.1±8
Yazdanshenas	2016	94	Dass	Low	Tehran	NA
Khodadadi	2016	242	Dass	High	Tabriz	NA
Kashani	2017	102	MMPI	Medium	Tehran	30.2 ± 5.6
Sagharjoghi Farahani	2017	241	Beck	High	Khoram abad	NA

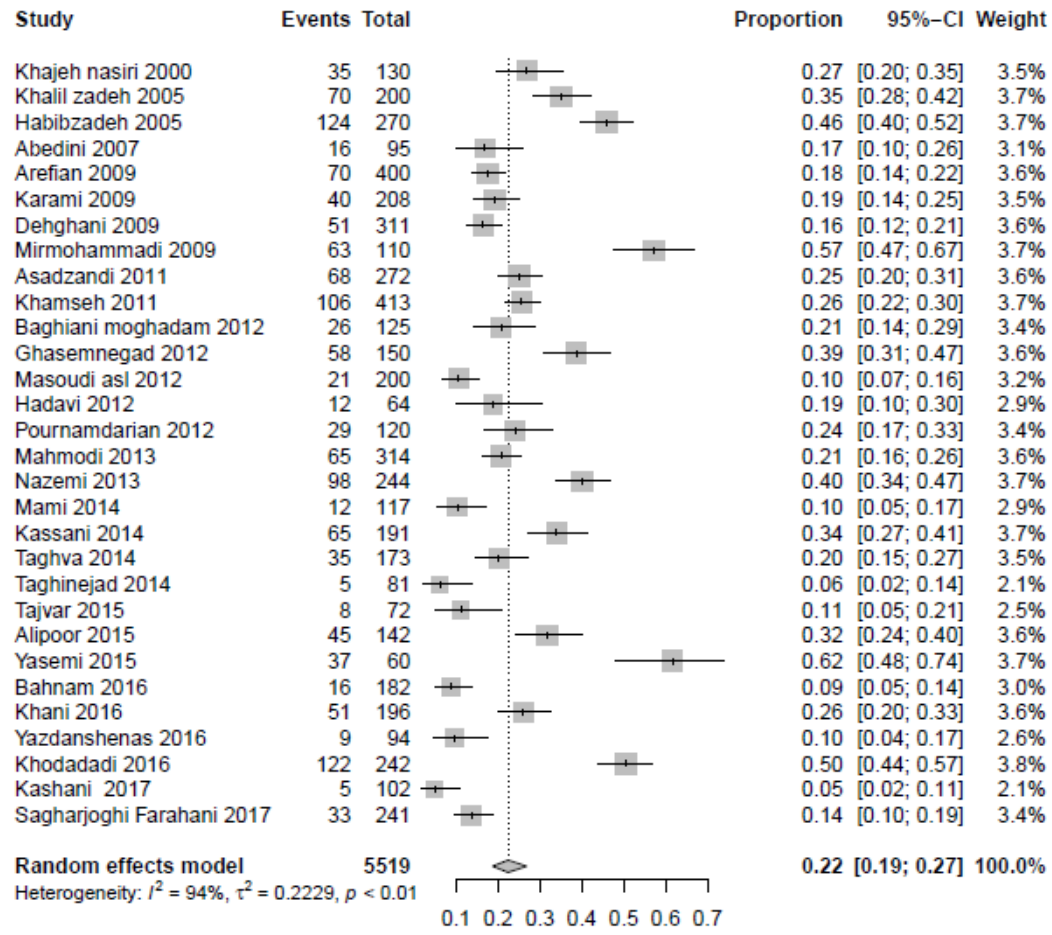


Fig. 2. Forest plot of the included studies

Table 2. Subgroup analyses of the included studies

Variables	No. studies	No. participants	Prevalence 95% CI	I^2	p
Quality of studies					
High	19	3610	22% (18-28)	94%	<0.001
Medium	6	1249	16% (9-26)	95%	<0.001
Low	5	660	31% (21-46)	92%	<0.001
Sample size					<0.001
≤150	14	1462	20% (15-28)	93%	<0.001
>150	16	4057	23% (19-29)	95%	<0.001
Regional					<0.001
Center	9	2036	21% (16-27)	89%	<0.001
East	3	578	14% (6-29)	92%	<0.001
North	1	150	39% (32-47)	-	<0.001
South	7	919	22% (14-36)	94%	<0.001
West	10	1836	27% (20-36)	95%	<0.001

The results of sensitivity analysis and cumulative analysis showed that the overall prevalence did not change in a statistically significant way.

Meta- regression

Meta-regression was conducted based on year of publication and sample size. Results showed that the prevalence of depression in Iranian nurses tended to decrease based on the publishing year, and this decrease was statistically significant.

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Table 2. Cntd

Tools					<0.001
Beck Depression Inventory	17	3096	21% (17-27)	93%	<0.001
DASS questionnaire	7	1343	30% (21-42)	94%	<0.001
GHQ-28 questionnaire	2	153	9% (5-16)	14%	0.285
Geriatric Depression Scale (GDS)	1	244	40% (34-47)	Not applicable	-
Goldberg test	1	270	46%(40-52)	Not applicable	-
MMPI	1	102	5% (2-12)	Not applicable	-
Zung Self-Rating Depression Scale	1	311	16% (13-21)	Not applicable	-

Table 3. Results of meta-regression

Variable	Estimate	Size Effect	Z-val	p	95% CI	
					Lower	Upper
Year of publication	-0.041	0.0241	-1.708	0.087	-0.088	0.006
Sample size of studies	0.000	0.001	0.668	0.503	-0.001	0.002

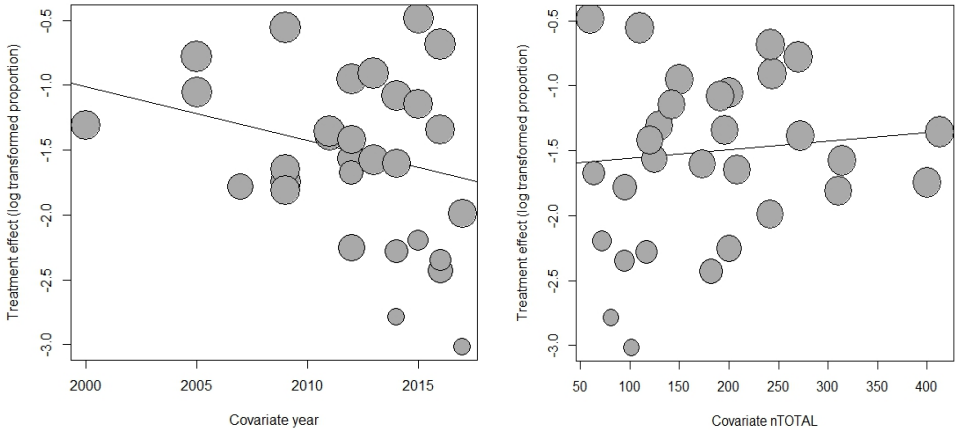


Fig. 3. Results of the meta-regression analyses

Meta-regression based on the sample size of the included studies showed that depression prevalence tended to increase, but this increase was not statistically significant (Table 3 and Fig. 3).

Publication bias

Publication bias was assessed with Egger's test. P-value was 0.412, showing no significant evidence of publication bias.

Discussion

Studies examining the prevalence of diseases and health problems can provide useful and valuable information for health decision-makers, helping them to properly implement interventional programs and secondary and tertiary level prevention activities (48). In this study, the prevalence of depression was studied among the Iranian nurses. Based on these results, prevalence of depression was 22%. The prevalence among Iranian general population was reported to be 4%. The results of this study showed that depression among nurses is significantly higher than the overall pooled prevalence rate in Iran (49).

In a study conducted in China, the prevalence of depression among nurses was 38% (14). Also in 2 studies conducted in Taiwan, the prevalence was 52.5% and 27.7%, respectively (50, 51). Canada, France, and the USA reported a prevalence rate of 10% to 40% (12, 13, 52, 53).

Various factors, such as differences in personality, cultural, social, and working conditions may explain differences in the prevalence of depression among nurses in different countries around the world. Moreover, different methodological designs and different tools used for assessing depression could play a role in explaining these discrepancies.

The rate of depression among nurses is considerably high. Nursing is considered as one of the most stressful jobs, and this can increase depression and reduce nurses' job performance and working motivation over time (54).

In Iran, the Ministry of Health is responsible for recruiting and training nurses. Given the limited financial resources in the health sector, the country is faced with shortage of nurses like other many developing countries. A total of 90 026 nurses in Iran were employed in 2008, while the country needed at least approximately 220 000 nurses (55). The shortage of work force has led the nurses to provide services for longer hours. Lack of manpower in hospitals increases job burnout in nurses, reduces job satisfaction, and raises the rate of depression (56). Based on studies in different geographical areas of Iran and considering the results of this study, the highest rate of depression was in the Western part of Iran, with a prevalence of 27%. Iran has a large population in its West part, and unfortunately, shortage of nurses is particularly high in this area. On the other hand, the significant role of the private sector in the health sector and the lack of private hospitals have increased the workload of nurses, resulting in an increase in the rate of depression among them.

Several studies have shown that nurses who work for longer periods are more prone to depression. Fatigue

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caused by an increase in working hours can have a devastating impact on intellectual and spiritual life (52). Also, the rate of depression among nurses could depend on working in specific wards, where stress is higher. Unfortunately, in this study, no proper information was available to compare the level of depression in different parts of hospitals.

It seems that health care workers working in intensive care units (ICUs), coronary care units (CCUs), emergency, surgery, pediatrics, ear, nose and throat (ENT), and internal departments are at higher risk of developing depression. Also, nurses working in psychiatric hospitals and clinics are more prone to depression. Due to hard working conditions in these sectors, the nurses are at greater risk for developing depression (52, 57). On the other hand, in sectors such as infectious diseases, fear of infections may cause too much stress in nurses. Nurses' work stress is generally high, and as the most important reason for depression is stress, stress management plays an important role in reducing depression in nurses (57). On the other hand, violence in the workplace is another factor profoundly influencing nurses' mental health. The violent and intimidating behavior of some patients and their relatives is another reason for the increase in depression rate (58). Studies revealed a relationship between workplace violence and depression among nurses. Indeed, nurses who have experienced violence are more likely to develop depression than the ones who have been less exposed to violence. Research shows that the prevalence of violence caused by employment condition has a huge impact on psychological conditions of nurses (59).

Nurses, due to long working hours in the hospital, do not have a chance to attend social activities. Sustained engagement in social activities, communication with friends, and emotional interactions with family members make people less susceptible to stress, isolation, and depression (60).

Research has shown that people who work in rotating shifts (round the clock) have lower level of serotonin hormone than others. Serotonin is a neurotransmitter of the central nervous system that helps the body to regulate sleep. Insomnia has a negative impact on the body and mind of individuals over time and can cause depression and anxiety. Working shifts can cause insomnia and disruption of the body's circadian rhythm. Nurses and doctors are among people whose circadian rhythm is disrupted and get insufficient sleep. This impairs family, work, and social spheres (61, 62).

In this study, the prevalence of depression ranged from 5% to 46% (Table 2). One of the reasons for this variation comes from differences in diagnostic tests used (63).

The strengths of this study were performing a comprehensive and systematic research on diverse and important medical sites, using sensitivity analysis to check the stability of the results, and studying the potential sources of heterogeneity by meta-regression and subgroups-analyses.

However, this study had some limitations. There was a high level of observed heterogeneity, which was mainly due to the examination of studies characterized by different geographic locations, and there were different methodological features. Furthermore, the collected data were insufficient to stratify the prevalence of depression by gender and different hospital wards.

As such, we recommend that future high-quality studies be conducted fully taking into account the results of the current investigation.

Conclusion

According to the results of this study, the prevalence of depression among Iranian nurses is 22%, which is relatively high. Presence of happy nurses with good mental state is essential for the promotion of patients' health care. Thus, health policy- makers in Iran should have a comprehensive plan to increase the manpower in nursing, try to manage nurses' working hours, and provide wage increase and welfare services to raise job satisfaction and motivation in nurses.

Funding/Support

Iran University of Medical Sciences, Tehran, Iran, (Grant No: 96-01-193-30016).

Conflict of Interests

The authors declare that they have no competing interests.

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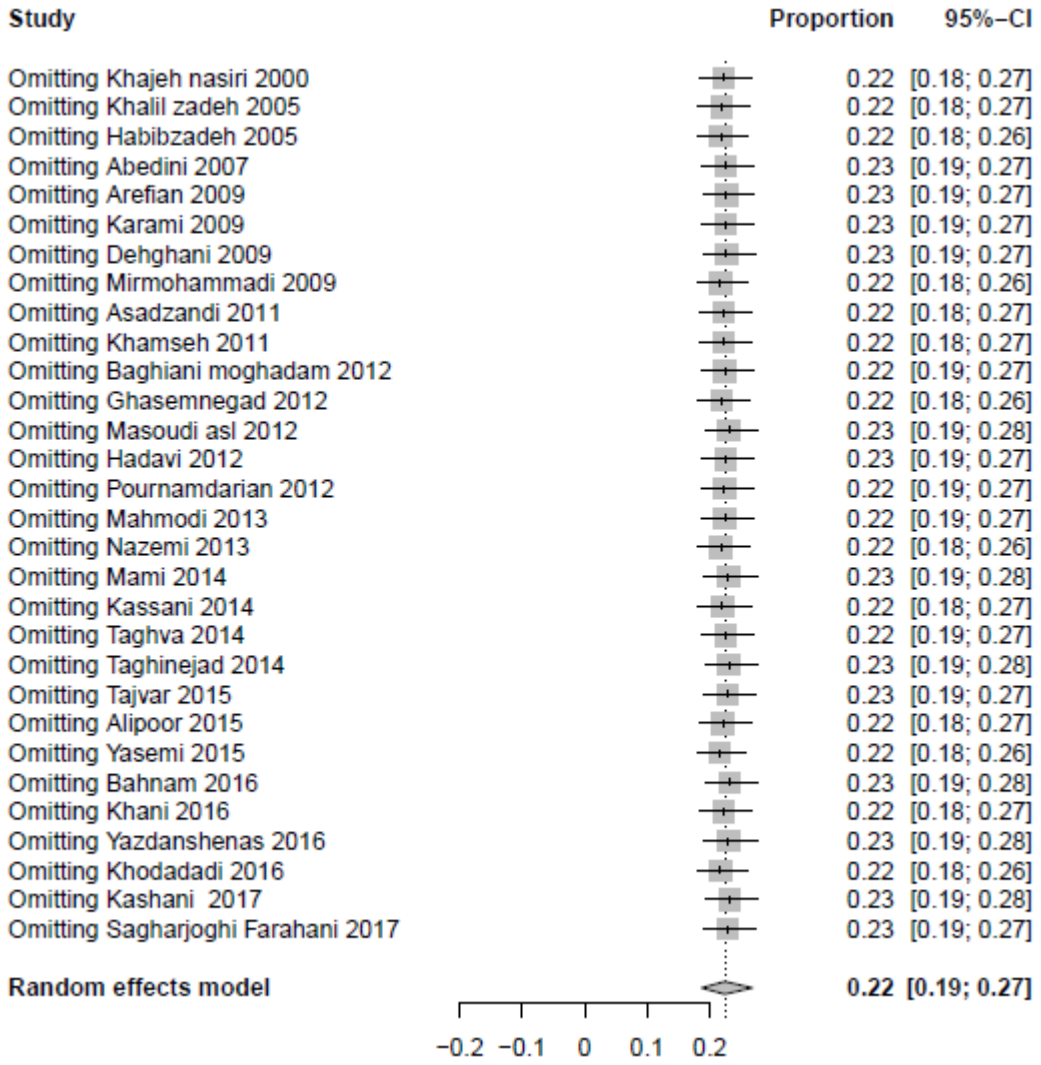
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Appendix 1. Search strategy in PubMed/MEDLINE and ISI/Web of Sciences

Search strategy for PubMed/MEDLINE
#1 Prevalence[Tiab]
#2 Frequency[Tiab]
#3 Epidemiology[Tiab]
#4 #1 OR #2 OR #3
#5 Depression[Tiab]
#6 Mental Health Disorder[Tiab]
#7 Major Depression Disorder[Tiab]
#8 #5 OR #6 OR #7
#9 Nurses[Tiab]
#10 Iran[Tiab]
#11 #4 AND #8 AND #9 AND #10

Search strategy for ISI/Web of Sciences
#1 TS=(Prevalence* OR Frequency* OR Epidemiology)
#2 TS=(Depression* OR Mental Health Disorder* OR Major Depression)
#3 TS=(Nurses)
#4 TS=(Iran)
#5 #1 AND #2 AND #3 AND #4

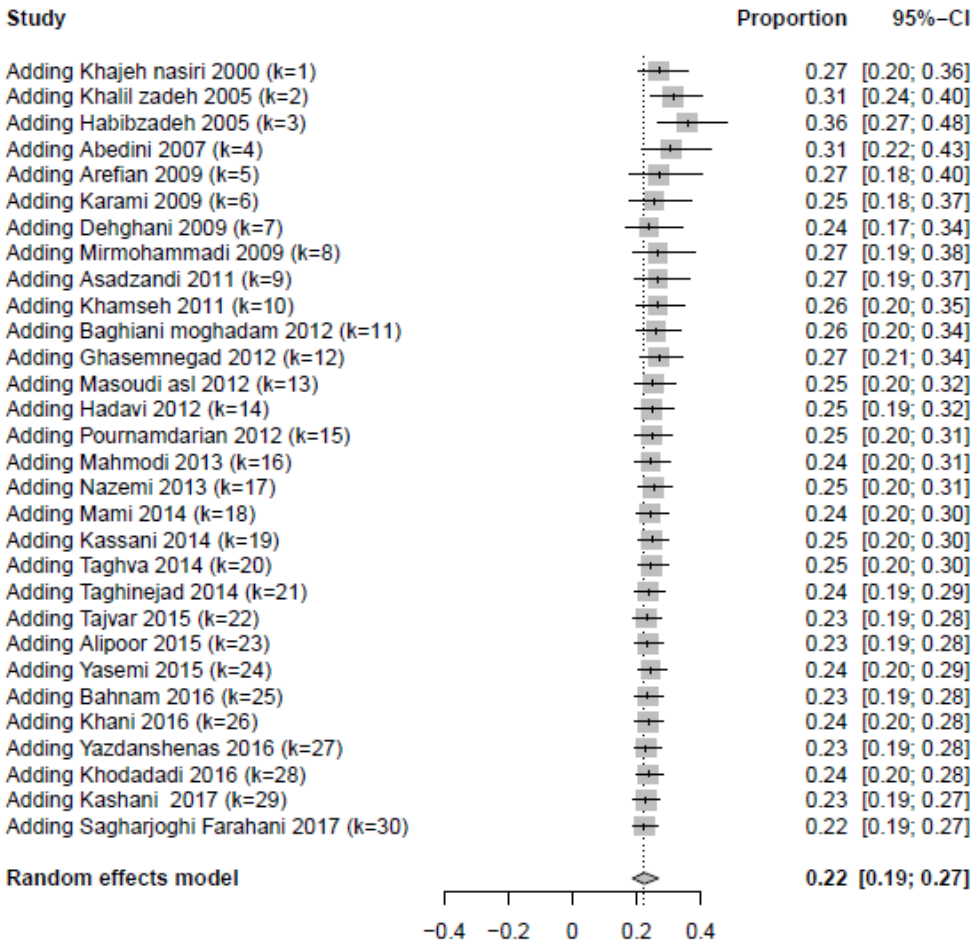
Appendix 2. Sensitivity analysis of included studies



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Appendix 3. Cumulative meta-analysis of included studies



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