



Sleep Disturbances Among Nurses in Iran: A Meta-Analysis

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Abstract

Context: Sleep disorder is a crucial occupational problem for nurses that not only makes health problems for them but also affects job performance and patient's safety. The status of sleep disorders in nurses is reported variously in Iran.

Objective: This study aimed to provide an accurate, precise, and reliable estimate of sleep disorders among nurses using a meta-analysis.

Methods: To find relevant studies, international (PubMed, Web of Sciences, and Scopus) and Iranian (Magiran, IranMedex, SID, Iran-Doc, and Medlib) databases were systematically searched until June 2017. Statistical analysis was performed using Stata Statistics Software version 11 (Stata Corp., College Station, TX., USA). The heterogeneity of studies was calculated using the I-square test. The analysis of data was conducted using a random-effects model.

Results: Overall, 6894 subjects were enrolled from 26 reviewed studies. The pooled rate of poor sleep quality among nurses in Iran was 64% (95% CI: 55 - 73), and the average score of the Pittsburgh sleep quality index (PSQI) was estimated to be 8.72 (95% CI: 7.80 - 9.65). The prevalence of daytime sleepiness was 36% (95% CI: 23 - 48). The rate of hypnotic drug consumption was 28% (95% CI: 17 - 38), the sleep latency was 30.84 minutes (95% CI: 27.98 - 33.70), and the mean sleep duration was estimated to be 6.43 hours (95% CI: 5.29 - 7.56).

Conclusions: The prevalence of sleep disorders was high among Iranian nurses. It seems necessary to implement appropriate measures, such as optimal scheduling of work shifts, sleep hygiene education, and day rests after night shifts.

Keywords: Depression, Meta-Analysis, Nurses, Prevalence, Sleep Disorder

1. Context

Sleep is a biological function, which is essential to human health and wellbeing (1). Sleep disorders are among the most important public health concerns around the world (2, 3). Shift work is a necessity for most groups of healthcare workers (4, 5). The previous studies show that shift working can lead to important sleep disorders (1, 5-7). Shift work is associated with significant physiological and psychological impacts such as anxiety, depression, and mental health problems (8, 9), insomnia, impaired focus, fatigue, mood disorders, low quality of care, reduced job performance, job dissatisfaction, accident, and family problems (4, 10, 11).

Nurses, as one of the most prominent groups of health professionals, had a critical role in healthcare systems (12). They often have rotating work shifts (13-15), which can lead to adverse effects such as physical and psychological problems, accidents, injuries, circadian rhythm asynchronies, and sleep disorders (16-18).

Generally, sleep disorders are among crucial occupational health issues for nurses that can lead nurses to not only health problems, but also lower job performance (19), medical errors (20, 21), depression (20), low-quality performance (22), and reduced patient safety (23).

The rate of low sleep quality in healthcare workers was reported to be 42.3% in a study in Najran, Saudi Arabia (24) and 54.2% in Kano, Nigeria (25).

Overall, nurses are more vulnerable to sleep disorders compared to other health care workers (26). The literature shows that sleep problems are prevalent among nurses. In this regard, in a study from Taiwan (2013), poor sleep quality in nurses was reported as 75.8% (19). In addition, in a study from China, the rate of poor sleep quality was 72.1% among nurses (6). In another study from Corpus Christi (USA), 63% of nurses reported poor sleep quality, and 22% of the nurses experienced daytime sleepiness (27). Moreover, in Nigeria, 61% of nurses reported poor sleep quality (28).

Considering the importance and crucial role of sleep for nurses, the evaluation of the status of sleep disorders is essential for hospital managers and policymakers to plan and employ preventive strategies and improve sleep quality. In Iran, many studies have been performed on sleep disorders among nurses. Nonetheless, the status of sleep disorders among nurses has been varied in different studies. So far, no systematic review has been performed on sleep problems among nurses. Therefore, this study aimed to present an accurate and reliable estimate of sleep disorders among Iranian nurses using a meta-analysis.

2. Methods

2.1. Data Source

This study is a systematic review and meta-analysis of the literature on sleep disorders in Iranian nurses following the PRISMA guidelines (29).

2.2. Search Strategy

To identify relevant studies, both international (PubMed, Web of Science, and Scopus) and national (SID, Medlib Magiran, IranMedex, and IranDoc) databases were systematically searched until June 2017. The keywords included "sleep quality," "sleep disturbances," "sleep disorders," "Iran" and "nurses." To improve the search sensitivity, all possible combinations of Persian and English keywords were also searched. The reference list of the papers was also manually reviewed to detect relevant studies.

2.3. Inclusion and Exclusion Criteria

Descriptive and cross-sectional studies on sleep disorders among nurses were included in the meta-analysis. Studies with inadequate data and those with no access to full texts were eliminated from the search. Studies on nurses' attitudes, knowledge, or awareness of sleep disorders, as well as interventional and qualitative studies, were excluded. Regarding duplicate publications, the most recent studies with more detailed information were included. The recruited studies were reviewed independently by two reviewers and disagreements were solved by discussion. In this review, studies populations were nurses, and the outcome was sleep quality.

2.4. Data Extraction

Data were extracted using a designed checklist that included authors' names, the study place, year of study, sample size, the poor sleep quality rate, PSQI score, the rate of daytime sleepiness, hypnotic drug consumption, sleep latency, and sleep duration. The researchers extracted the

data from the selected studies. To reduce the risk of publication bias, blinding and task separation methods were applied.

The quality was assessed using the STROBE (the strengthening the reporting of observational studies in epidemiology) checklist, which determines the methodological characteristics of studies (30). This checklist is a valid and reliable tool for reporting of studies (31).

This checklist had 22 items, and according to the previous study, we considered the quality of studies as high (score 17 - 22), moderate (score 8 - 16), and low (score 1 - 7) (32).

2.5. Statistical Analysis

Statistical analyses were carried out by STATA Statistics Software version 11 (Stata Corp., College Station, TX., USA). The heterogeneity index of studies was calculated using the I-square (I²). Since the heterogeneity index was significant in the current study ($P = 0.000$), the analysis of data was conducted using a random-effects model.

3. Results

3.1. Study Selection

Using the search strategies, a total of 384 articles were retrieved on sleep disorders among Iranian nurses. 175 duplicates were excluded, and the titles of the remaining 209 articles were screened. Then, 153 articles were found irrelevant and excluded. In the next step, after reviewing the full texts of the remaining 56 articles, 30 other irrelevant studies were also excluded. Finally, 26 studies with a sample size of 6894 were included in this review (Figure 1).

The Egger's plot was used to assess the publication bias in the included studies (Figure 2).

The poor sleep quality prevalence ranged from 14% to 91% in different studies from Iran. The combined results of 22 studies showed that the pooled rate of poor sleep quality was 64% among nurses in Iran (95% CI; 55 - 73) (Figure 3).

In the present study, the mean score of PSQI was estimated at 8.72 (95% CI; 7.80 - 9.65) in the range of poor sleep quality (Figure 4).

Meta-regression showed that poor sleep quality prevalence according to year had an increasing trend (Figure 5).

The overall prevalence of daytime sleepiness ranged from 16% to 58% in different studies among nurses. The combined results of seven studies showed that the prevalence of daytime sleepiness was 36% among Iranian nurses (95% CI; 23 - 48) (Figure 6).

In the present study, the rate of hypnotic drug consumption was approximately 28% (95% CI: 17 - 38) among

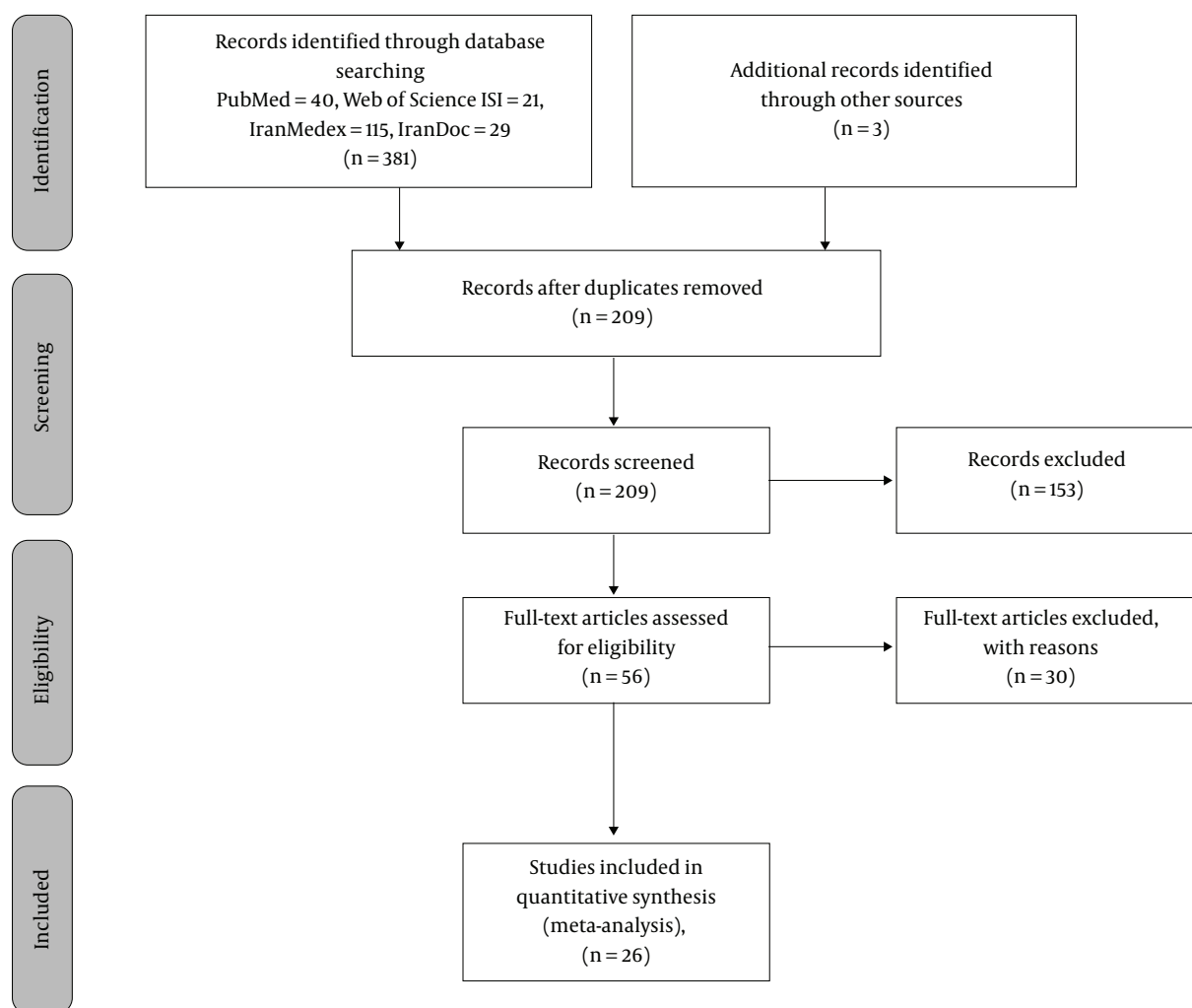


Figure 1. Flow diagram of the selected studies

Iranian nurses. In addition, sleep latency was 30.84 minutes (95% CI: 27.98 - 33.70) among nurses, and the mean sleep duration was 6.43 hours (95% CI: 5.29 - 7.56) among study subjects.

4. Discussion

Previous studies on sleep disorders among nurses in Iran show various findings. In our study, the overall estimation of poor sleep quality was 64% among nurses in Iran, which is consistent with some similar studies. In this regard, a study from China on 4951 nurses reported a poor sleep quality rate of 63.9% (26). Moreover, 61% of nurses had poor sleep quality in Nigeria that is similar to our study (28).

In a study in China, the poor sleep quality rate was 72.1% among nurses (6). In addition, in a study in Taiwan, the poor sleep quality rate was 57% among nurses, which is similar to the present study (33). In another study from Taiwan, 75.8% of nurses reported poor sleep quality (19), which is higher than the value found in the present study.

Moreover, in a study on sleep disorders among nurses in Norway, the prevalence of poor sleep quality was 70%, which is slightly higher than the rate in the present study (34). In addition, in a study from Corpus Christi (USA), the poor sleep quality rate was 63%, and 22% of nurses complained of sleepiness, which is similar to the findings of the present study (27).

Han et al. conducted a study on 2,033 nurses in Harbin Medical University and reported that the poor sleep qual-

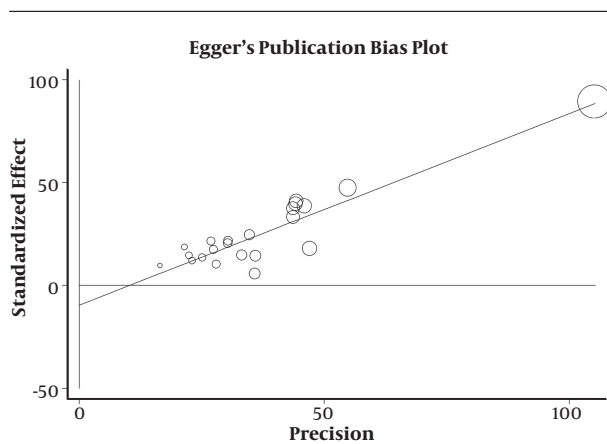


Figure 2. Egger's plot of selected studies

ity rate was 42.9% (35), which is lower than the rate in the present study. In a study in Germany, the rate of poor sleep quality among female nurses was reported to be 33% (36), which is lower than the rate in the present study. In their study, an analog scale was used to evaluate sleep quality, which may be the reason for the lower rate of poor sleep quality.

The prevalence of sleep disorders among nurses is a prevalent problem, suggesting that nurses are at risk of sleep disorders, thus necessitating more attention. Since nurses should work in different shifts, the sleep-weak-up patterns are disrupted, making them more susceptible to develop sleep disorders.

The mean total PSQI score in our study was 8.72, which is indicative of poor sleep quality. In a study performed in Turkey on 418 nurses, the mean PSQI score was 7.46 ± 3.58 , which is consistent with the present study (37). Moreover, in a Norwegian study, the average score of PSQI was 7.5 ± 3 among nurses working in the intensive care unit, which is similar to the present study (34). Furthermore, the mean score of PSQI was 7.32 ± 3.24 among Chinese nurses, which is similar to the score found in the present study, indicating poor sleep quality (26).

In a study from Taiwan, the sleep quality score was greater among nurses working in nightshifts (9.04) than in those who worked in dayshifts (7.32) (8). The higher PSQI scores of nurses indicate poor sleep quality in this group. In a study from Portugal, the mean PSQI score was 7.02, which is slightly better than that in the present study (10). Moreover, in a study from Sao Paulo, the overall score of PSQI was 6.8, which indicates a better sleep status, compared to the present study (38).

In the present study, the overall daytime sleepiness rate was 36% among nurses. The rate of daytime sleepiness was

26% among 4407 nurses in Japan, which is lower than the rate of the present study (39). In another study from Norway, the rate of sleepiness among nurses was 25%, which is lower than the rate reported in the present study (34). In addition, in the study from Corpus Christi (USA), the rate of sleepiness was 22% among nurses, which is also lower than the present findings (27).

The rate of hypnotic drug consumption among nurses was 28% in our study. In a previous study from Brazil, approximately 17.7% of nurses used sleep medications, which is lower than the rate in the present study (40). In the present study, sleep latency was 30.84 minutes among nurses, which is longer than the finding reported from Taiwan (18.33 minutes) (19).

In addition, the average sleep duration was 6.43 hours for nurses, which is similar to the study from Taiwan (6.11 hours) (19). In another study from Portugal, sleep duration was reported about 7.5 hours per day among nurses, which is similar to the present study (10).

Sleep disorders can affect the nurse's performance, care quality, and patient's safety (15, 17). Therefore, the sleep problem is of great importance among nurses. The results of the present study, as well as research from other countries, show that nurses are at risk of sleep disorders. Therefore, comprehensive programs are needed to overcome sleep problems among nurses. Moreover, planning for improving work shift schedules by head nurses can be helpful. In addition, the use of day rest after night work can improve the nurses' sleep quality (8).

4.1. Limitations

The rate of poor sleep quality among nurses in different wards was not clearly reported in some studies. The studies were not conducted evenly in all regions of Iran. Moreover, the subscales of PSQI were not reported in several studies. Despite these limitations, the present review is the first meta-analysis of sleep problem among nurses. In this study, we performed a comprehensive search of published and unpublished reports, as well as grey literature, in international and national databases.

4.2. Conclusion

The prevalence of sleep disorders was high among Iranian nurses. Because sleep can affect the personal and professional lives of nurses, it seems necessary to implement appropriate measures, such as optimal scheduling of work shifts, sleep hygiene education, and day rests after night shifts.

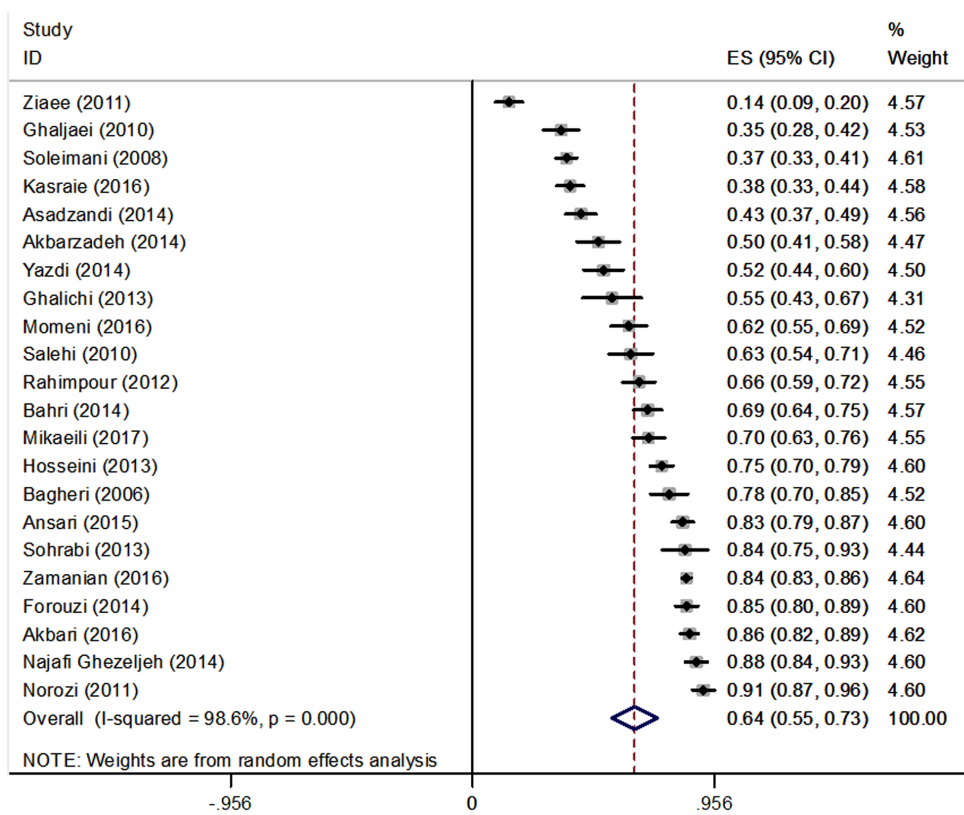


Figure 3. The rates of poor sleep quality in Iranian nurses

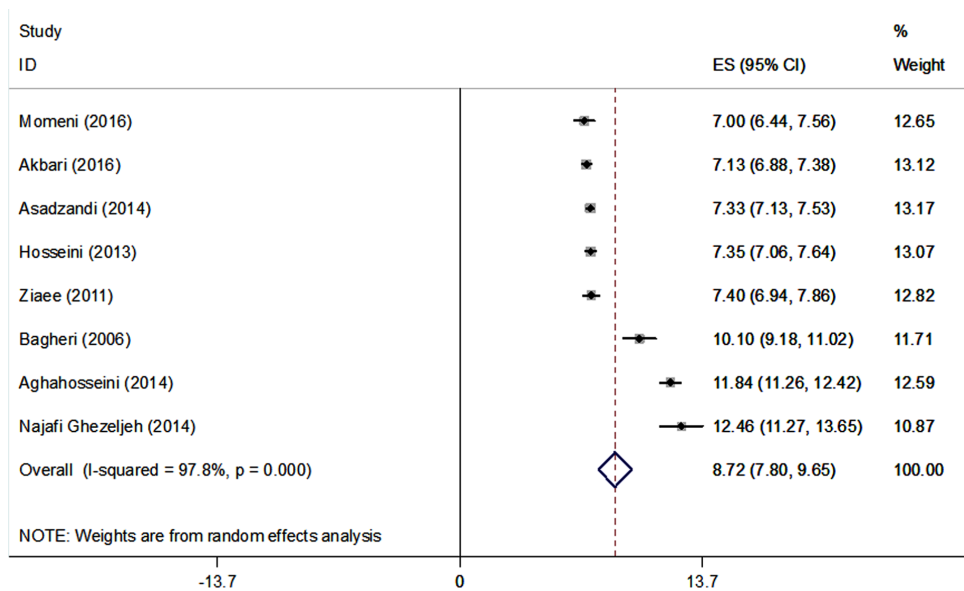


Figure 4. The overall PSQI score means in Iranian nurses

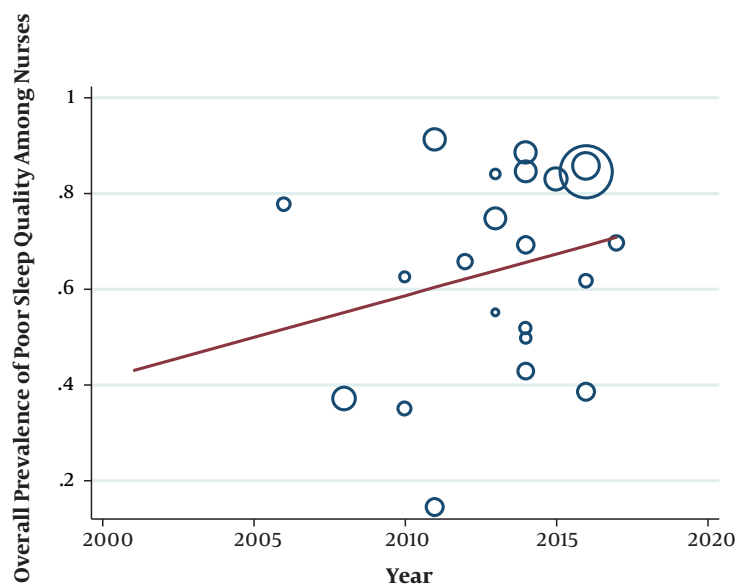


Figure 5. The meta-regression of poor sleep quality trend

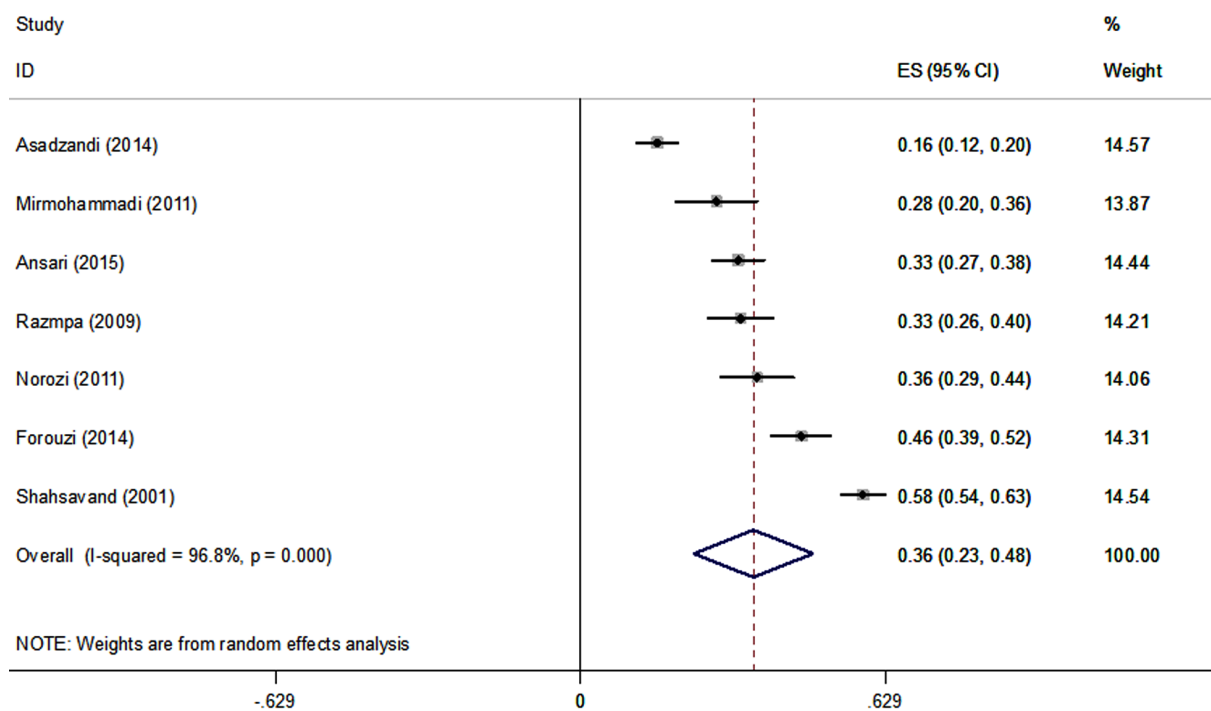


Figure 6. Daytime sleepiness rate in Iranian nurses

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Footnotes

Authors' Contribution: Study design, Ehsan Mohammadi; data gathering, Ehsan Mohammadi and Kourosh Sayehmiri; analysis and interpretation of data, Kourosh Sayehmiri; manuscript preparation, Ehsan Mohammadi; manuscript revision, Kourosh Sayehmiri.

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