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Meta-Analysis
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Meta-Analysis: Effects of Workload and Work Environment on Work Satisfaction in Health Personnel

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ABSTRACT

Background: Job satisfaction is one of the important points to motivate and improve work efficiency, high job satisfaction can improve the performance of health workers and patient satisfaction. However, low job satisfaction results in fatigue and a tendency to increase the turnover of health workers which will exacerbate the condition of health facilities. The research objective was to analyze the effect of workload and work environment on job satisfaction in health workers.
Subjects and Method: This study is a meta-analysis with PICO. Population: health workers. Intervention: high workload and safe work environment. Comparison: low workload and unsafe work environment. Outcome: job satisfaction. The articles used in this study were obtained from three databases namely Google Scholar, Science Direct and Pubmed. The keywords used to search for articles are "Workload" OR "Job Overload" AND "Safe Work Environment" AND "Job Satisfaction" AND "Health Workers" AND "Multivariate". The articles used were full text in English from 2012 to 2022. Articles were selected using the PRISMA flowchart and analyzed using the RevMan 5.3 application.
Results: A total of 17 cross-sectional study articles from Ethiopia, Switzerland, Israel, Belgium, China, Canada and Denmark. Based on the analysis, health workers with high workloads reduced job satisfaction 0.47 times compared to health workers with low workloads and this was statistically significant (aOR=0.47; 95% CI=0.24 to 0.92; p=0.030). Health workers with a safe work environment increased job satisfaction 2.75 times compared to health workers with an unsafe work environment and this was statistically significant (aOR=2.75; 95% CI=1.59 to 4.78; p=0.003).
Conclusion: High workload reduces job satisfaction in health personnel and a safe work environment increases job satisfaction in health personnel.

Keywords: workload, work environment, job satisfaction

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BACKGROUND

Health workers have an important role to play in improving the maximum quality of health services to the community so that they are able to increase awareness, willingness and ability to live healthily so that good health status will be realized. A health worker in carrying out his work certainly has the desire to achieve satisfaction at work. Satisfaction at work is one of the important points

to motivate and improve the work efficiency of health workers, where high job satisfaction can improve the performance or performance of a health worker and patient satisfaction. However, the low job satisfaction of health workers results in fatigue at work and a tendency to increase the turnover of health workers which will then exacerbate conditions in various health care facilities (Apriyanto and Haryono, 2020). Job satisfaction is also defined as job satisfaction enjoyed in work that gets praise, work results, placement, treatment, equipment and a good working environment among fellow health workers (Putri, 2018).

There are several factors that affect the job satisfaction of health workers, including the high and low workload and the good or bad safety of the work environment. The unequal number of health workers and patients often causes an increase in workload. In addition, health workers who work continuously and are not supported by a safe work environment will have a negative impact on the job satisfaction of health workers. Health worker workload is the amount of work that must be completed by professional health workers in one year and one health service facility. The workload also takes into account the standard number of workers according to the profession, qualification standards and job evaluation standards (Li et al., 2017). Health worker workload is the amount of work that must be completed by professional health workers in one year and one health service facility. The level of workload does not only depend on the number of available workers, but also depends on the qualifications of these health personnel.

In addition, job satisfaction of a health worker is also influenced by work environment factors. According to Rizany (2022), the work environment is everything, events, people and others that are around the workplace and can affect the way health workers work. A safe and good work environment will certainly have a positive impact on job satisfaction, so that productivity and work performance can increase. Meanwhile, the benefits derived from working with motivated people are that work can be completed properly. The purpose of this study was to analyze how much influence workload and work environment have on job satisfaction in health personnel.

SUBJECTS AND METHOD

1. Study Design

This was a systematic review and meta analysis. The search for article sources carried out by researchers relied on online article searches. Data collection was obtained from three databases namely Google Scholar, Pubmed and Science Direct. The keywords used to search for articles are “Workload” OR “Job Overload” AND “Safe Work Environment” AND “Job Satisfaction” AND “Health Workers” AND “Cross Sectional” AND “Multivariate”. This research analysis was carried out using the RevMan 5.3 application.

2. Steps of Meta-Analysis

Meta-analysis analysis was carried out through 5 steps as follows:

1) Formulate research questions in PICO (Population, Intervention, Comparison, Outcome). The PICO formula in this study is Population = health workers. Intervention = high workload and safe work environment. Intervention = low workload, unsafe work environment. Outcome= job satisfaction.
2) Search for articles from various databases including Google Scholar, Pubmed, and Science Direct.
3) Conduct screening and critical appraisal of primary studies using the Critical Appraisal Checklist for Cross-sectional Studies from the Center for Evidence Management

4) Perform data extraction and enter the effect size of each primary study into the RevMan 5.3 application
5) Interpret the results of the research analysis and draw conclusions

3. Inclusion Criteria

The inclusion criteria used were articles in full text and published in English, using a cross-sectional study design, the results of the study were tested multivariately and reported in the Adjusted Odds Ratio (aOR) and the research subjects were health workers.

4. Exclusion Criteria

Exclusion criteria in this study were articles published other than English and articles published before 2012.

5. Operational Definition

Workload is the number or difficulty of work demands assigned to health workers and must be completed at a certain time.

The work environment is everything related to the physical condition of the workplace around health workers that can influence them in carrying out their duties.

Job satisfaction is a pleasant or unpleasant emotional state felt by health workers in viewing a job.

6. Istrument

The study instrument used in this study was the Critical Appraisal Checklist for Cross-sectional Study from the Center for Evidence Based Management (CEBMa, 2014).

7. Data Analysis

The collected articles were then processed using the Review Manager application (RevMan 5.3). Data processing is done by calculating the aOR. Forest plots and funnel plots are used to determine effect sizes and heterogeneity of data.

RESULTS

Search for articles in this study through databases that include PubMed, Google Scholar, and Science Direct. The article review process can be seen in the search flow in Figure 1. The initial search process yielded 3,226 articles, after the process of deleting duplicate articles, 2,693 were obtained and 240 articles met the requirements for full text review. The final results obtained were 17 articles that met the criteria according to the meta-analysis of quantitative synthesis.

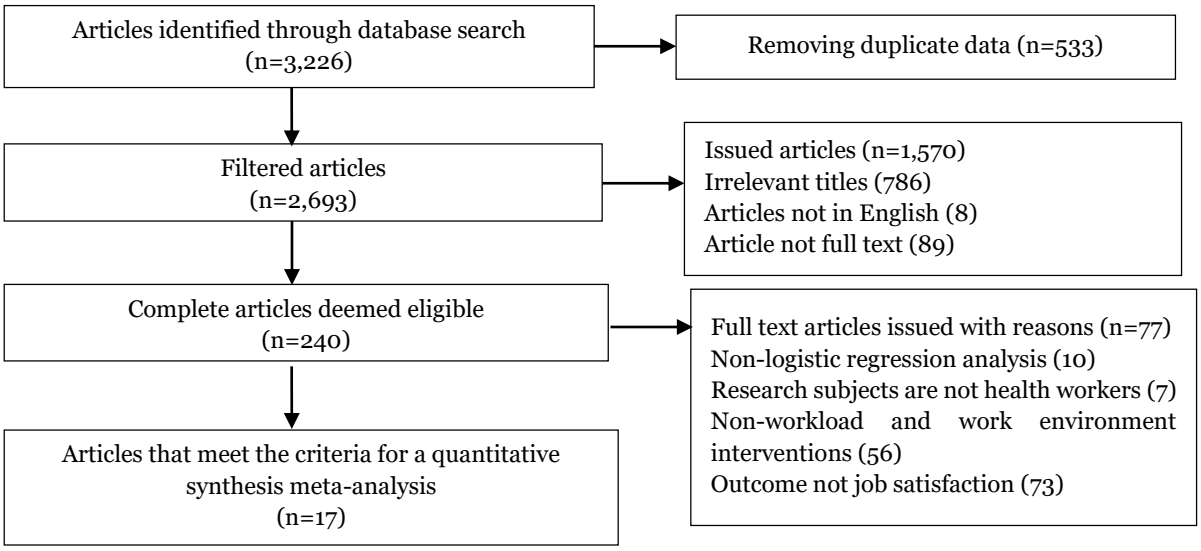

Figure 1. PRISMA Flow diagram

Figure 2. Map of the distribution of research on the effect of workload and work environment on job satisfaction

Figure 2 shows a map of the distribution of research on the effect of workload and work environment on job satisfaction in the obtained health workers. Based on 17 research articles obtained from 4 continents, 1 study was obtained from the Americas, namely Canada. 3 studies were obtained from the European continent, namely Switzerland, Belgium and Denmark. 3 studies were obtained from the Asian continent, namely China and Israel. And 10 studies were obtained from the African continent, namely the country of Ethiopia.

Table 1. Critical appraisal checklist for cross-sectional study from the center for evidence based management (CEBMa)

Primary Study	Criteria												
	1	2	3	4	5	6	7	8	9	10	11	12	Total
Kalkidan *et al.*, (2018)	1	1	1	1	1	1	1	1	1	1	1	1	12
Schwendiman *et al.*, (2016)	1	1	1	1	1	1	1	1	1	1	1	1	12
Ayele *et al.,* (2017)	1	1	1	1	1	1	1	1	1	1	1	1	12
Bekru *et al.*, (2017)	1	1	1	1	1	1	1	1	1	1	1	1	12
Bogaert *et al.*, (2018)	1	1	1	1	1	1	1	1	1	1	1	1	12
Li Na *et al.*, (2020)	1	1	1	1	1	1	1	1	1	1	1	1	12
MacPhee *et al* (2017)	1	1	1	1	1	1	1	1	1	1	1	1	12
Gebaba *et al.,* (2020)	1	1	1	1	1	1	1	1	1	1	1	1	12
Ayalew *et al.*, (2019)	1	1	1	1	1	1	1	1	1	1	1	1	12
Kagan *et al.*, (2021)	1	1	1	1	1	1	1	1	1	1	1	1	12
Geleto *et al.*, (2015)	1	1	1	1	1	1	1	1	1	1	1	1	12
Gedif *et al.*, (2018)	1	1	1	1	1	1	1	1	1	1	1	1	12
Geta *et al.*, (2021)	1	1	1	1	1	1	1	1	1	1	1	1	12
Riisgaard *et al.*, (2017)	1	1	1	1	1	1	1	1	1	1	1	1	12
Manyazewal *et al.,* (2017)	1	1	1	1	1	1	1	1	1	1	1	1	12
Asegid *et al.*, (2014)	1	1	1	1	1	1	1	1	1	1	1	1	12

Description of the answer score:

1 = Yes

0 = No

Question criteria descriptions:

1) Does this research address questions or problems regarding the effect of workload and work environment on job satisfaction in health workers?
2) Is the research method with a cross-sectional study design suitable for answering the research problem?
3) Is the subject selection method clearly explained?
4) Does the sampling method cause bias (selection)?
5) Does the subject sample represent the population to which the findings will refer?
6) Is the sample size based on pre-study considerations of statistical power?
7) Was a satisfactory response achieved?
8) Is the research instrument valid and reliable?
9) Was statistical significance assessed?
10) Are confidence intervals given for the main results?
11) Are there any confounding factors that have not been taken into account?
12) Are the results applicable to your research?

Table 2. Table PICO summary of cross-sectional source articles on the effect of workload on job satisfaction in health workers with a sample size (n = 8.455)

Author	Country	Sample	P	I	C	O
Kalkidan et al. (2018)	Ethiopia	575	Professional health personnel	Excessive workload	Low workload	Job satisfaction
Schwendiman et al. (2016)	Swiss	4,145	Nurse health personnel	High workload	Low workload	Job satisfaction
Semachew et a (2017)	Ethiopia	316	Nurse health personnel	High workload	Low workload	Job satisfaction
Bekru et al., (2017)	Ethiopia	234	Midwife health personnel	High workload	Low workload	Job satisfaction
Bogaert et al., (2018)	Belgium	1,236	Health personnel	High workload	Low workload	Job satisfaction
Li et al., (2020	China	256	Health personnel	Heavy workload	Light workload	Job satisfaction
Macphee et al., (2017)	Canada	472	Nurse health personnel	Heavy workload	Light workload	Job satisfaction
Li et al., (2017)	China	1,221	Doctor health personnel	High workload	Low workload	Job satisfaction

Table 3. Data on adjusted odds ratio (aOR) and 95% confidence interval (CI 95%) on the effect of workload on job satisfaction in health workers (n=8.455)

Author (Year)	aOR	CI 95%	
		Lower Limit	Upper Limit
Kalkidan *et al.,* (2018)	3.99	2.13	7.45
Schwendimann *et al.*, (2016)	0.86	0.74	1.01
Semachew *et al.*, (2017)	0.07	0.04	0.12
Bekru *et al.*, (2017)	0.11	0.04	0.42
Bogaert *et al.,* (2018)	0.54	0.35	0.86
Li Na *et al.,* (2020)	0.40	0.15	1.04
MacPhee *et al.*, (2017)	0.75	0.15	3.75
Li Tongtong *et al.*, (2017)	0.51	0.39	0.68

Table 1 shows the assessment of the quality of primary articles using CEBMa used in this study. Based on the results obtained, the total score of the 17 selected primary studies was around 12. This indicates that the quality of all the primary articles used in this study is worthy of meta-analysis.

Table 2 presents a summary of the source articles obtained by 8 primary articles with a cross-sectional study design used for meta-analysis on the effect of workload on job satisfaction in health workers. The total sample is 8,455 samples.

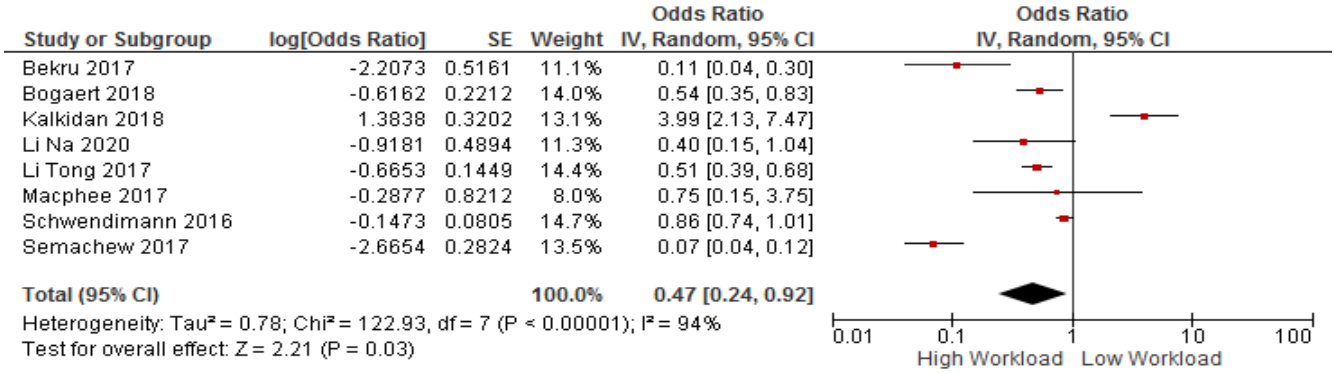

Figure 3. Forest plot of the effect of workload on job satisfaction in health personnel

a. Forest plot

Forest plot Figure 3 shows that health workers with high workloads reduce job satisfaction 0.47 times compared to health workers with low workloads (aOR=0.47; 95% CI= 0.24 to 0.92; p=0.03). Heterogeneity in the studies showed (I^2=94%; p<0.001). Thus the calculation of the average effect estimate is carried out using the random effect model approach.

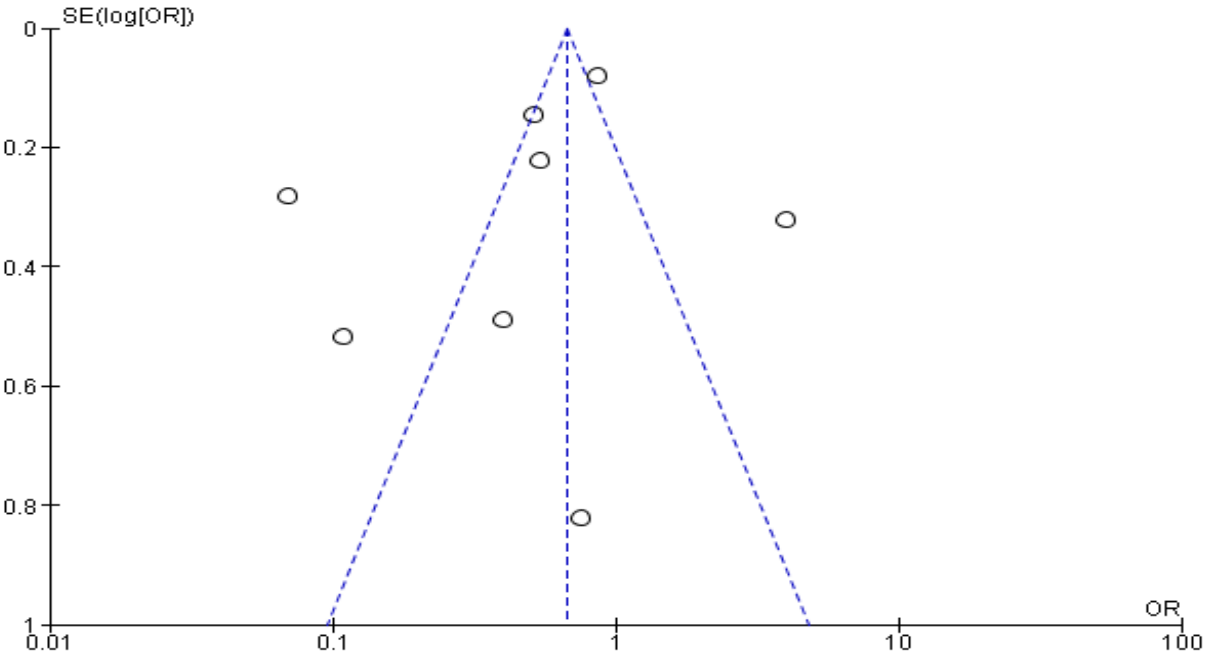

Figure 4. Funnel plot of the effect of workload on job satisfaction in health personnel

b. Funnel plot

The funnel plot in Figure 4 shows the distribution of the asymmetric effect estimates. The distribution of effect estimates is mostly located to the left of the estimated average vertical line, thus indicating publication bias. Because the distribution of effect estimates is mostly located to the left of the vertical line of the average estimate in the funnel plot which is the same as the average effect estimate in the forest plot which is located on the left, the publication bias tends to overestimate the true effect.

Table 4. PICO summary of cross-sectional studies on the influence of the work environment on job satisfaction in health workers with a sample size (n= 4, 497)

Author	Country	Sample	P	I	C	O
Gebaba *et al.*, (2020)	Ethiopia	389	Health personnel	Safe work environment	Unsafe work environment	Job satisfaction
Ayalew *et al.,* (2019)	Ethiopia	441	Nurse health personnel	Good environmental safety	Poor environmental security	Job satisfaction
Kagan *et al.,* (2021)	Israel	1.040	Nurse health personnel	Environmental security support	Unsafe environmental	Job satisfaction
Geleto *et al.,* (2015)	Ethiopia	405	Health personnel	Safe work environment	Unsafe work environment	Job satisfaction
Gedif *et al.*, (2018)	Ethiopia	383	Health personnel	Safe work environment	Unsafe work environment	Job satisfaction
Geta *et al.*, (2021)	Ethiopia	520	Professional health personnel	Safe work environment	Unsafe work environment	Job satisfaction
Riisgaard *et al.*, (2017)	Denmark	631	Health personnel	Safe work environment	Unsafe work environment	Job satisfaction
Manyazewal *et al.*, (2017)	Ethiopia	410	Professional health personnel	Safe work environment	Unsafe work environment	Job satisfaction
Asegid *et al.,* (2014)	Ethiopia	278	Nurse health personnel	Safe work environment	Unsafe work environment	Job satisfaction

Table 4 presents a summary 9 cross-sectional studies used for meta-analysis of the influence of the work environment on job satisfaction in health workers (n= 4,497). Table 5 presents the Adjusted Odds Ratio (aOR) and 95% Confidence Interval (CI 95%) on the effect of the work environment on job satisfaction in health workers.

Table 5. Data on adjusted odds ratio (aOR) and 95% confidence interval (95% CI) on the effect of the work environment on job satisfaction in health workers (n=4,497)

Author (Year)	aOR	CI 95%	
		Lower Limit	Upper Limit
Gebaba *et al.*, (2020)	4.08	1.98	8.41
Ayalew *et al.*, (2019)	4.88	1.13	21.07
Kagan *et al.,* (2021)	4.31	3.31	5.60
Geleto *et al.,* (2015)	4.61	3.33	6.38
Gedif *et al.*, (2018)	1.03	0.60	1.77
Geta *et al.*,(2021)	0.91	0.49	1.69
Riisgaard *et al.*,(2017)	4.33	0.78	24.04
Manyazewal *et al.*, (2017)	0.87	0.30	2.50
Asegid *et al.,* (2014)	26.63	4.27	166.07

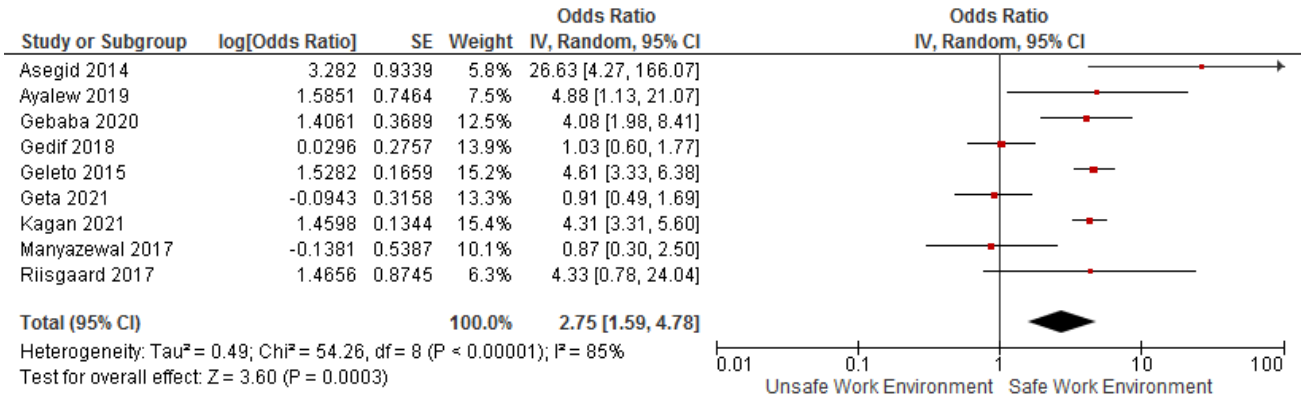

Figure 5. Forest plot of the influence of the work environment On job satisfaction in health workers

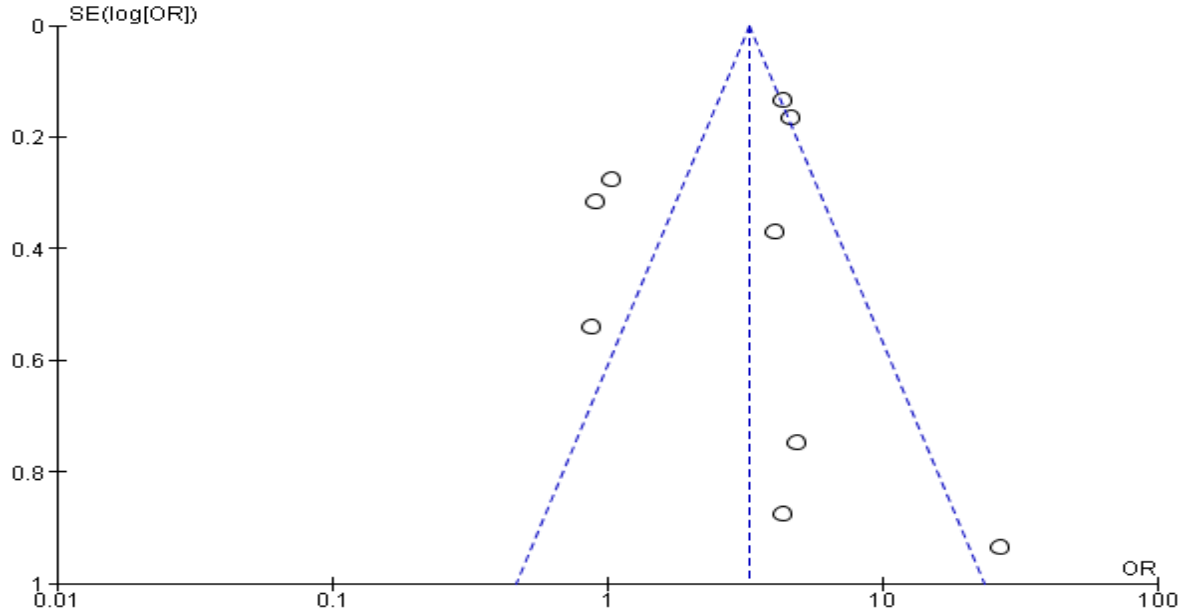

Figure 6. Funnel plot of the influence of the work environment On job satisfaction in health workers

1. The influence of the work environment on job satisfaction in health workers

a. Forest plot

The forest plot in Figure 5 shows that health workers with a safe work environment increase job satisfaction 2.75 times compared to health workers with an unsafe work environment (aOR=2.75; 95% CI=1.59 to 4.78; p=0.003). Heterogeneity in the studies showed (I^2=85%; p<0.001). Thus the calculation of the average effect estimate is carried out using the random effect model approach.

b. Funnel plot

The funnel plot in Figure 6 shows the asymmetric distribution of effect estimates. The distribution of effect estimates is mostly located to the right of the estimated average vertical line, thus indicating publication bias. Because the distribution of effect estimates is located to the right of the average vertical line in the funnel plot which is the same as the average effect estimate in the forest plot which is located on the right, the publication bias tends to overestimate the true effect.

DISCUSSION

In research with a systematic review design and meta-analysis with the topic of the effect of workload and work environment on job satisfaction in health workers. This study discusses the influence factors of job satisfaction on health workers.

Based on the analysis of 8 primary studies, it was found that health workers with high workloads reduced job satisfaction 0.47 times compared to health workers with low workloads (aOR=0.47; 95% CI=0.24 to 0.92; p=0.030). This is in line with Schafer et al., (2020) which revealed that health workers with a high workload reduced job satisfaction by 0.54 times compared to health workers who had a low workload. Another study conducted by Safitri and Astutik (2019) also shows that high workload reduces job satisfaction by 0.82 times compared to health workers with low workload. The same research by Said and El-Shafei (2021) on factors related to job satisfaction in nurses during the Covid-19 pandemic showed that nurse health workers with high workloads reduced job satisfaction 0.83 times compared to nurse health workers with low workload and significantly statistically significant (aOR=0.83; 95% CI=0.12 to 1.88; p=0.04). The impact of workload on task demands that are not in accordance with standards will have impacts such as the emergence of errors in reporting, physical and emotional fatigue, disruption of work processes, dissatisfaction of health workers with their work and the desire to move or leave their jobs (Sandra and Sondari, 2017).

Based on the analysis of 9 primary studies, it was found that health workers with a safe work environment increased job satisfaction 2.75 times compared to health workers with an unsafe work environment (aOR=2.75; 95% CI=1.59 to 4.78; p=0.003). The results of this study are in line with Ntopi et al., (2020) on health workers in Malawi which showed that nurse health workers with safe working conditions increased job satisfaction 1.24 times compared to health workers with unsafe working conditions and this was statistically significant (aOR= 1.24; 95% CI=0.72 to 2.14; p<0.05). Another study by Azagew (2020) showed that nurse health workers with good work environment security increased job satisfaction 6.56 times compared to nurse health workers with poor work environment safety and this was statistically significant (aOR=6.56; 95% CI=2.37 to 18.13 ;p=<0.001). A safe work environment is assessed from a good physical work environment which includes cleanliness of the workplace, good lighting, appropriate room temperature, a conducive work environment, away from noise which can cause disruption of the concentration of health workers in carrying out their work.

Several other studies have also stated that high workload and a safe work environment have an effect on job satisfaction in health workers. The limitations of this study are the presence of language bias because it only uses English-language articles, publication bias shown in the funnel plot results on asymmetric workload and work environment variables, and search bias because it only uses three databases. The conclusion in this meta-analysis study was that health workers with a high workload reduced job satisfaction 0.47 times compared to health workers with a low workload (aOR=0.47; 95% CI=0.24 to 0.92; p=0.030). Health workers with a safe work environment increased job satisfaction 2.75 times compared to health workers with an unsafe work environment (aOR=2.75; 95% CI=1.59 to 4.78; p=0.003). The results of this meta-analysis research can be used by policy makers so they can pay attention to appropriate workloads and safe work environments so as to increase job satisfaction in health workers.

AUTHOR CONTRIBUTION

Galuh Wulansari is the main researcher who selects topics, searches and collects articles, analyzes data and writes manuscripts. Bhisma Murti and Didik Tamtomo helped analyze the data and review research documents.

CONFLICT OF INTEREST

There was no conflict of interest in the study.

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