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Meta-Analysis
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Effects of Training and Supervision on Work Performance among Health Workers in Hospital: Meta-Analysis

Antina Lunturmas[1)], Eti Poncorini Pamungkasari[2)], Hanung Prasetya[3)]

[1)]Masters Program in Public Health, Universitas Sebelas Maret
[2)]Faculty of Medicine, Universitas Sebelas Maret
[3)]Study Program of Acupuncture, Health Polytechnics, Ministry of Health Surakarta

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ABSTRACT

Background: Performance in an organization is carried out by all existing human resources, both leaders and workers. There are several factors that can affect human resources in carrying out their performance, both factors that come from within human resources and those that come from outside themselves. The purpose of this study was to analyze the effect of training and supervision on the performance of health workers in hospitals, using a meta-analysis of primary studies conducted by previous authors.
Subjects and Method: This was systematic review and meta-analysis study conducted using the PICO model. Population: health workers. Intervention: training and supervision. Comparison: without training or supervision. Outcome: work performanceThe meta-analysis study was carried out by searching for articles from databases Google scholar, PubMed, Science direct, and Springerlink. The keywords used were "Performance" AND "Training" AND "supervision" AND "health workers" AND "Multivariate" AND "Cross-Sectional". An article search was conducted from 1 to 18 February 2023. The inclusion criteria for this study were complete articles using cross-sectional study, published years from 2013-2023. Analysis of the articles in this study used RevMan 5.3.
Results: A meta-analysis included 10 cross-sectional studies from Africa and Asia. Training (aOR= 1.68; 95% CI= 1.37 to 2.05; p= 0.001) and supervision (aOR= 2.38; 95% CI= 1.57 to 3.61; p= 0.009) improved health worker performance.
Conclusion: Training and supervision improve health worker performance.

Keywords: performance, training, supervision, health workers.

Correspondence:
Antina Luturmas, Masters Program in Public Health, Universitas Sebelas Maret. Jl. Ir. Sutami 36A, Surakarta 57126, Central Java, Indonesia. Email: antinaluturmas@gmail.com. Mobile: 08238720-4089.

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BACKGROUND

According to the Association of Hospital Care (1947), a hospital is a center where health services for a community, medical education and research are held. The hospital is also a training center for health workers and a research center for health workers and a medical research center (Yuniati, 2019). Since the 1978 Alma-Ata Declaration identified primary health care as an important mechanism for achieving health, there has been

increasing recognition that CHWs (community health workers), who are often elected and supported by the community, cannot be left to self-serve, but there are several challenges that plague CHW programs include a lack of oversight, fragmented training and weak linkages with health. Supervision and training supporting CHWs are recognized as important factors to ensure that CHWs perform well (Gopalakrishnan et al, 2021)

Some literature states that supportive supervision can help CHW (community health workers) improve their performance. A time use study conducted in Ghana reported that health workers who received supportive supervision spent more time providing direct patient care than workers who did not receive supportive supervision (OR=2.37; 95% CI; p<0.001). Another study conducted in India showed that among 809 CHW (community health workers), the initial proportion of better workers was 45%. Compared to CHWs who received a lower intensity of supportive supervision, CHWs who received a higher intensity of supportive supervision had a 70% higher chance (aOR=1.70; 95% CI=1.16 to 2.49; p=0.007) of better performance after controlling for their baseline performance (Gopalakrishnan et al 2021).

According to Nugrahaning (2013) performance is work performance or work (output) both quality and quantity achieved by human resources per period given to them. Good performance is highly expected for every company because performance is a benchmark in making comparisons between what is expected in relation to the job or position that has been entrusted to someone (Hasibuan, 2017).

Based on data from the Ministry of Health of the Republic of Indonesia in 2015, the highest number of health workers was nurses, 147,264 people (45.65%). In Indonesia, new professional nurses account for 2% of the total existing nurses. This figure is much lower than the Philippines, which has reached 40% with first and second degree education. Nurses who are "the caring profession" have an important position in producing quality health services in hospitals.

A study by Firza et al (2021) found that supervision improves performance. Nurses who receive supervision have the possibility to perform well 3.5 times compared to unsupervised (OR= 3.50; 95% CI; p= 0.002). Firza et al. (2021) also found that training increases the likelihood of good performance. Nurses who receive training have the possibility to perform well 4.9 times compared to no training (OR=4.902; 95% CI; p<0.001).

Based on the existing literature, statistical summaries are needed to estimate the effect of training and supervision on the performance of health workers. This study aims to analyze previous primary studies in assessing the effect of training and supervision on performance.

SUBJECTS AND METHOD

1. Study Design

The meta-analysis was carried out using the PRISMA flow chart using the Google scholar, PubMed, Science direct and Springerlink databases published from 2013 to 2023. The keywords used were “Performance” AND “Training” AND “Supervision” AND “Multivariate” AND “Cross -Sectional”. There were 10 studies with a cross-sectional study design that met the inclusion criteria. The analysis was performed with Rev-Man 5.3 software.

2. Meta-analysis Steps

The meta-analysis was carried out through 5 steps as follows:

1) Formulate research questions using the PICO model. P= Health worker; I= There is training, there is supervision; C= No training, no supervision; O= Performance.
2) Search for primary study research articles from 4 online databases namely Google

Scholar, PubMed, Science direct and Springerlink.

3) Conduct screening and quality assessment of primary research articles
4) Extract and analyze data into RevMan 5.3 software.
5) Interpret the results and draw conclusions.

3. Inclusion Criteria

This research article is a full-text paper with a cross-sectional study design that analyzes the effect of training and supervision on the performance of health workers. The influence measure used is the OR. Analysis used multivariate with adjusted odds ratio (aOR) and published articles in English.

4. Exclusion Criteria

The articles are not in English, the study design is not cross-sectional, and the articles were published before 2013.

5. Definition of Operational Variable

Performance: Performance is work performance or work results (output) both in quality and quantity achieved by human resources.

Training: Training is the process of teaching the skills a new employee needs to do his job.

Supervision: As an activity that plans, directs, guides, teaches, observes, encourages, improves, trusts and evaluates on an ongoing basis

6. Study Instrument

The quality assessment of the main articles in this study used the critical assessment checklist for cross-sectional studies published by the Joanna Briggs Institute (JBI).

7. Data Analysis

The articles in this study were collected using the PRISMA diagram and analyzed using the Review Manager 5.3 application (RevMan 5.3) by calculating the effect size and heterogeneity (I^2) to determine the combined research model and form the final results of the meta-analysis. The results of data analysis are presented in the form of forest plots and funnel plots.

RESULTS

The process of searching for articles is done through several journal databases which include Google Scholar, PubMed, Science Direct and Springerlink. The article review process can be seen in the PRISMA flow diagram in Figure 1.

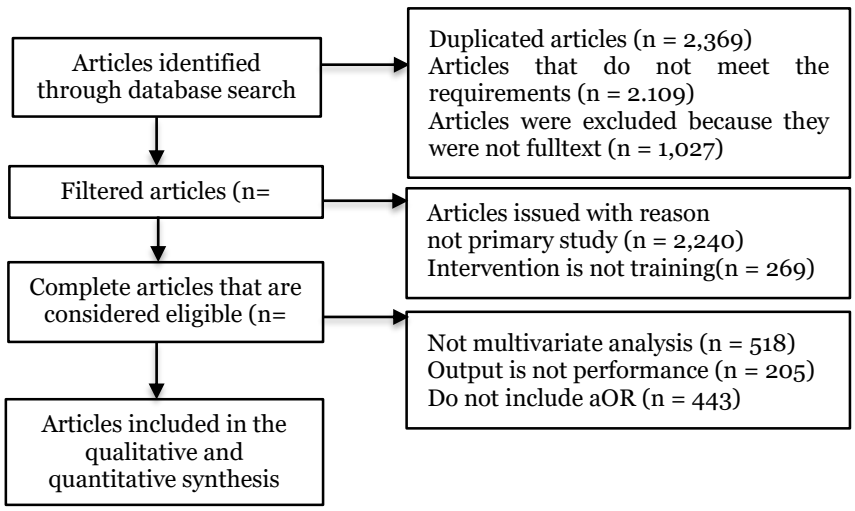


Figure 1. PRISMA Flow diagram

The research related to the effect of training and supervision on the performance of health workers consists of 10 articles. The initial search process yielded 6,780, after the deletion process 3,211 articles were obtained, of which 1,161 met the requirements for further full-text review, 10 articles that met the quality assessment were included in the quantitative synthesis meta-analysis.

It can be seen in Figure 2 that research articles come from the African continent (Uganda, Cameroon, Ethiopia, Tanzania, and Kenya, and the Asian continent (China, India and Nepal).

Figure 2. Map of the research area on the effect of training and supervision on the performance of health workers

Table 4.1 Critical appraisal checklist for cross-sectional study of the effect of training and supervision on the performance of health workers

Article	Questions of *Checklist*								Total
	1	2	3	4	5	6	7	8	
Musoke et al (2019)	2	2	2	2	2	2	2	2	16
Wanduru et al (2016)	2	2	2	2	2	2	2	2	16
Bagonza et al (2014)	2	2	2	2	2	2	2	2	16
Tsague-Nguefack et al (2020)	2	2	2	2	2	2	2	2	16
Wang et al (2023)	2	2	2	2	2	2	1	2	15
Benson et al (2017)	2	2	2	2	2	2	2	2	16
Megbaru et al (2017)	2	2	2	2	2	2	1	2	15
Margaret et al (2016)	2	2	2	2	2	2	1	2	15
Ngasala et al (2019)	2	2	2	2	2	2	1	2	15
Kuule et al (2014)	2	2	2	2	2	2	2	2	16

Description of the question criteria:

1. Are the criteria for inclusion in the sample clearly defined?
2. Were the research subjects and settings described in detail?
3. Is exposure measured in a valid and reliable way?
4. What are the standard criteria used for measuring objective conditions?
5. Were confounding factors identified?
6. Were strategies for dealing with confounding factors stated?
7. Are the results measured in a valid and reliable way?
8. Was proper statistical analysis used?

Description of the answer score:

0 = No
1 = Can't tell
2 = Yes

Table 2. PICO table summary of cross-sectional articles from primary study sources with sample size (n = 6.219)

No	Author (Year)	Country	Sample	P	I	C	O
1	Musoke et al., (2019)	Uganda	201	Community health workers	Trainings, Supervision	No training, no supervision	Performance health workers
2	Wanduru et al., (2016)	Uganda	393	Community health workers	Training, supervision	No training, no supervision	Performance community health workers
3	Kuule et al., (2014)	Uganda	508	Community health volunteers	Training	No training	Influencing Performance
4.	Bagonza et al., (2014)	Uganda	363	Community health workers	Supervision	No supervision	Performance health workers
5	Tsague-Nguefack et al., (2020)	Kamerun	111	Health staff	Training, Supervision	No training, no supervision	Performance healh staff
6	Wang et al., (2023)	China	308	Aged care service social organization	Training	No training	Performance health workers
7	Benson et al., (2017)	India, Nepal dan Nigeria	3471	Health workers abortion services	Training	No training	Performance health workers
8	Megbaru et al., (2017)	Ethiopia	46	Health workers professional laboratory	Training	No training	Performance of professional laboratory
9	Margaret et al., (2016)	Kenya	50	Community health workers	Training, supervision	No training, no supervision	Performance community health workers
10	Ngasala et al., (2019)	Tanzania	40	Community health workers	Training	No training	Performance health workers

Table 3. Data adjusted Odd Ratio (aOR) the effect of training on performance (n= 5,128)

Penulis	aOR	95%CI	
		Lower Limit	Upper Limit
Musoke et al. (2019)	12.79	1.02	159.26
Wanduru et al. (2016)	0.13	0.04	0.41
Kuule et al. (2014)	12.2	1.60	93.60
Tsague-Nguefack et al. (2020)	3.30	1.01	11.1
Wang et al. (2023)	3.17	1.39	7.43
Benson et al. (2017)	1.56	1.25	1.95
Megbaru et al. (2017)	7.00	1.50	36.30
Margaret et al. (2016)	0.68	0.16	2.92
Ngasala et al. (2019)	8.04	2.20	29.43

a. Forest Plot

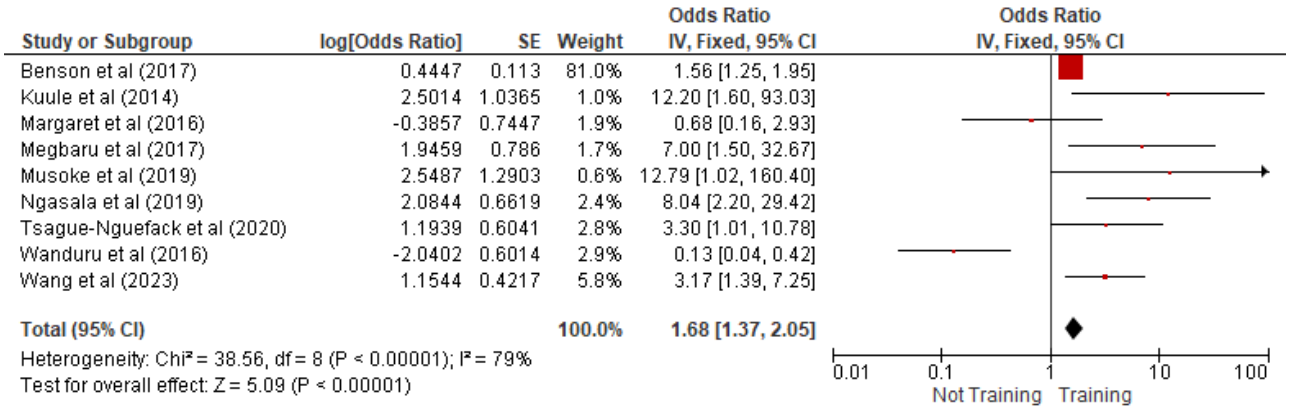


Figure 3. Forest Plot Effect of training on performance

b. Funnel Plot

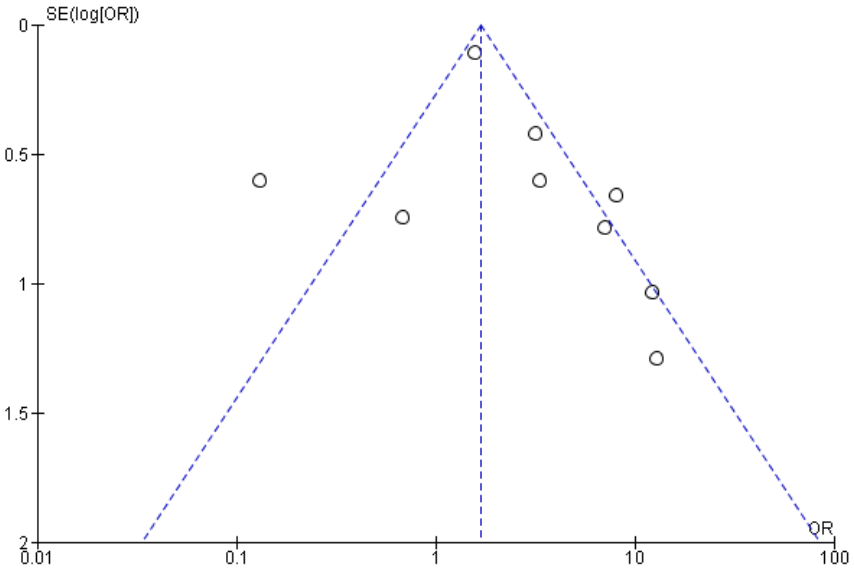


Figure 4. Funnel Plot The effect of training on performance

Forest plot Figure 3 shows that there is an effect of training on performance and this effect is statistically significant. Health workers who received the training had an effect on performance of 1.68 compared to health workers who did not receive training (aOR= 1.68; 95% CI= 1.37 to 2.05; p<0.001). The forest plot in Figure 3 shows variations in effect estimates with heterogeneity I^2=79%. Thus the calculation of the average effect estimate is carried out using the random effect model approach.

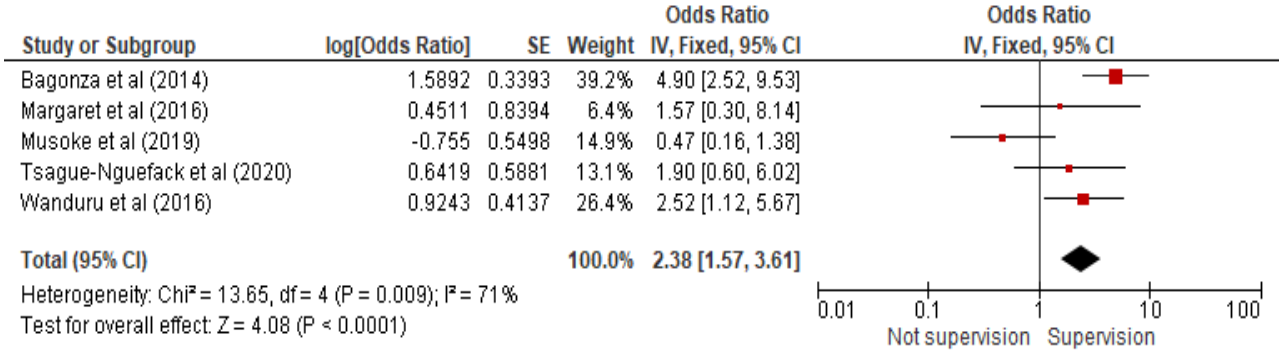
The funnel plot in Figure 4 shows the distribution of the asymmetric effect estimates. The distribution of effect estimates is more to the right of the estimated average vertical line, thus indicating publication bias. Because the distribution of effect estimates is located to the right of the average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

Table 4. Data adjusted Odds Ratio (aOR) influence of supervision on performance (n = 1,091)

Author	aOR	95% CI	
		Lower Limit	Upper Limit
Musoke et al. (2019)	0.47	0.16	1.37
Wanduru et al. (2016)	2.52	1.12	5.70
Bagonza et al. (2014)	4.90	2.52	9.51
Tsague-Nguefack et al. (2020)	1.90	0.60	5.6
Margaret et al. (2016)	1.57	0.30	8.15

a. Forest Plot

Figure 5. Forest Plot The effect of supervision on performance



Forest plot Figure 5 shows that there is an effect of supervision on performance and this effect is statistically significant. Supervised health workers had an influence on improving performance 2.38 times compared to unsupervised (aOR= 2.38; 95% CI= 1.57 to 3.61; p= 0.009). The forest plot in Figure 5 shows variations in effect estimates with heterogeneity I^2=71%. Thus the calculation of the average effect estimate is carried out using the random effect model approach.

b. Funnel Plot

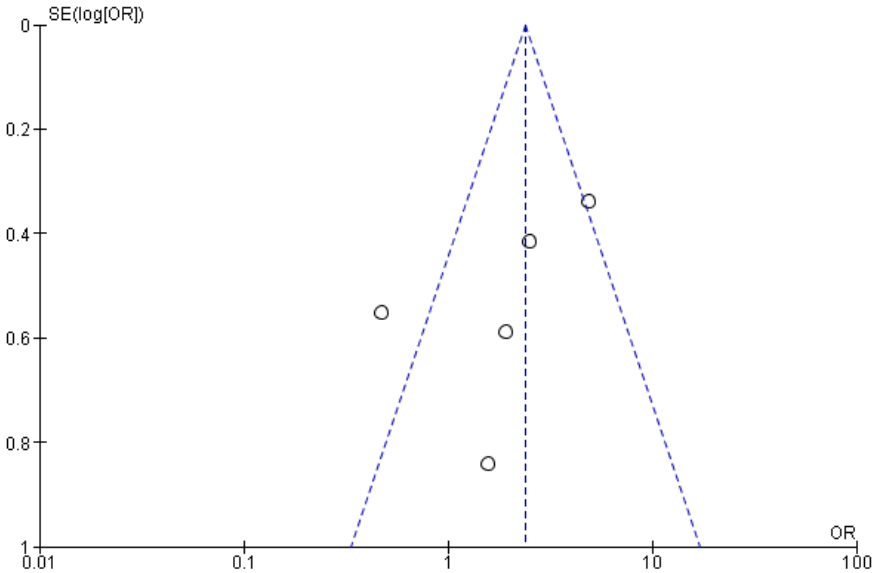


Figure 6. Funnel Plot The effect of supervision on performance

The funnel plot in Figure 6 shows an asymmetrical distribution of effect estimates on both sides of the vertical, the average effect estimates are located to the left of the vertical line more than to the right. Thus this funnel plot shows an indication of publication bias, while the estimated effects in the forest plot in Figure 6 are located to the right of the vertical line of the null hypothesis, so the publication bias tends to overestimate the true effect (overestimation).

DISCUSSION

Performance is work performance in the form of achieving work plans made by an organization carried out by leaders and employees who work in the organization, both government and private, to achieve organizational goals (Andreano et al., 2021 in Abdullah, 2014). Performance is basically the things that are done or not by employees. Employee performance is defined as the condition of a group that does work more actively and better with the goals of each individual. Assuming that the better the employee's performance, the better the organizational performance (Gondowahjudi et al 2018 in Ernika 2016). dividing the three dimensions of employee performance measurement, namely:

a) Task Performance (technical ability) is defined as proficiency in which an individual performs core substantive or technical tasks that are important to his or her work;
b) Contextual Performance (contextual ability) is defined as behavior that supports the organizational, social and psychological environment in which the technical core must function.
c) Counterproductive Work Behavior (contradictory work behavior), defined behavior that harms the welfare of the organization.

The performance of health workers is a combination of the willingness, competence, productivity, and level of response of health workers in providing health services. The performance of health workers includes processes, namely what health workers do while working, and results, namely what is produced by the actions of health workers (WHO, 2006).

This systematic study and meta-analysis research raised the theme of the effect of training and supervision on the performance of health workers. The dependent variable analyzed is performance. The independent variables analyzed were training and supervision.

1. Effect of Training on performance

A total of 9 observational research articles with a cross-sectional study design as a source of meta-analysis of the effect of training on performance. This study shows the results of the analysis that there is an effect of training on performance and that effect is statistically significant. Health workers who received training had a large influence on improving performance by 1.68 times compared to health workers who did not receive training (aOR= 1.68; 95% CI= 1.37 to 0.25; $p<0.001$). The heterogeneity of the research data shows $I^2 = 79\%$ so that the spread of the data is stated to be heterogeneous (random effect model).

Training is a series of individual activities in systematically increasing skills and knowledge so that they are able to have professional performance in their field. (Meidita, 2019)

Training is also a process of assisting employees in gaining effectiveness in their current or future jobs, through the development of thoughts and actions, skills, knowledge and attitudes. The head of the room needs to improve knowledge, skills and abilities because there is always a better way to increase work productivity which leads to an

increase in overall organizational productivity (Majid and sani, 2016)

This research is in line with research conducted by Musoke et al (2019) which states that health workers who have received additional or more training tend to have high achievements, and ongoing training results in better health worker performance. This is understandable because training increases the knowledge and skills of health personnel.

2.Effect of supervision on performance

A total of 5 observational research articles with a cross-sectional study design as a source of meta-analysis of the influence of supervision on performance. This study shows that there is an effect of supervision on performance and this effect is statistically significant. Health workers who received supervision were 2.38 times compared to health workers who were not supervised (aOR= 2.38; 95% CI= 1.57 to 3.61; p= 0.009). The heterogeneity of the research data shows I^2 = 71% so that the spread of the data is stated to be heterogeneous (random effect model).

Another study conducted in India showed that among 809 CHW (community health workers), the initial proportion of better workers was 45%. Compared to CHWs who received a lower intensity of supportive supervision, CHWs who received a higher intensity of supportive supervision had a 70% higher chance (aOR=1.70; 95% CI=1.16 to 2.49; p=0.007) of better performance after controlling their basic performance (Gopalakrishnan, 2021)

As one of the management functions, the notion of supervision has developed in particular. In general, what is meant by supervision is direct and periodic observation by superiors of the work carried out by subordinates so that if they find a problem, they are immediately given direct instructions or assistance to overcome it (Suparta et al, 2014).

Supervision must be carried out with regular frequency. Supervision that is carried out only once can be said to be not good supervision, because the organization or environment is always developing. Therefore, in order for the organization to always be abreast of various developments and changes, various adjustments need to be made. Supervision can help with this adjustment, namely through increasing the knowledge and skills of subordinates (Suparta et al, 2014).

AUTHOR CONTRIBUTION

Antina Luturmas as a researcher who selects topics, searches for and collects research data. Eti Poncorini Pamungkasari and Hanung Prasetya analyzed the data and reviewed research documents.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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