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Exploring the Factors that Enhance Learning and Self-Efficacy of Midwifery Students: A SEM-PLS Analysis

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A B S T R A C T

This study aims to identify the influencing factors on midwifery students' learning and self-efficacy development in Indonesia. The study employed a descriptive and cross-sectional analysis using an online questionnaire that included demographic data and analysis factors such as environmental learning, lecturer quality, learning methods, self-motivation, social support skills, assessment and feedback, circumstances of learning enhancement, and perceived self-efficacy. The study population was students majoring in midwifery at the Ministry of Health Polytechnic Sorong, who are currently enrolled in diploma and undergraduate programs. A total of 40 respondents completed the survey. The results showed that learning methods have a significant influence on both learning improvement and self-efficacy. The study highlights the need to identify and evaluate the various factors that influence midwifery students' learning to develop more effective and efficient strategies and methods to increase the quality and effectiveness of midwifery education. The study's findings could have implications for the future of education and health in Indonesia.

INTRODUCTION

The midwifery education field in Indonesia faces various changes and challenges. Several issues related to midwifery education exist, such as policy changes concerning midwifery services, the latest developments in the midwifery profession, and the challenges midwives encountered in their profession. Additionally, research indicates that the structure of midwifery programs, accreditation, midwifery laws, and the Midwifery Council are significant in influencing the quality of midwifery education. As of 2015, Indonesia had 151 midwifery programs that produced around 34,401 new midwives (Adnani, 2021; Adnani et al., 2023).

As education and health continue to evolve, the need to improve the quality and effectiveness of midwifery student education will increase. It is crucial to equip midwifery students with adequate knowledge and skills to provide high-quality health services to society. Various factors can enhance midwifery students' learning and development of self-efficacy. For example, a systematic review of qualitative studies found that the relationship with the preceptor is a prerequisite for the learning process and achievement of self-efficacy (Folkvord & Risa, 2023). Moreover, a high-fidelity simulation is an effective learning modality for technical and non-technical skill acquisition and transfer to patient care (Grabowski et al., 2020). The educational model for skill acquisition is also critical for managing students' stress, anxiety, and self-efficacy (Grabowski et al., 2020). Self-efficacy is a belief in one's ability to master challenges, a crucial

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component in learning theories (Folkvord & Risa, 2023). Midwifery training aims to educate students who love their profession and find motivation in education.

Despite the extensive research in this area, there still needs to be a gap in understanding the most significant and effective factors influencing midwifery students (Adnani et al., 2022, 2023; Susanti et al., 2022). Further research is needed to gain more insight into the factors influencing student midwifery, learning, and the development of self-efficacy. This study must provide more accurate and relevant information about these factors. With more understanding of these factors, we can develop more effective and efficient strategies and methods for increasing the quality and effectiveness of midwifery student education, which can benefit the future of education and health.

Influencing factors for midwifery student learning are varied and can be grouped into several categories, including learning methods, quality of learning materials, the use of technology, information, and communication in learning, and supportive social and environmental factors. These factors can impact midwifery student learning and the development of self-efficacy. The study aims to identify the influencing factors for midwifery student learning and self-development efficacy. By evaluating these factors, we can develop more effective and efficient strategies and methods for increasing the quality and effectiveness of midwifery student education.

METHOD

This study employed a descriptive and cross-sectional analysis of the population of students majoring in midwifery at the Ministry of Health Polytechnic Sorong who are currently enrolled in diploma and undergraduate programs. The study utilized a simple random sampling technique to select respondents who are ready-to-practice midwives, and these respondents complete an online survey questionnaire distributed through WhatsApp.

The data collection techniques used in this study involved an online questionnaire created using Google Forms, which consisted of two parts: demographic data and analysis factors. Demographic data covers various information such as age, religion, ethnicity, education of the last parent, index of performance during college, semester or level at the moment, level of the study program, number of extracurricular activities followed, and the number of family members living together with the respondent. The analysis factors included environmental learning, quality of lecturer learning, learning methods, self-motivation, social support skills, assessment and feedback, and circumstances of learning enhancement, and perceived self-efficacy. Respondents were asked to provide their responses using a Likert scale.

Regarding data analysis, the study utilized validity and reliability analysis, as well as univariate analysis using the Jamovi application. Multivariate analysis was performed using Structural Equation Modeling

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(SEM) analysis with SMART PLS. The study has received ethical approval from the Committe on Ethics and Health at the Ministry of Health and Health Polytechnic Sorong.

RESULT

A. Characteristics respondent

A total of 41 individuals participated in the study; however, only 40 respondents completed the questionnaire. Based on the data collected from the 40 participants, it was concluded that the majority of the respondents were undergraduate students in study programs (72.1%), with a mean age of 19.08 years (SD 1.16) and a cumulative performance index mean of 3.22 (SD 0.25). Of the respondents, 76.7% were from non-Papuan ethnic backgrounds, with the majority identifying as Muslim (62.8%). Regarding the education of the respondents' parents, the majority had completed high school (48.8%), and a significant portion of the respondents (79.1%) only participated in one extracurricular activity. The respondents' family size varied, with the majority reporting having five or more family members (46.5%). Table 1 below presents the data.

Table 1. Characteristics respondent

Variable	n	%
Age (mean,SD), Min-Max	19.08(1.16) 18-22	
study program level		
diploma	12	27.9 %
bachelor	31	72.1 %
semester		
2	15	34.9 %
4	19	44.2 %
6	9	20.9 %
Index performance cumulative (mean,SD) min-max	3.22 (0.25) 2.50-3.90	
Ethnic group		
non papua	33	76.7 %
Papua	10	23.3 %
Religion		
Islam	27	62.8 %
Catholic	3	7.0 %
Christian Protestant	13	30.2 %
parent education		
the end college tall	11	25.6 %
finished elementary school	6	14.0 %
finished high school	21	48.8 %
finished junior high	5	11.6 %
Activity following extracurriculars		
1	34	79.1 %
2	3	7.0 %
3	3	7.0 %
4	3	7.0 %
amount member family		
1	2	4.7 %
2	1	2.3 %
3	10	23.3 %
4	10	23.3 %
5/ more	20	46.5 %

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B. Validity and reliability test

Based on the validity and reliability tests results conducted on the instruments as mentioned above, each measured factor exhibits a high level of validity and reliability. The coefficients of correlation between each item on the factors and the total score factor is all significant (as indicated by a sig star above 0.05), and the values of Cronbach's alpha are sufficiently high (above 0.7) for all factors, indicating that the instrument possesses adequate reliability.

Thus, the instrument utilized in this study is valid and reliable for measuring the factors examined: learning environment, lecturer quality, learning methods, self-motivation, social and familial support, and rating and feedback. The relevant data are presented in Table 2 below.

Table 2. Validity and reliability test results instrument

Question	Pearsons	If item dropped	Cronbach's α
A. Environment learning			'0.810
To what extent does the on-campus environment support self-efficacy in learning and development?	'0.841***	'0.734	
To what extent do the facilities on campus support self-efficacy in learning and development?	'0.828***	'0.739	
To what extent does the campus atmosphere support self-efficacy in learning and development?	'0.718***	'0.786	
To what extent does the surrounding environment of your residence support self-efficacy in learning and development?	'0.661***	'0.818	
How much does the support of family and friends contribute to your self-efficacy in learning and development?	'0.722***	'0.781	
B. Quality Lecturer			'0.954
To what extent does a good quality lecturer provide study materials in a clear and systematic manner?	'0.892***	'0.952	
To what extent does a good lecturer provide motivation and support to students facing academic challenges?	'0.945***	'0.936	
To what extent does a good lecturer respond to students' questions and provide adequate explanations?	'0.878***	'0.953	
To what extent does a good lecturer provide constructive and solution-focused feedback on students' performance?	'0.950***	'0.934	
To what extent does a good lecturer create a conducive and supportive environment for students' self-efficacy in learning and development?	'0.934***	'0.939	
C. Method Learning			'0.949
To what extent does the frequency of using learning methods in class help you understand college material?	'0.924***	'0.934	
To what extent do active learning methods used in class help you engage in the learning process?	'0.925***	'0.933	
To what extent do creative learning methods used in class provide inspiration and enhance your understanding of new material?	'0.895***	'0.945	
To what extent do learning methods used in class help to increase your cognitive abilities, such as critical thinking and analysis?	'0.898***	'0.941	
To what extent do easy-to-understand learning methods used in class increase your self-efficacy?	'0.924***	'0.934	
D. Motivation Self			0.810
To what extent do you feel motivated to learn?	'0.829***	0.825	
To what extent does the social environment influence your motivation to study?	'0.840***	0821	
To what extent does the importance of academic objectives increase your motivation to study?	'0.832***	0.824	
To what extent does self-efficacy play a role in increasing your motivation to study?	'0.923***	0.792	

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How often do you feel bored with college material, and to what extent does it impact your motivation to study?	'0.673***	0910	
E. Support Social and family			'0.877
How often do you actively participate in class discussions to increase your self-efficacy in learning and development?	'0.676***	'0.886	
How often do you participate in extracurricular activities related to midwifery to increase your self-efficacy in learning and development?	'0.775***	'0.872	
How often do you take the initiative to discuss learning material with classmates or lecturers to increase your self-efficacy in learning and development?	'0.948***	'0.801	
How often do you use additional learning resources from the library or outside of class to increase your self-efficacy in learning and development?	'0.832***	'0.850	
To what extent are you involved in activities organized by your study program or major to increase your self-efficacy in learning and development?	'0.863***	'0.835	
F. Ability self			'0.946
To what extent are you confident in your ability to read to increase your self-efficacy in learning and development?	'0.876***	'0.943	
To what extent do you trust your ability to write to increase your self-efficacy in learning and development?	'0.877***	'0.940	
To what extent are you confident in your ability to speak to increase your self-efficacy in learning and development?	'0.946***	'0.923	
To what extent do you trust your ability to think critically to increase your self-efficacy in learning and development?	'0.952***	'0.921	
To what extent are you confident in your academic abilities in general to increase your self-efficacy in learning and development?	'0.887***	'0.938	
G. Rating and bait come back			'0.958
How often do lecturers provide ratings and feedback on your study results to improve your self-efficacy in learning and development?	'0.934***	'0.943	
To what extent does clear and specific feedback provided by lecturers help you improve your self-efficacy in learning and development?	'0.921***	'0.940	
To what extent does honest and fair assessment by lecturers help you improve your self-efficacy in learning and development?	'0.924***	'0.923	
To what extent do solution-oriented ratings and feedback provided by lecturers help you improve your self-efficacy in learning and development?	'0.956***	'0.921	
To what extent do constructive ratings and feedback provided by lecturers help you improve your self-efficacy in learning and development?	'0.896***	'0.938	

Note. *p < .05, **p < .01, ***p < .001

C. Partial analysis least square

1. Outer model testing

Outer model testing aims to look at the model's validity and reliability.

a) Factor loading

To ensure the quality and validity of the measured constructs, a factor loading model was tested, and the results showed that all indicators in each construct had a factor loading value exceeding 0.6. This indicates that each of the selected indicators, including the learning environment, lecturer quality, learning methods, self-motivation, social and family support, self-assessment ability, and feedback, has a strong relationship with the corresponding construct being measured. Therefore, the constructs used in this study have a reasonably high level of accuracy and can be relied upon to measure the factors that influence the improvement of learning and the development of self-efficacy for midwifery students. The outer research model analysis can be seen in Figure 1 below.

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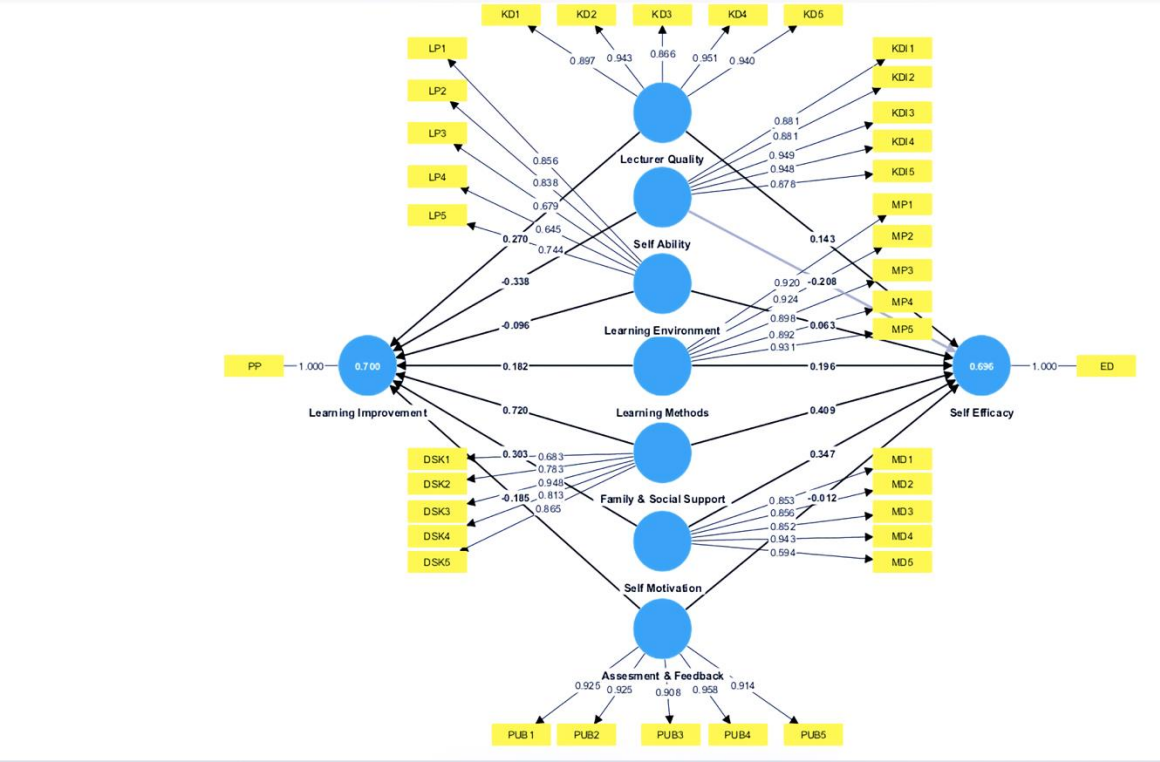
Figure 1 analisis faktor loading



b) Inner model testing Coefficient of Determination R2 (R- Square)

The R-square value for Learning Improvement is 0.700, indicating that the observed factors in this study can explain 70% of the variability in learning enhancement. The Adjusted R-square value of 0.642 suggests that after controlling for other variables, the observed factors can explain 64.2% of the variation in learning enhancement. Similarly, the R-square value for Self-Efficacy is 0.696, indicating that the observed factors can explain 69.6% of the variation in self-efficacy for midwifery students. The Adjusted R-square value of 0.637 suggests that the observed factors can explain 63.7% of the variation in self-efficacy after controlling for other variables. These high R-square values indicate that this study's observed factors effectively explain the variation in learning enhancement and self-efficacy for midwifery students. However, it is essential to note that other factors may influence these outcomes which were not observed in this study. The data is presented in Table 3.

Table 3. R-square analysis

Construct	R-square	Adjusted R-square
Learning improvements	0.700	0.642
Self Efficacy	0.696	0.637

The R-square value indicates the proportion of variance in the dependent variable (in this case, learning improvement and self-efficacy) that can be explained by the independent variables (learning environment, lecturer quality, learning methods, self-motivation, social and family support, self-assessment ability, and feedback) included in the model. In this study, the R-square values for both learning improvement and

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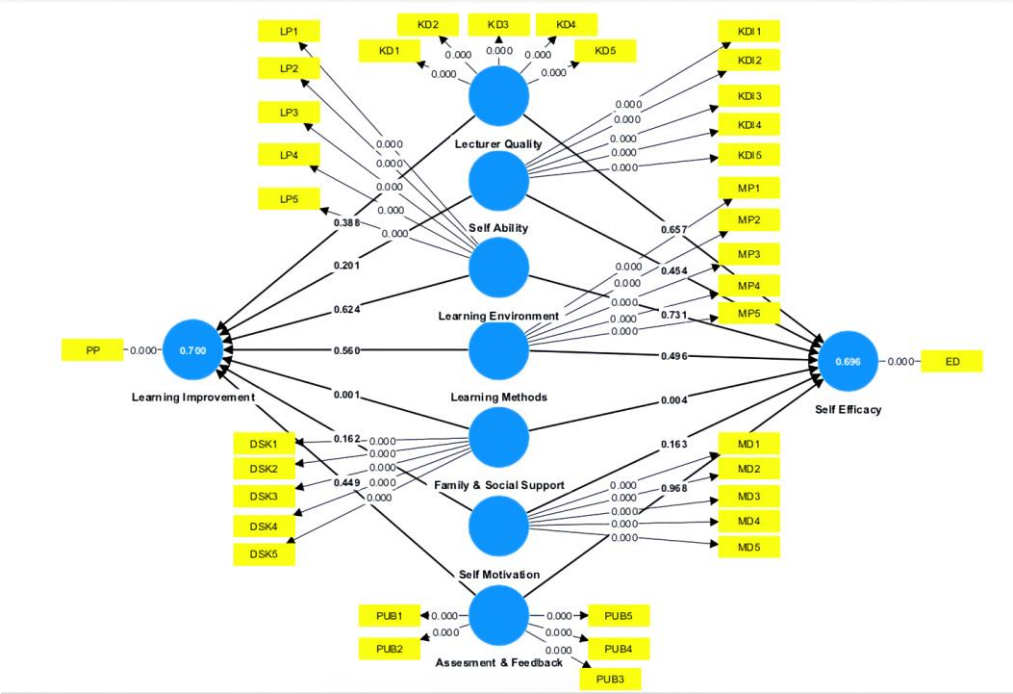
self-efficacy are relatively high; indicating that the observed factors in the study can explain a significant proportion of the variability in these outcomes.

However, the adjusted R-square values are slightly lower than the R-square values, indicating that controlling for other variables in the model reduces the proportion of variance explained by the independent variables. This suggests that other variables may contribute to learning improvement and self-efficacy but were not included in the study.

Therefore, while the observed factors in the study are significant in explaining learning improvement and self-efficacy among midwifery students, other factors may also influence these outcomes. Future studies could explore additional variables that may impact learning improvement and self-efficacy in this population.

c) Analysis Factor



Based on the statistical analysis, only the variable of learning method has a significant influence on both learning improvement and self-efficacy, with a p-value less than 0.05. This means that the other variables, such as learning environment, lecturer quality, self-motivation, social and family support, self-assessment abilities, and feedback, do not significantly influence learning improvement and self-efficacy, with p-values greater than 0.05. It is important to note that this is based on the data collected and analyzed in this study. There may be other factors that were not measured or accounted for that could potentially influence learning improvement and self-efficacy.

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DISCUSSION

Research results show that only the learning method variable significantly influences the enhancement of learning and the efficacy of self-student midwifery. This indicates that the learning method used can influence the ability to learn and the development of self-efficacy in student midwifery. However, it is necessary to note that other variables, such as the learning environment, quality of the lecturer, self-motivation, social and family support, self-abilities, assessment, and feedback do not significantly influence the enhancement of learning and self-efficacy. Although they are not significant, this does not mean that these factors are not necessary in learning and the development of self-efficacy in student midwifery.

The findings of this study were obtained through the process of data collection and analysis. This study used a cross-sectional descriptive method with a sample of all students majoring in midwifery at the Health Polytechnic of the Ministry of Health Sorong diploma and undergraduate study programs. Data were collected through online questionnaires distributed using Google Forms and were filled out voluntarily by the respondents.

After the data is collected, descriptive analysis is performed to see the characteristics of the sample and analyze the data distribution. Next, multivariate analysis using Structural Equation Modeling (SEM) with the help of the Smart PLS application is used to analyze the connection between variables in the research.

The research results can be associated with previous studies that have found that the learning method significantly influences learning and the development of self-efficacy in students. Several previous studies show that the learning method significantly influences learning and self-efficacy in students (Folkvord & Risa, 2023; Gudayu et al., 2015; Jordan & Farley, 2008; Thompson et al., 2021).

However, the results of this study are different from previous studies that have shown that other factors such as the learning environment, quality of the lecturer, self-motivation, social and family support, self-abilities, assessment, and feedback also have a significant influence on learning and the development of self-efficacy in students. Several previous studies show that these factors significantly influence students' learning and self-efficacy (Grabowski et al., 2020; Inoue et al., 2023; Liu et al., 2021; Thompson et al., 2019, 2021) .

Enhancement of learning and self-efficacy is an essential factor for student midwifery to achieve good academic quality. However, in research conducted on student obstetrics, there were findings that the variables of the learning environment, quality of the lecturer, self-motivation, social and family support, self-abilities, assessment, and feedback do not have a significant influence on the enhancement of learning and self-efficacy, with a p-value greater than 0.05.

This can be explained by some factors that influence the enhancement of learning and self-efficacy in student midwifery. First, the variables of the learning environment, quality of the lecturer, and facilities

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may not be considered significant by midwifery students because of a lack of understanding about the importance of these factors in the learning process. Additionally, a lack of adequate quality lecturers and learning environments can be overcome by other factors, such as self-motivation and more significant social and family support, which may be more dominant (Chen & Xiao, 2022; Coman et al., 2020; Kim et al., 2019).

Second, the self-motivation and self-abilities of student midwifery may have already reached an optimum level, so they have little effect on the improvement of learning and self-efficacy. This can happen if midwifery students have intrinsic solid motivation and adequate self-abilities in facing academic tasks.

Thirdly, social and family support are possible factors that significantly enhance learning and self-efficacy in student midwifery. These factors are more important in the beginning stage of learning when student midwives are still experiencing difficulties in adapting to the new environment and building strong social relationships.

Several studies have supported the findings that these factors do not have a significant effect on improving learning and self-efficacy in student midwifery. For example, research by Firoozehchian et al., (2022); Iwanowicz-Palus et al., (2022) shows that social and family support does not significantly influence the self-efficacy of student midwives. However, research by Mirzakhani & Shorab, (2015); Mohamed Mohamed Bayoumy & Alsayed, (2021) shows that the self-motivation and abilities of student midwives have a moderate influence on their academic performance.

Environmental variables such as learning environment, quality of lecturers, self-motivation, social and family support, self-abilities, assessment, and feedback have no significant influence on increasing learning and self-efficacy in student obstetrics. These variables should be considered when designing effective learning strategies. Furthermore, the results of another study conducted by Kintu et al., (2017); Simões et al., (2022); Zhao et al., (2021) show that the study environment, quality of lecturers, and social support do not have a significant influence on the performance of students in high school. These research results also support the findings of previous studies that these factors do not significantly influence students' learning and academic achievement.

However, several other factors can influence the learning and efficacy of self-directed students, such as emotional intelligence, interpersonal skills, intelligence, and peer support (Chang & Tsai, 2022; Okwuduba et al., 2021; Tekkol & Demirel, 2018; Zhoc & Chen, 2016). Therefore, further research can explore specific variables that can influence the learning and efficacy of self-directed students in midwifery.

In conclusion, while the learning environment, quality of lecturers, self-motivation, social and family support, self-abilities, assessment, and feedback may not have a significant influence on enhancing the learning and efficacy of self-directed students in obstetrics, there are other necessary factors to be

considered for increasing the learning and efficacy of self-directed students in midwifery. Thus, further research can explore specific and more profound factors.

From the research results and discussion above, several relevant theories emerge that expand our understanding of the factors that influence learning and the development of self-directed students in midwifery. One trend is that self-directed learning is the main factor influencing self-directed students' learning and efficacy. This is based on the finding that self-motivation significantly influences learning and efficacy, while other variables do not. Therefore, the concept of self-directed learning, which refers to an individual's ability to control their learning process alone, is a critical factor in increasing the learning and efficacy of self-directed students in midwifery.

Enter variable method learning as the main factor. This is based on findings that the learning method itself significantly influences on the efficacy of oneself, which is more associated with various environmental learning variables, social support, and assessment. This modification theory can expand understanding of the influencing factors affecting the self-efficacy of student obstetrics, especially in the context of proper learning methods. The theory on influencing factors in psychology can shed light on the importance of psychological factors such as self-perception, motivation, and emotions in influencing the learning process and developing the self-efficacy of student midwifery.

CONCLUSION

Based on the research results and discussions above, only the variable of the learning method has a significant influence on enhancing learning and the efficacy of self-student midwifery. Currently, other variables such as the learning environment, lecturer quality, self-motivation, social and family support, self-abilities assessment, and feedback do not have a significant influence on enhancing learning and self-efficacy. This shows that effective learning methods can help increase learning and self-efficacy for student midwives. Therefore, it is suggested that the midwifery education institution pays attention to selecting and using proper learning methods to increase learning and self-efficacy for students. Furthermore, it is necessary to conduct further studies to deepen the understanding of other factors that can influence learning and self-efficacy for student midwives. These studies should consider factors such as learning style, personal factors, and social environment as potential variables that influence learning and self-efficacy for students. In this regard, a suggestion for student midwives is to choose appropriate learning methods that suit their learning style and maximize learning through extracurricular activities and self-development. Additionally, the midwifery education institution should provide more support regarding availability and accessibility of study facilities and adequate academic guidance.

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Differences in Effectiveness Between Breast Massage and Combination Massage in Breast Milk Production in Postpartum

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A B S T R A C T

Various factors can predispose to the lack of exclusive breastfeeding in Indonesia. One of them is a lack of breast care and massage. This research aims to evaluate the effectiveness of a breast and back massage combination on increasing breast milk production in postpartum mothers in the Sorong Regency by comparing the breast and back massage combination group with the breast massage group. This study used a quasi-experimental design with a post-test approach involving two groups. The population was postpartum mothers with newborns aged 0 months in the Sorong Regency, West Papua Province. There were 37 respondents with accidental sampling. The authors provided a breast and back massage combination in the intervention group. In addition, we gave breast massage to the control group. Both groups had breast milk volume measurements after 14 days of treatment. Bivariate analysis used T-test to determine the difference between the two groups on breast milk volume in postpartum mothers. The mean breast milk volume in the breast and back massage combination was higher than in the breast massage group. T-test results obtained p= 0.00, indicating significant differences between both groups. Thus, respondents in the breast and back massage combination group had a significantly higher average breast milk volume than the breast massage group. In conclusion, the combination of breast and back massage is more effective in increasing breast milk production in postpartum mothers than breast massage only. Further research should explore combining massage methods to improve milk production.

INTRODUCTION

According to United Nations International Children's Emergency Fund (UNICEF), in 2012, only 20% of countries had exclusive breastfeeding for infants' percentage of 50%. Meanwhile, 80% practiced exclusive breastfeeding for babies <50%. Unfortunately, Indonesia is one of them, with an exclusive breastfeeding percentage of 39%. According to World Health Organization, 37% of children in Indonesia had stunting, a contributor to the fifth largest in the world. It was because of the lack of practice of exclusive breastfeeding (Irnawati & Sari, 2022).

Annually, child mortality in Indonesia was 823,000, and maternal mortality was 20,000. One of the causes is the lack of awareness of exclusive breastfeeding. The coverage of exclusive breastfeeding in Indonesia in 2018 was 68,74%, whereas breastfeeding is the most effective way to increase the quality of life in children (Darmasari et al., 2019).

In 2015, West Papua province had 331,000 children, or 38% of the population. In every 1000 live births, 35 infants died during the first 1,000 days, and 109 died before five years old. In addition, the exclusive breastfeeding percentage reached 39% or below the national average for breastfeeding in Indonesia.

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Reducing child mortality due to no exclusive breastfeeding is one strategy to speed up the achievement of the SDGs (Sustainable Development Goals) 2030.

Breast massage and care is one of the efforts to stimulate prolactin and oxytocin in breastfeeding mothers. Another is through expressing breast milk (Hesti et al., 2017). Prolactin influences breast milk production, and oxytocin affects lactation secretion. This research aims to evaluate the effectiveness of a breast and back massage combination on increasing breast milk production in postpartum mothers in the Sorong Regency by comparing the breast and back massage combination group with the breast massage group.

METHOD

This study used a quasi-experimental design with a post-test approach involving two groups. The study was conducted in the work area of the Sorong Barat Public Health Center for over three months, from March to May 2022. Five student midwives and one midwife assisted in this study. The population was postpartum mothers with new-borns aged 0 months in the Sorong Regency, West Papua Province. There were 37 respondents with accidental sampling. The participants were informed of the study's purpose and consented before participating in the intervention. The authors provided a breast and back massage combination in the intervention group. In addition, we gave breast massage to the control group. Both groups had breast milk volume measurements after 14 days of treatment. Bivariate analysis used T-test to determine the difference between the two groups on breast milk volume in postpartum mothers. This study was conducted after obtaining a letter of permission and ethical clearance from the Commission of Ethics Health Polytechnic Ministry of Health Sorong.

RESULT

In the breast and back massage combination group, 27.1% of respondents were over 31 years old and had graduated from high school. Meanwhile, in the breast massage group, 24.3% of respondents were aged 21-30 and graduated from junior high school.

Table 1 Distribution frequency characteristics respondent based on age and education.

Characteristics variable	Massage combination		Massage breast	
	n	%	n	%
Age				
15-20 years	4	10.82	6	16.1
21-30	6	16.3	9	24.3
>31	10	27.1	2	5.5
Education				
Elementary School	5	13.6	1	2.7
Junior High School	3	8.2	13	35.2
Senior High School	11	29.8	4	10.82
University	1	2.7	-	-

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The standard deviation of breast milk volume in the breast and back massage combination group was more significant, indicating that that group had a more considerable variation in breast milk production. The standard error in the breast and back massage combination group was also more significant, indicating a larger measurement error in this group. However, despite the variation and measurement error, the mean breast milk volume in the breast and back massage combination was higher than in the breast massage group. T-test results obtained *p*= 0.00, indicating significant differences between both groups. Thus, respondents in the breast and back massage combination group had a significantly higher average breast milk volume than the breast massage group.

Table 2 Bivariate analysis

Group	n	Mean	Std. Dev	Std. error mean
Breast Massage	17	33,65	7.697	1.867
Breast Massage combination	20	75,30	11.725	2.622

DISCUSSION

Our findings indicated that respondents in the breast and back massage combination group had a significantly higher average breast milk volume than the breast massage group. Thus, a breast and back massage combination was more effective than breast massage only in increasing breast milk production in breastfeeding mothers in the Sorong Regency. It aligns with a previous study by Albertina et al. (2015) that showed excellent and proper breast care was essential in increasing milk production. In Albertina et al.'s study, respondents had an average increase in breast milk volume after conducting breast care. Other studies also showed oxytocin massage could increase breast milk production in mothers with Cesarean delivery (Wulandari et al., 2020). Oxytocin massage for breastfeeding mothers can stimulate oxytocin or love hormone to facilitate lactation secretion by increasing convenience for mothers so that it will comfort breastfed babies. Thus, counseling and training on oxytocin massage can increase exclusive breastfeeding coverage (Harefa et al., 2020).

Oxytocin is produced by glands posterior pituitary (neurohypophysis). When a baby sucks areola, it will stimulate the neurohypophysis, producing and releasing oxytocin intermittently. Oxytocin will enter the maternal blood flow and stimulate muscles around the alveoli to contract. Back massage on the spine can cause reflex accelerated neurogenic to transmit signals to the brain, especially in nerve parasympathetic. Consequently, there is a potential action of oxytocin that releases into blood systemic from the posterior pituitary. Oxytocin is delivered to the alveoli and uterus, causing myoepithelial cell contraction (Nuampa & Payakkaraung, 2021). In addition, oxytocin is critical for uterine involution to prevent active bleeding in postpartum mothers.

Besides oxytocin massage, one effort to increase oxytocin is by stimulating mammary glands through breast massage. Breast massage causes myoepithelium cells around the alveoli to contract and push breast

milk into the ampulla (Aprilina & Lestari, 2022). Breast care on the first days postpartum can launch blood vessels in the breast. In addition, it reduces Intraductal pressure caused by breast milk accumulating in the lactiferous ducts. In addition, stimuli during breast massage are transmitted to the hypothalamus through the spinal cord and mesencephalon to stimulate the Prolactin-releasing hormone, stimulating the anterior pituitary to produce prolactin. Furthermore, the prolactin hormone stimulates alveolar cells to produce breastmilk (Pertami et al., 2020).

So, breast and back massage combination will increase milk production and secretion more effectively. It is because it can give stimulation of the mammary glands to produce breast milk and trigger oxytocin in the let-down reflex (LDR). In addition, it offers comfort and creates relaxation for the breastfeeding mother through hormone endorphin secretion because of the massage and social support (Utami & Rohuna, 2021).

Thoughts, feelings, and sensations in a mother will affect oxytocin as a love hormone. So, it causes increased breast milk production. Recent studies also showed that some massage methods could be combined to improve breast milk production, such as nape, endorphin, and Marmet massage methods (Mudrikatin & Wati, 2020).

Breast milk production in the first days after birth is essential for the mother and baby in successful exclusive breastfeeding. Infants do not need breast milk substitutes. When there is little breast milk production in the first days after birth, a mother fears the baby will be hungry. Whereas milk production in the first days after birth ranges from 2-20 cubic centimeters (cc) (Peranginangin et al., 2022).

Early breast milk production will allow the mother to breastfeed the baby exclusively and lower the risk of failure in exclusive breastfeeding. Enough breast milk volume can remove the perception of breast milk insufficiency. The perception of breast milk insufficiency potentially disturbs the psychological in breastfeeding mothers. Thus, a baby needs to get breast milk as soon as possible after birth until six months old. In addition, the Indonesian Pediatric Society states that exclusive breastfeeding for 4-6 months can lower disease incidents because there are antibodies in the breast milk (Manurung, 2022). Health facilities, especially Independent Midwifery Practices (IMP) and Public Health Centers (PHC) should apply breast care and oxytocin massage in breastfeeding mothers to increase milk production (Widaryanti et al., 2022). It is recommended to provide the mother with health education about breast care and oxytocin massage from pregnancy, especially in the third trimester. That education is essential to prepare for breastfeeding. So, the mother can perform breast care independently with support from her husband and family.

This study had several weaknesses that might affect the generalizability and reliability of the findings. The small sample size might not represent the postpartum mother's population. In addition, no control group provided any message to compare the effectiveness of intervention against no intervention. Thus, it limits

the efficacy of the interventions. Furthermore, the study was conducted in a specific district (Sorong Regency), which might limit the generalizability of the findings to other populations. The researchers also did not blind the participants or the outcome assessors to the intervention, which could bias the results. Last, the study only measured breast milk volume after 14 days of treatment. There was no long-term follow-up to assess the sustainability of the interventions and their effect on breastfeeding outcomes. These weaknesses highlight the need for caution when interpreting the findings of this study.

CONCLUSION

In conclusion, the combination of breast and back massage is more effective in increasing breast milk production in postpartum mothers than breast massage only. The combination stimulates the breast muscles to produce more milk volume and triggers the hormone oxytocin. Counseling and training on this massage method are critical to increasing the scope of exclusive breastfeeding. Further research should explore combining massage methods to improve milk production.

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Predictors of Burnout Among Nurses in Asia During The Covid-19 Outbreak: A Literature Review

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A B S T R A C T

The Covid-19 outbreak induced worldwide disruption that required nurse responsibility to maintain professional nursing care during the viral infection. As healthcare workers, nurses experience stressful situations that are difficult to deal with. This article aimed to analyze the predictors of burnout among nurses in Asia. This article is a literature review that assessed the articles from databases of Scopus, Science Direct and Pubmed determined from 2020 until 2022 with English language approved. Nine articles are included in this review after meeting the inclusion and exclusion criteria. The inclusion criteria are the population was nurses in Asia with outcome was predictors of nurse burnout, and the study design was quantitative. The exclusion criteria are the outer Asia region of nurses with outcome predictors of other mental disorders, with a study design of qualitative or review. The predictors of burnout among nurses in Asia during the Covid-19 outbreak were individual and work-related factors. Individual factors are divided into demographic and psychological factors, whereas work-related factors are divided into nurse-job-related factors and nurse-patient-related factors. The nurses must continuously learn how to face the internal and external factors that may trigger nurse burnout, specifically in critical periods.

INTRODUCTION

The Covid-19 pandemic is known as a gripping situation that made people stay at home order. This worldwide disruption was announced on March 11, 2020, as a global pandemic caused by SARS-Cov-2 in Wuhan, China. The unpredictable situation of Covid-19 required the readiness of healthcare systems to deal with the uncertainty (Shalbafan, de Filippis and Hayek, 2022). Asia, the center of the spread of this viral infection, which started in China, indicated that Asia has more significant challenges than other countries requiring a fast response. The consequence of increasing burnout experience significantly due to overlap responsibilities of nurses than other healthcare workers (Matsuo *et al.*, 2020). The global pandemic increased stress levels when many healthcare workers have been asked to work outside of their usual place and to treat infected patients. Concerning the frontline, they performed nursing care direct to Covid-19 patients, specifically needing to treat in the isolation ward with the high level of personal protective equipment required (Bergeron *et al.*, 2022). Nurses have critical responsibilities as the frontlines who invited actively in the intervention to ensure the provided health care services when the demand increased during the pandemic, which required strong engagement among nurses to prevent the collapse of healthcare services (Fawaz, Anshasi and Samaha, 2020).

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Through comparative analysis, Sullivan et al. (2022) found that nursing burnout before and during the pandemic proved that nurses had a higher burnout during the Covid-19 and during routine work (Ge *et al.*, 2023). Burnout is defined as a mismatch between stressors and the adaptive capacity or resiliency required to deal with those stressors, which results in emotional exhaustion, cynicism and loss of sense of meaning in work. This situation matters to nurses and health care services because it possible to affect the quality of nursing care delivery (Mayer, 2021). Nurses working during the Covid-19 pandemic are exposed to various stressors leading to occupational burnout, which affects emotional exhaustion, depersonalization, and a sense of personal achievement (Tomaszewska *et al.*, 2022).

The study in India revealed that burnout among nurses during the pandemic was associated with feeling stressed, dissatisfied with their current job, working in a chaotic, hectic environment and feeling that covid impacted mental health (Gupta *et al.*, 2021). The research in Israel, conducted in the first month of spreading the covid virus, proved that trait worry and psychological distress were significant predictors of burnout (M Khouri, Lassri and Cohen, 2022). Burnout among nurses was a significant predictor of the intention to leave a job, accompanied by anxiety and job position (Tabur *et al.*, 2022). The cross-sectional study conducted in the epicenter of the virus in Wuhan found that significant predictors of burnout were 12 factors grouped into social-demographic characteristics and work-related factors based on different dimensions of the burnout scale (Wan *et al.*, 2022).

Previous studies on burnout among nurses during the covid-19 outbreak indicated that nurses in Asia have different causes of burnout experience. They were commonly told that stressful situations induced burnout during the pandemic. No article assessed the predictors of nurse burnout which focused on the Asia region. This literature review is expected to deliver information about burnout predictors among nurses during the covid-19 outbreak, specifically in Asia.

METHOD

This study is a literature review arranged from journal database identification, including Scopus, Science Direct, and PUBMED, by screening the research conducted from 2020 to 2021. The literature focused on predictors of nurse burnout during a pandemic in Asia. English language studies with the cross-sectional method among the Asia region about nurse burnout are included, whereas the literature/systematic review and outer Asia region are excluded.

The Boolean searching method was used to look for the keywords of “predictors” OR “risk factor” AND “nurses” AND “burnout” AND “Covid-19”. There were 107 articles from those three databases in the beginning, and the remaining 87 articles were assessed after 20 articles were removed due to duplications. After that, 87 articles were assessed by inclusion and exclusion criteria according to the PICOS screening process. Based on the population, the nurse in the Asia region was included, but the outer Asia region was

excluded. The primary outcome of this review was predictors of nurse burnout, but not the other mental disorder. The quantitative cross-sectional study from 2020 to 2021 in English language was included, but the article with qualitative methods or reviews and other languages and published before 2020 were excluded.

Table 1. Inclusion and exclusion criteria based on the PICOS format.

Criteria	Inclusion	Exclusion
Population	Nurses in Asia region	Outer Asia region
Intervention	None	None
Comparator	None	None
Outcome	Predictors of nurse burnout	Predictor of other mental disorders
Study design	Quantitative cross-sectional	Qualitative study, literature review, systematic review
Publication year	2020-2021	Before 2020
Language	English	Indonesia or other languages

A total of 87 articles were assessed after entering keywords on Scopus, Science Direct and PUBMED databases. The screening resulted in 76 articles being excluded due to 11 articles involving the participant, not nurses, 21 articles in the outer region of Asia, 38 articles with unsuitable topics, and ten articles with other than quantitative cross-sectional method. Figure 1 shows the database searching process in this literature review.

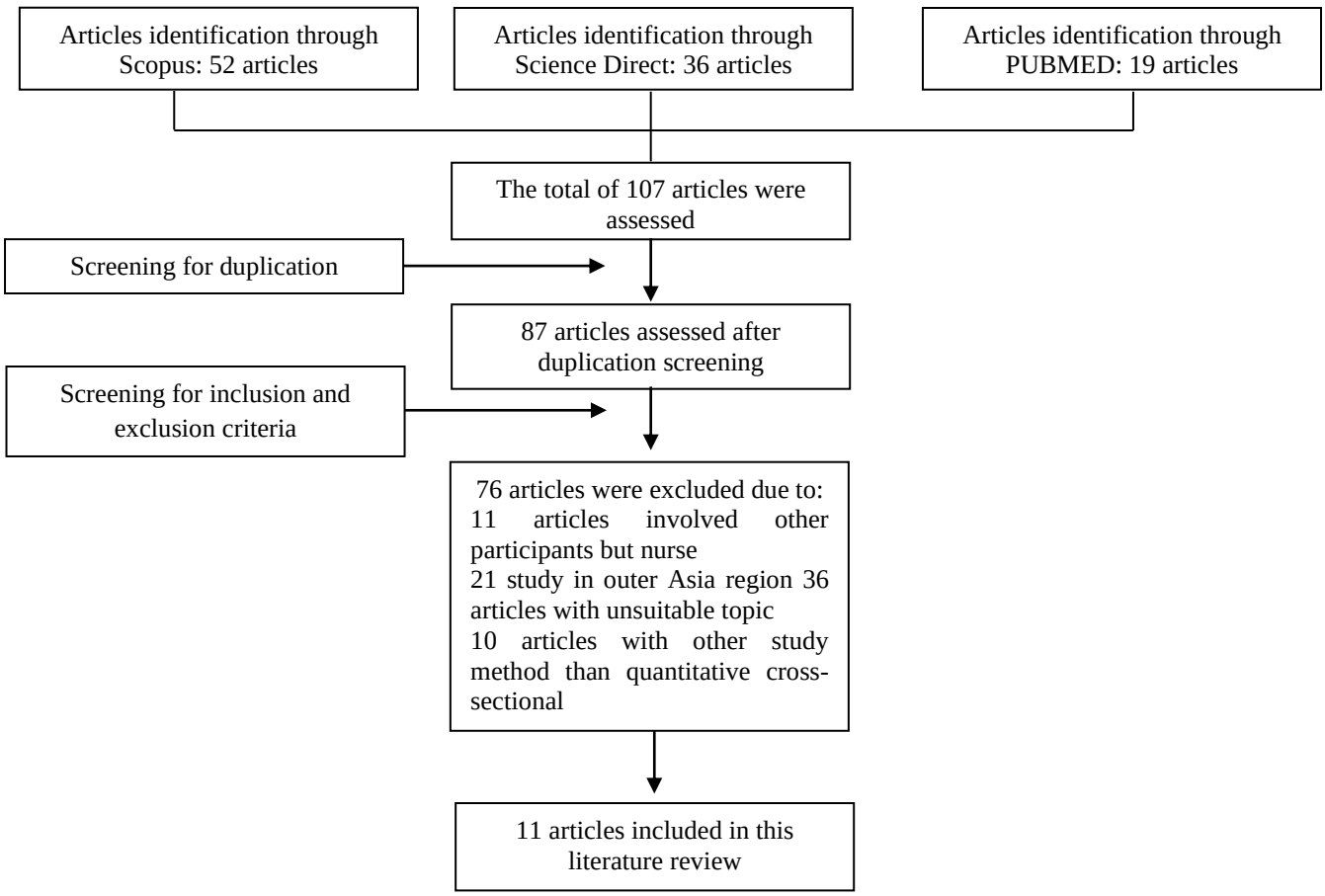

Figure 1. Flow diagram of literature searched and selection process

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RESULT

This literature review analyzed 10 related *cross-sectional* studies that met inclusion and exclusion criteria. A review of those articles is presented in Table 2.

Table 2. Summary of the included articles reviewed

Author, year	Title (Location)	Method	Predictors of burnout
(Zare *et al.*, 2021)	Beyond the Outbreak of COVID-19: Factors Affecting Burnout in Nurses in Iran (Iran)	Cross-sectional	Workload, job stress and inadequate hospital resources for covid-19 prevention
(Jamebozorgi *et al.*, 2022)	Nurses Burnout, Resilience, and Its Association with Socio-Demographic Factors During COVID-19 Pandemic (Iran)	Cross-sectional	Hospital type, ward type, gender, and overtime
(Inocian *et al.*, 2021)	Professional quality of life and caring behaviors among clinical nurses during the COVID-19 pandemic (Saudi Arabia)	Cross-sectional	Age, education, religion
(M Khouri, Lassri and Cohen, 2022)	Job burnout among Israeli healthcare workers during the first months of COVID-19 pandemic: The role of emotion regulation strategies and psychological distress (Israel)	Cross-sectional	Trait worry and psychological distress
(Kamali *et al.*, 2022)	Occupational burnout in Iranian health care workers during the COVID-19 pandemic (Iran)	Cross-sectional	History of physical illnesses and psychiatric disorders
(Hajebi *et al.*, 2022)	Mental Health, Burnout, and Job Stressors Among Healthcare Workers During the COVID-19 Pandemic in Iran: A Cross-Sectional Survey (Iran)	Cross-sectional	Worry about family health condition, family worries about nurse health condition, lack of a specific treatment for covid-19
(Fateminia *et al.*, 2022)	Post-Traumatic Stress Disorder among Frontline Nurses during the COVID-19 Pandemic and Its Relationship with Occupational Burnout (Iran)	Cross-sectional	PTSD
(Mohammadi *et al.*, 2021)	Resilience, occupational burnout, and parenting stress in nurses caring for COVID-19 patients (Iran)	Cross-sectional	Resilience, parenting stress, marital status, number of children, employment status, and gender
(AlJhani *et al.*, 2021)	Burnout and coping among healthcare providers working in Saudi Arabia during the COVID-19 pandemic (Saudi Arabia)	Cross-sectional	Having a close person infected with COVID-19, being assigned to treat COVID-19 patients, longer working hours, having sleeping hours affected by the pandemic and experiencing verbal or physical abuse of patients
(Matsuo *et al.*, 2020)	Prevalence of Health Care Worker Burnout During the Coronavirus Disease 2019 (COVID-19) Pandemic in Japan (Japan)	Cross-sectional	Women, less experience, anxiety due to protection, and desire to reduce workload
(Zakaria *et al.*, 2021)	Assessment of burnout among emergency medicine healthcare workers in a teaching hospital in Malaysia during COVID-19 pandemic (Malaysia)		Demand coping with an angry public, job overload, lack clear guideline or rapid program change, pay too little

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The primary assessment of the included studies is the predictors of burnout among nurses during a Covid-19 pandemic which focuses on the Asia region as the epicenter of Covid-19 viral infection. Those factors were identified and divided into individual characteristics and work-related factors. The individual characteristics are the factors that came from the nurses' selves, such as demographic and psychological factors. The work-related factors revealed the factors that appeared due to the interaction between the worker and the workplace. These factors are presented in Table 3.

Table 3. Identification of predictors of burnout among nurses in Asia during the Covid-19 outbreak

Individual characteristics	Work-related factors
Demographic factors: - Gender (Matsuo *et al.*, 2020; Mohammadi *et al.*, 2021; Jamebozorgi *et al.*, 2022) - Marital status and number of children (Mohammadi *et al.*, 2021) - Age, education and religion (Inocian *et al.*, 2021) Psychological factors: - Worry and psychological distress (AlJhani *et al.*, 2021; Hajebi *et al.*, 2022; Marlyn Khouri, Lassri and Cohen, 2022) - History of physical and mental illness (Fateminia *et al.*, 2022; Kamali *et al.*, 2022) - Resilience (Mohammadi *et al.*, 2021)	Nurse-job-related factors: - Workload, overtime job, job stress (AlJhani *et al.*, 2021; Zare *et al.*, 2021; Jamebozorgi *et al.*, 2022; Zakaria *et al.*, 2021) - Hospital/ward type (Jamebozorgi *et al.*, 2022) - Inadequate resources (Zare *et al.*, 2021; Hajebi *et al.*, 2022) Nurse-patient-related factor: - Physical/verbal abuse (AlJhani *et al.*, 2021) - Coping with the angry public (Zakaria *et al.*, 2021)

Based on the identifications of burnout among nurses during pandemic, individual characteristics and work-related factors are predictors. Individual characteristics are demographic factors and psychological factors that contribute to nurse burnout. Work-related factors are divided into nurse-job-related factors and nurse-patient-related factors.

DISCUSSION

As an inherently stressful profession, professional nurses must provide nursing care in various healthcare settings (Waddill-Goad, 2016). Burnout among nurses is expected in early career nurses, which identified through various chronic stressors within the nursing profession (Zangaro, Dulko and Sullivan, 2022). Maslach et al. (2001) define burnout as primarily associated with deleting nurses' emotional resources linked to increased chronic stress, expressed as chronic fatigue syndrome (Iadanza, 2019). Burnout is not an objective phenomenon but the accumulation of a certain number or type of stressors that might affect every area of life and require the ability of nurses to adapt (Yoder-Wise and Sportsman, 2022).

Individual characteristics

In identifying nurses' burnout predictors based on individual characteristics, the most mentioned factor from individual characteristic was gender. Mohammadi *et al.* (2021), Matsuo *et al.*, (2020), and Jamebozorgi *et al.*, (2022) found that being a female nurse is a predictor of burnout experience during a Covid-19 pandemic. Guttormson *et al.*, (2022) also found the result in line with this literature review that

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burnout was higher among female nurses. A similar study also found that female nurses were at a greater risk of burnout across work and patient-related areas (Stufano, Vimercati and Awoonor-Williams, 2022). Concerning gender, as a female and being younger identified as increased risk of burnout because experienced more emotionally exhausted (Bartos, 2020).

Mohammadi *et al.*, (2021) and Çelik and Kiliç, (2022) mentioned marital status and having children in the family were which also correlated with parenting stress as a nurse. Marital status and having children during the Covid-19 era also mentioned in the study by the hectic pandemic requires a nurse to focus on health care services, increasing the workload and less time to concern the family needs. The family's unmet needs affect mothers' emotions regarding their relationship are physically separated. The qualitative study by Coşkun Şimşek and Günay, (2021) found that nurses who have children were afraid of being infected and possibly transmitting the viral infection to them. On the other hand, the nurses loved their profession but did not consider quitting.

Younger age, low education level and religion are only mentioned by (Inocian *et al.*, 2021). Based on age, working conditions during covid more affected younger age in the study by Guttormson *et al.*, (2022). It is also related to less experience, specifically in nurses who work in critical care. Younger nurses are stated to be more vulnerable to burnout due to being less familiar with handling extreme situations such as a pandemic related to infection control, protective measures and difficulty in facing the suffering and dying of patients (Galanis *et al.*, 2021). Low education level was also identified as a factor of burnout that expressed emotional exhaustion in Pujiyanto, Mendrofa and Hani, (2022), which was associated with less experience in charge in the Covid-19 ward. Conversely, Jamebozorgi *et al.* (2022) proved that education status is a leading predictor of a high level of resilience. Another study mainly assesses the religiosity of the spiritual aspect, indicating that healthcare workers need to have religious beliefs (Chow *et al.*, 2021). In the study by Chang *et al.*, (2021), a religion expressed in religious faith impacts mental health and happiness.

Based on psychological factors, the most predictor of burnout was worry and psychological distress, which were mentioned in the articles by AlJhani *et al.*, (2021), Hajebi *et al.*, (2022), Marlyn Khouri, Lassri and Cohen, (2022). Dale *et al.*, (2021) found a similar result that worry is a significant factor in exhaustion as a burnout aspect. Worry and psychological distress profoundly exacerbated employee mental health issues during the Covid-19 outbreak and negatively affected work performance (Sun *et al.*, 2022).

History of physical and mental illness is also crucial as a burnout predictor, as mentioned in the study of Fateminia et al., (2022) and (Kamali et al., 2022) among nurses in Asia. It also includes resilience from the study by Mohammadi et al., (2021). When burnout has a solid correlation with exhaustion and depression, the history of mental illness may outweigh the burnout condition among nurses (Ulfa, Azuma and Steiner, 2022). A similar study by Zakeri *et al.*, (2021) proved that psychological stress, anxiety and depression

were high during the first wave of Covid-19 viral infection as a predictor of job burnout. Resilience stated has a negative correlation with burnout (Bashirian, 2021).

Work-related factors

The identification of those articles revealed work-related factors of burnout, which workload, overtime job and job stress as a significant factor of burnout (AlJhani *et al.*, 2021; Zakaria *et al.*, 2021; Zare *et al.*, 2021; Jamebozorgi *et al.*, 2022). Elshaer *et al.*, (2019) found a similar result: job stress was significantly correlated with burnout syndrome of nurses in the surgical ward and ICU. Overtime jobs and overload responsibility in nursing care were also mentioned in the research by Wan *et al.*, (2022) that working more than 9 hours per day and night shift schedule more than three times a week as the variables.

Hospital/ ward time was also found to affect nurses' burnout (Jamebozorgi et al., 2022). In line with this review, Toscano, Tommasi and Giusino, (2022) found the high level of burnout of nurses who work in the ICU. The research conducted by Javadi *et al.*, (2021) compares burnout in Covid-19 and non-Covid-19 wards. The burnout was highest in Covid-19 wards in variables of depersonalization and exhaustion.

Inadequate resources were identified as a predictor of burnout among nurses (Zare et al., 2021; Hajebi et al., 2022). This literature review finding align with prior research (Khan, Bruyneel and Smith, (2022), Al Thobaity and Alshammari, (2020) and Moreno-Jiménez *et al.*, (2021)), that noted the lack of material and personal protective equipment (PPE) as a predictor of nurses' stress. Ustun, (2021) revealed that lack of PPE directly leads to stress among nurses.

Concerning nurse-patient relations, physical/verbal abuse from the patient induces burnout among nurses (AlJhani et al., 2021). The angry public emotional situation also induced burnout among nurses (Zakaria *et al.*, 2021). It is also found in the review by Davis, (2021) that provoked burnout, whereas rarely reported. Starting from the decrease in job satisfaction, the experience of patient abuse is responsible for the increasing burnout risk in the study by Schablon *et al.*, (2022).

In this literature review, the predictors of burnout among nurses in Asia are categorized into individual and work-related factors. Each factor is divided into two factors that have been proven to induce burnout among nursing during the covid-19 pandemic, specifically in nurses in Asia. There are required concerns by the healthcare system to overcome the risk factors to prevent prolonged burnout among nurses.

CONCLUSION

The predictors of burnout among nurses in Asia during the Covid-19 outbreak were individual and work-related factors. Individual factors are divided into demographic and psychological factors, while work-related factors are divided into nurse-job-related factors and nurse-patient-related factors. The nurses must continuously learn to maintain the internal and external factors that trigger nurse burnout, specifically in the critical period.

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Antibacterial Activity and 16S rRNA Gene Sequencing of Lactic Acid Bacteria from Homemade Fermented Milk in Medan, Indonesia

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A B S T R A C T

Research indicates that fermented products have nutritional and non-nutritional components that can improve health. Milk is commonly used for fermentation products because its rich nutrients support the growth of Lactic Acid Bacteria (LAB). This paper investigates antibacterial activity and 16S rRNA gene sequencing of LAB from homemade fermented milk in Medan City, Indonesia. This paper was an experimental study by In Vitro Models conducted in August-October 2019. This study used three different homemade fermented milk (SF2-4) and positive control of manufactured fermented milk (SF1). All isolated LABs underwent an antibacterial assay by the Disc diffusion method against two pathogens, including *Escherichia coli* (Gram-negative) and *Staphylococcus aureus* (Gram-positive). In addition, there was molecular identification based on 16S rRNA gene sequencing. The zone of inhibition from samples against *Escherichia coli* ranged from 5.600-12.23 mm. The most potent antibacterial activity was found in SF4 (12.23 mm) and the least in SF2 (5.60 mm). Some samples (SF1 and SF2) showed no antibacterial effect against *Staphylococcus aureus* bacteria. The antibacterial activity against *Staphylococcus aureus* bacteria was found only in SF2 and SF3, which were 6.60 mm and 7.14 mm, respectively. Based on the characteristics, enumeration, and antibacterial activity, the authors chose isolated LAB from SF4 for molecular identification based on 16S rRNA gene sequencing. SF4 isolates had a similar 16S rRNA molecule to *Lactobacillus fermentum* strain NBRC 15885 with a homology level of 99.78%. In conclusion, some homemade fermented milk in Medan City, Indonesia, are potential probiotics.

INTRODUCTION

Research indicates that fermented products have nutritional and non-nutritional components that can improve health. Around 90% of fermented products in some countries are produced as homemade products in the form of traditional food and beverages (Tamang *et al.*, 2016). Recently, a study showed the positive role of microbes in the digestive and immune systems of humans (Bansal *et al.*, 2013). Thus, some fermented foods have the potential to make a healthier body.

Food and Agriculture Organization (FAO) and World Health Organization (WHO) have defined probiotics as a group of living microorganisms in adequate numbers that may give some health benefits to the host. A previous study reported that probiotics might prevent and treat some diseases (Khikmah, 2015)**.** The most common type of probiotic for health purposes was Lactic Acid Bacteria (LAB), including *Lactobacillus*, *Leuconostoc*, *Pediococcus*, and *Streptococcus*. LAB secretes a bacteriocin peptide that can inhibit growth and kill some pathogens (Fachrial, Adrian, and Harmileni, 2018).

Milk is commonly used for fermentation products because of its rich nutrients to support LAB growth. However, milk cannot be stored for long and spoil quickly. It can be prevented by pasteurization and

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sterilization. Pasteurization is a method to preserve milk by heating it at a specific temperature below the boiling point of milk. This method keeps the fresh milk's consistency and taste while not eliminating all microbes from the fresh milk (Surono and Hosono, 2011).

Furthermore, the fermentation process promotes the Lactic Acid Bacteria that secrets some antibacterial compounds like organic acids (lactic acid, acetic acid, formic acid), hydrogen peroxide, diacetyl, and bacteriocins. These antibacterial compounds inhibit the growth or even kill bacteria by affecting the metabolism of microbes. *Lactobacillus*, a typical LAB, can hinder the development of some *Enterobacteriaceae* bacteria (*Salmonella* sp, *Escherichia coli*, *Shigella* sp), *Bacillus cereus*, and *Staphylococcus aureus* (Fachrial and Harmileni, 2017; Khristnaviera and Meitiniarti, 2017). This paper investigates antibacterial activity and 16S rRNA gene sequencing of Lactic Acid Bacteria (LAB) from homemade fermented milk in Medan City, Indonesia.

METHOD

This paper was an experimental study by In Vitro Models in Microbiology Laboratory, Universitas Prima Indonesia. In addition, molecular identification was performed at the Indonesia Institute of Science in August-October 2019. This study used three different homemade fermented milk (SF2-4) and positive control of manufactured fermented milk (SF1).

Some materials used in this study included de Man Rogosa and Sharpe Agar (MRSA), de Man Rogosa and Sharpe Broth (MRSB), nutrient agar, 96% alcohol, 70% alcohol, crystal violet solution, safranin solution, 10% hydrogen peroxide solution, aluminium foil, cotton swab, tissue, distilled water, 5M hydrochloric acid solution, Isolated *Escherichia coli* and *Staphylococcus aureus* in slant agar. In addition, this study also used some instruments like a reaction tube, Erlenmeyer flask, analytic scale, petri dish, beaker glass, Durham tube, Bunsen burner, spatula, dropper, inoculation loop, magnetic stirrer, microtube, disc diffusion, autoclave, incubator, callipers, pH meter, antibiotic disc diffusion (Tetracycline, amoxicillin, and ampicillin). The enrichment process was performed by diluting a millilitre sample into 9 ml MRS Broth Media in some reaction tubes. After that, all reaction tubes were homogenized by a vortex and incubated at 37ºC for 18-24 hours in anaerobic conditions (Nasution, Ramadhani, and Fachrial, 2020).

Then, each enriched sample was diluted into different concentrations by serial dilution method until the seventh dilution level. Initially, 0.1 ml of enriched sample was diluted into 0.9 ml of MRSB in a 1.5 ml microtube, and then it was homogenized and labelled as the first dilution level. Furthermore, a hundred microlitres of first-dilution level fermented milk was diluted in the same way as described before until the seventh dilution level (Syukur, Fachrial, and Jamsari, 2014).

One hundred microlitres of diluted samples were cultured into MRSA in some Petri dishes from the fourth to seventh dilution level. Then, all Petri dishes were incubated for 48 hours at 37°C in an incubator. After

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that, the enumeration was performed in each petri dish and expressed as Colony Forming Unit (CFU) per millilitre sample. Furthermore, four quadrant streak methods were used to subculture six random inoculums of LAB colonies into MRS agar in some Petri dishes (Lase *et al.*, 2021).

This study evaluated LAB's morphological and biochemical characteristics from samples. The morphological characteristic included macroscopic and microscopic. Macroscopic characteristics were obtained from observing bacterial colonies on MRS Agar 1% CaCO3 media, including the colonies' shape, color, edges, texture, elevation, and size. Meanwhile, the microscopic characteristic was obtained from the gram staining of the colonies (Nasution, Ramadhani, and Fachrial, 2020; Lase *et al.*, 2021).

Biochemical characteristics analysis of LAB from samples included catalase and fermentation-type test. An inoculum of LAB was applied to an object glass disinfected by alcohol. A drop of 3% hydrogen peroxide solution was dropped into the object glass and observed for the formation of bubbles. Meanwhile, the fermentation-type test was performed by culturing an inoculum of LAB on 10 ml MRSB with a Durham tube placed upside down. Furthermore, the culture was incubated for 24 hours at 37^{c}C. An inoculum of bacteria (*Staphylococcus aureus* and *Escherichia coli*) was suspended in a millilitre of normal saline in a reaction tube and then incubated for 24 hours. Furthermore, it was compared to McFarland Standard 0.5 (Putri, Jannah, and Purwantisari, 2020).

20 ml NA Media was poured into some Petri dishes filled with 1 ml of the bacterial suspension and then homogenized. Some disc diffusion was diffused into the extract, antibiotic, or distilled water and placed at the surface of these media. Each dish was placed in five-disc diffusions, except the antibiotic and distilled water, which only put two disc diffusions. All Petri dishes were incubated at 35-37°C for 18-24 hours. Last, the width of the inhibition zone was measured by a caliper (Mostafa *et al.*, 2018; Mutia, Annisa, and Suhartomi, 2021).

Identification of the 16S rRNA molecule was initially begun by extraction of DNA, followed by amplification and sequencing of the gene. DNA isolation kit (Gene Aid) was used to extract bacterial DNA. The primer used a universal primer (27F: AGAGTTTGATCCTGGCTAG and 1525 R: AGAAAGGAGGTGATCCAGCC). Meanwhile, the amplification used a PCR solution containing primer DNA, PCR-Grade water, and KAPA Taq extra hot start the ready mix with dye. Initially, the PCR process began in a pre-denaturation process at 95°C for five minutes, followed by denaturation at 94°C for a minute, annealing at 56°C for a minute, and extension at 72°C for 1.5 minutes, and the final extension for 72°C for five seconds. Finally, the amplified gene was separated into a 1.5% agarose gel with EtBr staining, and the gel was observed under the GelDoc Machine (BioRad). This amplified gene was then sequenced by a one-way primer reverse performed by the Indonesian Institute of Sciences. The Basic Local Alignment Search Tool (BLAST) program analyzed and compared the obtained sequence to the NCBI database (Fachrial and Harmileni, 2018; Siburian *et al.*, 2021).

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RESULT

Based on Table 1, the number of colonies in SF1, 2, 3, and 4 sequentially was 1, 117, 139, and 3. The number of colonies was used to determine the enumeration of LAB in all fermented milk samples. The enumeration of LAB in SF1, 2, 3, and 4 sequentially were 1.0 x 10^6 CFU/ml, 117 x 10^5 CFU/ml, 139 x 10^5 CFU/ml, and 3 x 10^7 CFU/ml.

Table 1. Enumeration of LAB from Homemade and Manufactured Fermented Milk

Sample	Dilution	Number of Colonies
SF 1	10^{-6}	1
SF 2	10^{-5}	117
SF 3	10^{-5}	139
SF 4	10^{-7}	3

The isolated LAB from samples underwent the evaluation of morphological and biochemical characteristics. The morphological characteristics included the evaluation of macroscopic and microscopic. Figure 1 shows the macroscopic characteristics. The macroscopic appearance of the lactic acid bacteria colonies from all samples was a creamy white LAB colony.

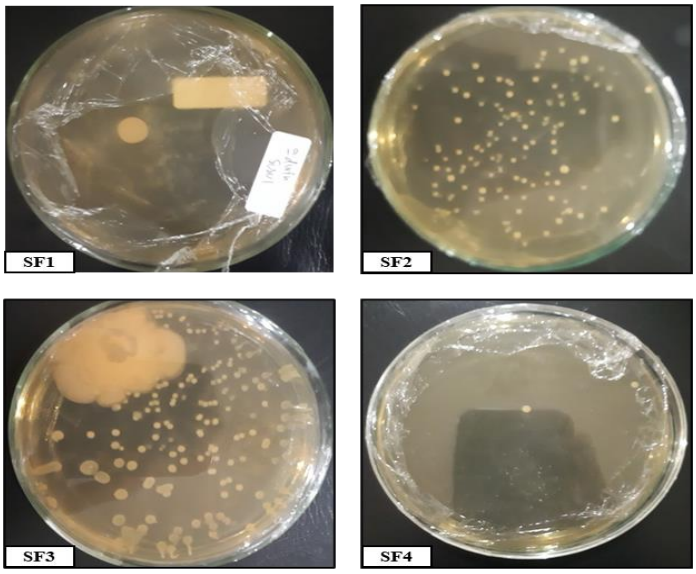

Figure 1. Macroscopic Morphology of Lactic Acid Bacteria Colonies from all Samples on MRSA Media

Figure 2 shows the microscopic view with gram staining. LAB in SF1 was gram-positive cocci bacteria, while in SF2-SF4 was gram-positive bacilli. Furthermore, this study also identified the biochemical characteristic of LAB in these bacteria. Bacteria in SF2-SF4 showed no catalase activity but a heterofermentative activity. Meanwhile, the positive control (SF1) showed a catalase and heterofermentative activity.

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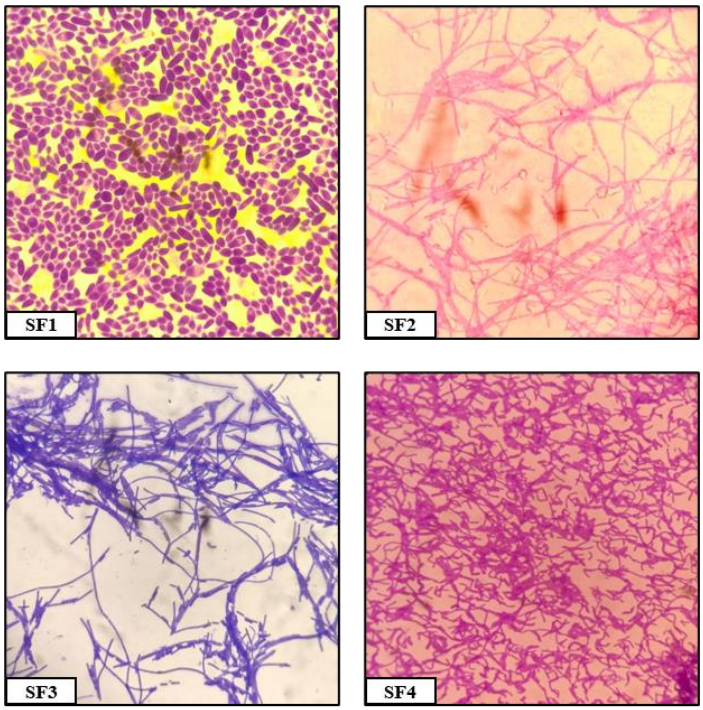

Figure 2. Microscopic View of LAB in all samples. Staining: Gram Staining. Magnification: 1000x

All isolated LABs underwent an antibacterial assay against two different pathogens, including *Escherichia coli* (Gram-negative) and *Staphylococcus aureus* (Gram-positive), by Disc diffusion method, and the result of the antibacterial activity of LABs against these pathogens was described in Table 2. Table 2 shows that the zone of inhibition from samples against *Escherichia coli* ranged from 5.600-12.23 mm (including disc diameter, 5.2 mm). The most potent antibacterial activity was found in SF4 (12.23 mm) and the least in SF2 (5.60 mm). On the other hand, some samples (SF1 and SF2) showed no antibacterial effect against *Staphylococcus aureus* bacteria. The antibacterial activity against *Staphylococcus aureus* bacteria was found only in SF2 and SF3, which were 6.60 mm and 7.14 mm, respectively.

Table 2. Antibacterial Activity of LAB from Samples against Two Different Pathogens

Sample	The zone of inhibition (mm)	
	Escherichia coli	*Staphylococcus aureus*
SF 1	6.98 mm	-
SF 2	5.60 mm	6.60 mm
SF 3	7.20 mm	7.14 mm
SF 4	12.23 mm	-

Based on the characteristics, enumeration, and antibacterial activity, the authors chose isolated LAB from SF4 for molecular identification based on 16S rRNA gene sequencing. Figure 3 shows DNA sequences.

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Consensus_ SF4

TTGATTGATGGTGCTTGCACCTGATTGATTTTGGTCGCCAACGAGTGGCGGACGGGTGAG
TAACACGTAGGTAACCTGCCCAGAAGCGGGGGACAACATTTGGAAACAGATGCTAATACC
GCATAACAACGTTGTTCGCATGAACAACGCTTAAAAGATGGCTTCTCGCTATCACTTCTG
GATGGACCTGCGGTGCATTAGCTTGTTGGTGGGGTAATGGCCTACCAAGGCGATGATGCA
TAGCCGAGTTGAGAGACTGATCGGCCACAATGGGACTGAGACACGGCCCATACTCCTACG
GGAGGCAGCAGTAGGGAATCTTCCACAATGGGCGCAAGCCTGATGGAGCAACACCGCGTG
AGTGAAGAAGGGTTTCGGCTCGTAAAGCTCTGTTGTTAAAGAAGAACACGTATGAGAGTA
ACTGTTCATACGTTGACGGTATTTAACCAGAAAGTCACGGCTAACTACGTGCCAGCAGCC
GCGGTAATACGTAGGTGGCAAGCGTTATCCGGATTTATTGGGCGTAAAGAGAGTGCAGGC
GGTTTTCTAAGTCTGATGTGAAAGCCTTCGGCTTAACCGGAGAAGTGCATCGGAAACTGG
ATAACTTGAGTGCAGAAGAGGGTAGTGGAACTCCATGTGTAGCGGTGGAATGCGTAGATA
TATGGAAGAACACCAGTGGCAAGGCGGCTACCTGGTCTGCAACTGACGCTGAGACTCGAA
AGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTCCATGCCGTAAACGATGAGTGCT
AGGTGGTTGGAAGGGTTTCCGCCCTTCAGTGCCGGAGCTAACGCATTAAGCACTCCGCCT
GGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTG
GAGCATGTGGTTTAATTCGAAGCTACGCGAAGAACCTTACCAGGTCTTGACATCTTGCGC
CAACCCTAGAGATAGGGCGTTTCCTTCGGGAACGCAATGACAGGTGGTGCATGGTCGTCG
TCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTGTTACTAG
TTGCCAGCATTAAGTTGGGCACTCTAGTGAGACTGCCGGTGACAAACCGGAGGAAGGTGG
GGACGACGTCAGATCATCATGCCCCTTATGACCTGGGCTACACACGTGCTACAATGGACG
GTACAACGAGTCGCGAACTCGCGAGGGCAAGCAAATCTCTTAAAACCGTTCTCAGTTCGG
ACTGCAGGCTGCAACTCGCCTGCACGAAGTCGGAATCGCTAGTAATCGCGGATCAGCATG
CCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGCCCGTCACACCATGAGAGTTTGTA
ACACCCAAAGTCG

Figure 3. DNA Sequence of SF4 LAB Isolate

Figure 3 shows the 16S rRNA gene sequencing from isolated LAB in SF4. This data was trimmed and assembled for analysis in the BLAST registered with National Center for Biotechnology Information (NCBI). The analysis result was a phylogeny tree shown in Figure 4.

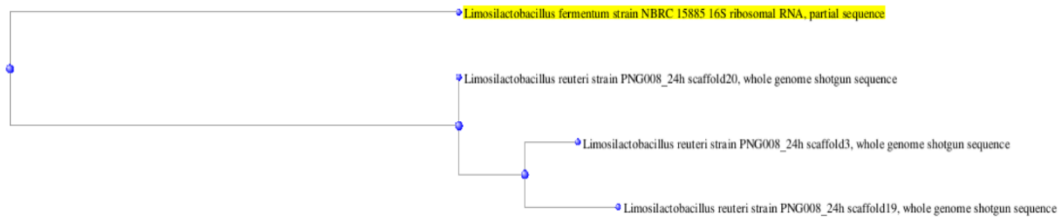

Figure 4. Phylogenetic tree of SF4 isolates

Based on Figure 4, SF4 isolates had a similar 16S rRNA molecule to *Lactobacillus fermentum* strain NBRC 15885 with a homology level of 99.78%.

DISCUSSION

This paper found that the enumeration of LAB in SF1, 2, 3, and 4 sequentially were 1.0 x 10^6 CFU/ml, 117 x 10^5 CFU/ml, 139 x 10^5 CFU/ml, and 3 x 10^7 CFU/ml (Table 1). It showed a similar result to Khalil and Anwar (2016), who reported that the enumeration of LAB under aerobic conditions ranged from 1.1 x 10^5 to 7.2 x 10^8 CFU/ml, and anaerobic went from 6.1 x 10^5 to 5.3 x 10^7 CFU/ml (Khalil and Anwar, 2016). In addition, the macroscopic appearance of the lactic acid bacteria colonies from all samples was a creamy white LAB colony (Figure 1). It showed a similar result to Khalil and Anwar (2016) and Siburian *et al.* (2021), which reported that the LAB colony in MRS Agar 1% CaCO3 media was an appearance as a white

colony with a smooth surface (Siburian *et al.*, 2021). Moreover, the microscopic view with gram staining showed that LAB in SF1 was gram-positive cocci bacteria, while in SF2-SF4 was gram-positive bacilli. It was similar to Khalil and Anwar (2016), who reported that LAB was characterized as either bacilli or cocci gram-positive (Khalil and Anwar, 2016).

Antibacterial activity classifications are based on the wide inhibition zone. Morales *et al*. (2003) grouped the antimicrobial activity based on the wide inhibition zone into four categories: weak activity (5 mm), moderate (5–10 mm), strong (>10–20 mm), and very strong (>20–30 mm). Thus, most samples in this study showed a moderate antibacterial effect against these pathogens. However, SF4 showed a strong antibacterial effect against *Escherichia coli* but no antibacterial effect against *Staphylococcus aureus*. It showed a similar result to Zaraswati *et al*. (2017), who reported that some LAB strains from fermented milk had some antimicrobial activities against *Escherichia coli* (19.83 mm) and *Candida albicans* (19.33 mm).

Some studies have investigated the mechanism of action of antibacterial effects from fermented milk. Fermented milk contains *Lactobacillus bulgaricus, Lactobacillus acidophilus, and Lactobacillus casei* (Morales *et al.*, 2003; Dwyana, 2017). Prior studies reported that LAB had some compounds responsible for antibacterial effects, including bacteriocin and lactic acid. Bacteriocin is a high molecular weight (> 30 kDa) of heat-labile proteins; this protein is a group of endopeptidases that lyse peptidoglycan in bacterial cell walls. Zhu and Zhang (2020) reported that Lacidophilin, a bacteriocin, could disturb the integrity of the bacterial cell membrane through lipid peroxidation and cell oxidative damage. It leads to the leakage of electrolytes, nucleic acid, and proteins. It also restrained phosphorus metabolism, inhibited the growth of the bacteria, and caused changes in some bacterial proteins. In addition, Ijaz (2021) also reported that LAB might also secrete lactic acid that reduces the medium pH and inhibiting the growth of various enteropathogens and foodborne pathogens (Zhu and Zhang, 2020; Ijaz, Iqbal and Saeed, 2021).

Furthermore, this paper revealed that SF4 isolates had a similar 16S rRNA molecule to *Lactobacillus fermentum* strain. *Lactobacillus fermentum* predominantly ferments some fermented dairy products and human microbiota. Ijaz et al. (2021) reported that the dairy samples from some rural areas in Southern Punjab, including cow milk and fresh homemade yogurt, had some isolates contained *Lactobacillus fermentum* by 16S rRNA sequencing, which may be a potential source of probiotics. On the other hand, Allaith et al. also reported that other fermented beverages like malt milk (Boza) and apple juice (Sider) might have 16S rRNA molecule that was identic *Limosilactobacillus fermentum* (also known as *Lactobacillus fermentum*) and *Leuconostoc mesenteroides*, with a similarity level of 99.8%–100.0% (Ijaz, Iqbal and Saeed, 2021; Allaith *et al.*, 2022).

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CONCLUSION

In conclusion, some homemade fermented milk in Medan City, Indonesia, are potential probiotics. They had Lactic Acid Bacteria with moderate antibacterial activity against gram-positive and gram-negative bacteria. One was identified as *Lactobacillus fermentum* strain NBRC 15885 with a homology level of 99.78% based on 16S rRNA gene sequencing.

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Effective Simulation Methods Improve Student Skills in Performing Basic Life Support

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A B S T R A C T

Almost ten thousand people are affected by cardiac arrest, and the prevalence tends to increase every year in Indonesia. Nursing students need to have skills in performing basic life support (BLS) to increase the survival rate of patients with cardiac arrest inside or outside the hospital. An effective method for facilitating students in gaining such skills is educational simulation. This study aims to identify the effectiveness of the simulation method in improving students' skills in providing BLS. This is a quantitative quasi-experiment with a pre-posttest design. The sample is all fourth-year students in Nursing at Poltekkes Kemenkes Mataram who have had emergency classes in the previous semester. Data were collected using observation sheets and analyzed using the Wilcoxon Signed Rank Test to identify students' skills before and after they were given educational simulations. Before the educational video method was implemented, most respondents had insufficient skills in carrying out BLS, with 11 people (55%) falling into this category. Only two respondents (10%) demonstrated good skills in conducting BLS. After the simulation, all respondents acquired the skills to perform BLS in the "good" category, with 32 people (82%) exhibiting these skills. There were no respondents who had sufficient or poor BLS skills. Educational simulation significantly influenced students' skills in performing BLS (p=0.000). It can be concluded that the simulation method was effective in improving the students' skills in performing BLS. Educational simulation of BLS can be applied as an alternative method in the learning process.

INTRODUCTION

Heart disease and stroke have become the number one cause of death worldwide in the last 15 years (Virani et al., 2020). Cardiovascular disease is the leading cause of death in adults where cardiac arrest related to coronary ischemia is the only major cause (Keto et al., 2016; Virani et al., 2020). In 2014, there were 60,000 cases of cardiac arrest outside in several Asia Pacific regions. In Indonesia estimated around 10 thousand people per year experience cardiac arrest where most events are experienced by coronary heart disease patients whose prevalence tends to increase every year (Kemenkes, 2018).

Victims of cardiac arrest have a survival capacity that will continue to decrease by 7-10% every minute. Therefore, assistance is needed especially assistance from people around them, both outside the hospital and in the hospital (Atmaja et al., 2022; Purwadi et al., 2021). The success of returning spontaneous circulation in less than 20 minutes after a cardiac arrest is associated with an increased survival rate in patients (Virani et al., 2020). This indicates the importance of skills in providing Basic Life Support (BLS) quickly and precisely, especially for nursing students. Nursing students have a very broad opportunity to provide BLS, both in cases of cardiac arrest in their home environment and in cases of cardiac arrest in the

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hospital environment where they practice nursing and or work as nurses later. Therefore, they need to be equipped with the skills to do BLS quickly and precisely (Pranata et al., 2021).

One of the factors that influence the quality of student skills is the method used in the process of learning these skills (Atmaja et al., 2022; Mulianda et al., 2022). The educational simulation method can be used to improve student skills. Simulation is a learning approach that accurately portrays and simplifies real-world situations or phenomena (Pranata et al., 2021; Purwadi et al., 2021). The simulation method can replicate real-life situations, allowing students to react, assess the simulation setting, make decisions about actions to be taken, and reflect on the relationship between their decisions and the ultimate consequences of the skills they are practicing (Atmaja et al., 2022; Purwadi et al., 2021). This supports students in experiencing real-life conditions, preparing them well for situations they may encounter in actual emergencies.

From the brief description above, it can be concluded that both the simulation method and the educational video method have the potential to improve the quality of students' skills, especially in dealing with cardiac arrest cases that require BLS. However, it is uncertain whether educational simulations can effectively enhance students' skills in performing BLS. Based on the provided description, the purpose of this study was to determine the effectiveness of the simulation method in improving students' skills in providing BLS.

METHOD

Design

A quasi-experiment with a pre-post-test design was designed for this study.

Population and samples

The population in this study were students of Poltekkes Kemenkes Mataram. Samples taken from the population using a purposive sampling technique, namely based on inclusion and exclusion criteria, with as many as 40 students.

Inclusion and exclusion criteria

Inclusion criteria included willing to be a respondent, received a lecture on emergencies, and able to take part in a simulation from the beginning to the end of the study process. Exclusion criteria included not present during the data collection process (educational simulation), and never attending a lecture on emergencies.

Research variables

The variables in this study were the educational simulation method as the independent variable and the quality of students' skills in carrying out BLS as the dependent variable. The primary data were the skills of students doing BLS before and after the educational simulation. Secondary data included demographic

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data of respondents including age, gender, and data on whether the respondent attended BLS training before.

Data collection

Data on the characteristics of the respondents collected using the respondent data sheet which was filled in by the researcher according to the data provided by the respondent. Primary data collected using an observation checklist. The researcher filled the checklist of student skills observation before and after the educational simulation carried out.

Data collection carried out after obtaining permission from the relevant institutions and the ethics committee of the Poltekkes Kemenkes Mataram. Data collected by socializing about the research to be conducted to prospective respondents and registering students who are willing to become respondents. Next, give the consent sheet to become a respondent to the students and explain the procedure. Fill out the form sheet regarding the demographic data of the respondent. Conducting a pre-test by asking respondents to demonstrate their skills in conducting BLS and assessed/evaluated using a checklist before being given an educational simulation. After the pre-test, the simulation was played 2 times. Doing a post-test by asking respondents to practice how to do BLS after the simulation, then assessed/evaluated using a checklist.

Data management: the researcher re-checked all the respondent's data entry sheets and the respondent's skills evaluation checklist to avoid mistakes or the possibility of filling out incomplete questionnaires. Furthermore, the researcher calculated the results of the evaluation of the skills of the respondents in carrying out the BLS, determined the category of the ability of the respondents and calculated the research data then collected them into the master table according to the variable category.

Statistical analysis

After collecting and managing data, data analysis is carried out to obtain research results. Data on students' skills in carrying out BLS before (pre-test) and after (post-test) given the education simulation method were analyzed using the Wilcoxon Signed Rank Test non-parametric statistical test. This test was conducted to determine the effect of educational methods on the quality of students' skills in carrying out BLS.

Ethical consideration

The informed consent. Participant has the right to withdraw. The researcher got approved to conduct the study from the committee ethic of Poltekkes Kemenkes Mataram (IRB Number: 001/EC/I/2022), further, the data about the level of stress among students were collected.

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RESULT

The results of collecting secondary data and primary data on respondents can be described as follows:

Respondent characteristics

Distribution of Respondents based on Age, Gender and Experience Participating in BLS Training presented in Table 1.

Table 1. Distribution of Respondents based on Age, Gender and Experience Participating in BLS Training

Characteristic	Amount	Percentage
Age		
20 years old	5	12.5%
21 years old	26	65%
22 years old	7	17.5%
23 years old	2	5%
Gender		
Male	11	27,5%
Female	29	72,5%
Experience Participating in BLS Training		
1 time	0	0%
≥ 2x times	40	100%
None	0	0%
Total	40	100%

The age of the respondents was in the age range of 20 - 23 years. Most of the respondents were 21 years old (65%) and only 2 respondents were 23 years old (5%). Most of the respondents were female, namely 29 people (71.8%). All respondents had attended BLS training 2 times (100%). There were no respondents who had never participated in BLS training or who had attended training only once.

Respondents' skills in carrying out BLS before being given educational simulation methods.

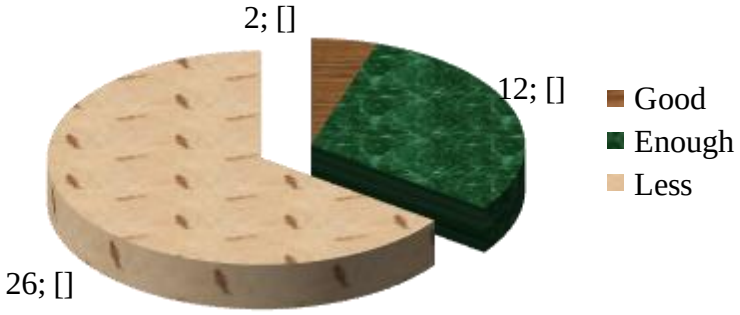

Figure 1. Skills Diagram for Carrying Out BLS After being given a Simulation.

Before given the educational video method, most of the respondents had insufficient skills in carrying out BLS, namely as many as 11 people (55%). Only two respondents (10%) have good skills in conducting BLS.

Respondents' skills in carrying out BLS after being given the simulation method.

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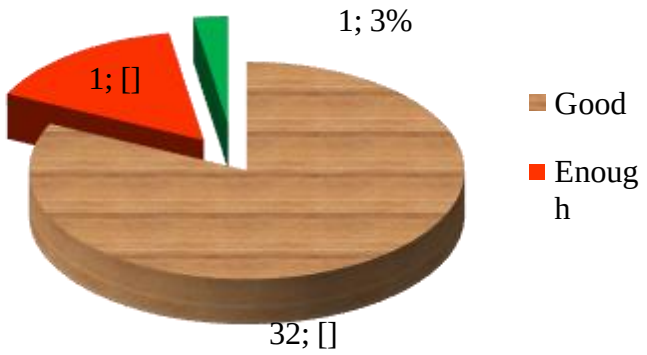

Figure 2. Skills Diagram for Carrying Out BLS After Being Given a Simulation

After given a simulation, all respondents had the skills to do BLS in a good category, namely 32 people (82%). There were no respondents who had sufficient and poor BLS skills.

Analysis of Respondents' skill data before and after being given the simulation method

Respondents' skill data in carrying out BLS before and after given the simulation method analyzed using the Wilcoxon Signed Rank Test non-parametric statistical test to measure the difference between the two data groups. The average scores of students' skills before and after given a simulation and the results of statistical tests on the data are presented in Table 2.

Table 2. The mean value of the skills of the respondents in the simulation group (mean)

	Pre-Test Simulation	Post-Test Simulation	Z	Pretest-Post test simulation
N	40	40	-3.874b	.000
Mean	44.7368	96.5789		
Median	40.0000	100.0000		
Mode	40.00	100.00		
Std. Deviation	21.56860	5.28431		

Table 2, there is a difference in the average score of the respondents' skills before and after the educational video is carried out, where the average value after the simulation (post-test) is greater than the average value before the educational video (Pre-test). The results of the Wilcoxon Signed Ranks Test statistical test showed that there was a significant difference between the skills of the respondents before and after being given the educational video (p = 0.000). This shows that the simulation influences increasing the skills of respondents doing BLS.

DISCUSSION

There was a significant difference between the skills of the respondents before and after given a simulation. This shows that the simulation influences increasing the skills of respondents doing BLS. The results of this study are in accordance with research on the application of the simulation method to improve student learning outcomes (Priester, 2016; Steurer, 2011). With the simulation method, students can participate actively, and students who are active observers can develop imagination, and form group

cohesiveness, students are not embarrassed and hesitate, resulting in an increase in student's knowledge and skills (Sari, 2019; Steurer, 2011).

Other studies also show the effectiveness of the simulation method in increasing student activity in the learning process. There was an increase in learning activities from cycle I to cycle II and from cycle II to cycle III so as to optimize student achievement (Pranata et al., 2021; Sari, 2019; Steurer, 2011). The simulation method not only increases student knowledge but can also improve students' ability to respond to an object and practice an object skill shown (Priester, 2016; Purwadi et al., 2021). Simulation methods that involve a lot of sense will shape knowledge and understanding more perfectly, thus helping someone to respond positively to an object that is manifested in real actions (Steurer, 2011).

In addition to involving almost all the senses and aspects of one's intelligence, the simulation method also allows one to practice making the right action decisions or appropriate skills in response to an object or situation that is made like in a real situation (Brewer et al., 2020; Liao, 2021; Veenerma, 2015). This can explain why the simulation method is more effective in improving student skills than the educational video method (Veenerma, 2015). However, this does not mean that one of the two methods must be chosen, if possible, the two methods can be combined so that the learning process can obtain maximum results.

Based on the data, all respondents in this study had attended BLS training twice. In training, they certainly have practiced or simulated BLS skills. However, the pre-test scores in the educational video group and the simulation group showed unsatisfactory scores, where there were still many respondents who were not skilled at doing BLS even though they had been trained. This shows the need for a continuous learning process to improve and maintain student skills. The learning process to maintain students' skills in carrying out BLS can use the educational video method because with this method the knowledge and skills learned can settle in memory (Ahayalimudin & Osman, 2016; Hammad et al., 2012).

The audiovisual method through simulation is indeed a method that has often been used, especially for the learning process and health education activities. Simulation can affect the increase in the value of student knowledge (Arbon et al., 2013; Whetzel et al., 2013).

CONCLUSION

The simulation method is effective in increasing students' skills in carrying out BLS. To maintain students' abilities and skills, it is necessary to make continuous learning efforts or recall lessons ever learned. This effort can be carried out by applying the simulation method either jointly with the teaching lecturers in the class or independently by each student. As previously mentioned, even though it is effective, the simulation method still has drawbacks, so future research is expected to be able to identify other methods that can be used to complement the simulation method or used as an alternative method to improve the quality of student skills.

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Effect of Anemia on Cognitive Capacity of Adult Students in Sokoto, Nigeria

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A B S T R A C T

Anemia due to iron deficiency or inherited sickle cells nowadays threatens public health in many respects. Among the effects of anemia is its ability to affect cognitive or related abilities. Thus, this study aimed to assess the effect of iron deficiency anemia and sickle cell anemia on the cognitive ability of participants in Sokoto. The study design involved recruiting 50 participants (25 healthy and 25 tested to be anemic) who were subjected to Montreal Cognitive Assessment. Another fifteen sickle anemia patients, and twenty-five healthy persons were evaluated using Montreal cognitive assessment. The scores of all the respondents were recorded and subjected to the X2 test and revealed significant differences at ($p<0.05$). The result of the study indicated that the anemic participants scored fewer mean marks (420.0 ± 14.0) in contrast to the healthy participants (820.0 ± 32.6) at ($P<0.05$). The effect of sickle cell anemia was revealed with a significant difference ($p<0.05$), showing that the healthy adult participants of the study scored higher marks (240.0 ± 16.0) compared to the anemic participants (924.0 ± 30.8). Thus, the anemia of any kind can potentially affect the cognitive capacity of students in the state.

INTRODUCTION

Iron is the second in abundance among all the earth's metals. The element is crucial in oxygen transportation, oxidative metabolism, catalytic reactions, and cellular proliferation; therefore, the iron level in the body must be beneficial only on maintained at balance levels (Yiannikourides & Latunde-Dada, 2019). Indeed, iron is a pivotal micronutrient and essential that plays a vital role in human blood functions in the body. Iron is a prerequisite in many enzymes, such as peroxidases, catalases, and cytochromes, necessary for respiration. Iron is a functional element in hemoglobin, enzymes, and tissues. It also exists as stored iron in ferritin and transferrin circulating iron, highlighting some iron roles in the body (Sarkingobir et al., 2023) Alhazmi et al., 2021). Parable, the cytochrome P450 (an iron-requiring enzyme) detoxifies foreign substances entering the liver. Iron is needed signal and control neurotransmitters in the brain (Gupta, 2014).

The world is plagued by illiteracy, ignorance, food insecurity, malnutrition and poverty, and diseases. Anemia is a dubbed condition of low red cells or hemoglobin level, and in turn, the primary function of hemoglobin to convey oxygen along the body parts is militated (Abbaspour et al., 2014). The most common anemia is iron deficiency anemia, mainly considered nutritionally based (Abbaspour et al., 2014).

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Iron deficiency anemia is a widespread and cumbersome issue toiling public health and affecting about 1 billion inhabitants worldwide. As a result of this disease, many people suffer poor academic/ cognitive performance, poor immunity, low fertility, neurological disorders, low physical activity, poor intelligence, poor growth, and quasi (Soleimani, 2011; Igbal et al., 2015).

Indeed, another type of anemia is hemolytic anemia, with the dominant sickle cell anemia affecting many people with extreme adverse effects (Abbaspour et al., 2014). Moreover, sickle cell anemia is a congenital disorder characterized by severe life-threatening and lifelong anemia, pain crises, chronic organ damage, reduced life span (Koduri, 2003). Iron deficiency anemia and sickle cell anemia affect iron levels by causing iron imbalance and instigating biological problems prior to cognitive decline (Castro & Viana, 2019; Felek, 2023). Thus, Sokoto, a state challenging poor health care, malnutrition, poor educational achievement, and food insecurity, needs to evaluate the effects of anemia and sickle cell anemia on the cognitive achievement of its people for proper policy on intervention measures such as nutritional supplementation, screening before marriage, early screening of diseases, drug administration etc (Sarkingobir et al., 2023). Thus, this study aimed to assess the effect of iron deficiency anemia and sickle cell anemia on the cognitive ability of participants in Sokoto.

METHOD

The study was carried out in Sokoto State, Nigeria. In comparison, the study design involved voluntarily recruiting 50 participants (25 healthy and 25 tested to be anemic). All these participants were subjected to Montreal cognitive assessment. On the other hand, another fifteen participants tested positive for sickle anemia, and twenty-five healthy persons were evaluated using Montreal Cognitive Assessment (Mahendra et al., 2015; Felek, 2023). The scores of all the respondents were calculated and subjected to the X^2 test and revealed significant differences at ($p<0.05$).

RESULT

Table 1. The effect of anemia on the cognitive ability of some adult students in Sokoto, Nigeria

	N (individuals)	Mean marks scored	Standard deviation	X^2	Remark
Anemic patients	25	420.0	14.0	129.032	Significant
Healthy people	25	820.0	32.6		
Total	50				

In Table 1, a total of fifty participants were involved in evaluating the effect of anemia on the cognitive ability of adult participants of the study. Table 1 shows the effect of anemia on the cognitive capacity of adult patients and healthy individuals recruited for the study in Sokoto. The result of the study indicated

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that the anemic individuals had less mean mark score (420.0 ± 14.0) compared to that of healthy participants (820.0 ± 32.6) at (P<0.05).

Table 2. The effect of sickle anemia condition on the cognitive ability of some adult students in Sokoto, Nigeria

	N (individuals)	Mean marks scored	Standard deviation	X^2	Remark
Anemic patients	15	240.0	16.0	401.938	Significant
Healthy people	20	924.0	30.8		
Total	35				

In Table 2, 35 participants were involved in studying the effect of sickle cell anemia on cognitive ability in adult students in Sokoto. In Table 2, the effect of anemia was revealed with a significant difference (p<0.05), showing that the healthy adult participants of the study scored higher marks (240.0 ±16.0) compared to the anemic participants (924.0±30.8).

DISCUSSION

This finding shows that the anemia in the patient can potentially reduce the cognitive ability of adult students in Sokoto (in Table 1). Like this study (in Table 1), another work from Iran revealed that students with anemia show low academic achievement compared to the healthy participants in addition to that (Soleimani, 2011). This result aligned with the finding revealed by a Turkey study, showing that the cognitive ability of adult patients attending a hospital is affected by anemia (Youssef et al., 2020; Felek, 2023). Another study from Egypt indicated that most of the students examined had anemia and resultantly suffered low academic achievement due the condition (Youssef et al., 2020). In another study related to Pakistan, it was observed that students with low iron deficiency anemia displayed poor cognitive and academic achievement in contrast with the control group (Igbal et al., 2015). Anemia is a predominate health issue in many parts of society. It is characterized by low hemoglobin levels below the specific ranges set up by WHO, and the condition is primarily due to iron deficiency, which can be prevented through intervention. Iron deficiency anemia has symptoms such as weakness, fatigue, slow memory, slow movement, headache, poor cognition, skin changes, etc. (Felek, 2023). The condition might occur due to loss of iron or poor iron intake or lack of iron bioavailability, infection and quasi (Youssef et al., 2020).

This study, in turn, has indicated that sickle cell anemia condition has the potential to negatively affect the academic or cognitive performance of adult students examined. Other studies have found that sickle cell patients revealed a lower cognitive ability than healthy individuals (Erdem et al., 2021; Felek, 2023). Another study from Saudi Arabia reports that sickle cell anemia in students led to poor academic performance in patients related due to the disease. Students with the diseases had comparatively lower scores compared to the healthy ones, a situation linked to the complications of the disease (Alhazmi et al., 2021).

Invariably, from this study, it has been revealed that anemia can affect the cognitive performance of the study participants. In other words, anemia is primarily due to iron problem, which is dubbed as iron deficiency anemia (Soleimani, 2011; Youssef et al., 2020). The problem of anemia due to iron is a nutrition issue and most prevalent in Africa and other developing nations, Nigeria included (Mahendran et al., 2015). However, it was reported that iron-deficiency anemia at early stages of life or adulthood affects academic or cognitive performance because the brain (enzyme system) is a forefront organ sensitive to iron deficiency. Some shot brain enzymes due to iron deficiency anemia affect behavior of the biological system, ultimately affecting cognitive performance (Mahendran et al., 2015; Umar et al., 2022). In youngsters, the situation of iron deficiency anemia profoundly affects learning, memory, physical activity, health, and later life; in adults, the situation causes similar effects such as fatigue, reduced physical activity, impaired cognitive capacity. In most cases, the situation in adults can be reversed by supplementing nutrients without residual traces. The effects of iron deficiency can be felt by its ability to affect Hippocampus (neuronal metabolism, gene expression, mitochondrial health etc) and hippocampal thyroid hormone, myelination, dopamine etc) (Fretham et al., 2011; Samson et al., 2022).

Also, sickle cell anemia participants in this study have revealed lower cognitive function than healthy participants. This condition of anemia has also been reported elsewhere to be affecting humans' cognitive effort, albeit it is a genetic/ hereditary disorder (Tebbi, 2022; Felek, 2023). It might be able to affect the cognitive performance of patients because of issues that accompany the diseases, such as to poor iron availability or hypoxia, pain crises, and the like (Ojewunmi et al., 2019; Castro & Viana, 2019; Matondo et al., 2020; Alhazmi et al., 2021; Tebbi, 2022). Therefore, both iron deficiency anemia and sickle cell anemia disease can affect cognitive ability in humans. Measures such as nutritional interventions, management of sickle cell anemia, early screening and other interventions should be imbibed, and public awareness is essential for public health promotion. This action would help in the development of education for the population of the country.

CONCLUSION

Iron is an essential micronutrient in the human biological system that is required for various functions. However, the anemia due to iron deficiency and sickle cell disorders are characterized by poor iron in the body and, afterwards, effects that directly or indirectly affect students' cognitive performance. In Sokoto state, where malnutrition and other public health concerns are recorded, data is needed to study the effect of anemia on the cognitive performance of adult students. This study finding revealed that anemia in the form of iron deficiency and sickle cell could negatively lower the cognitive outcome of the study participants. Therefore, more efforts are needed to alleviate the prevalence of anemia in all forms to have a better society, a better workforce, and an educated society.

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Family Support and Social Support in Preoperative Anxiety Status

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A B S T R A C T

Anxiety is vital in determining the decision of appendectomy surgery. Anxiety may be reduced with support from family and society. This study aimed to analyze the relationship between family and social support on the anxiety of preoperative appendectomy patients. This study used an analytical descriptive quantitative method with a cross-sectional approach on 15 preoperative appendectomy patients in the operating room. Collecting data was using a questionnaire from one month. Data analysis was using Spearman rank test. The study's results indicate that family support has a significant value of 0.904 for anxiety, while social support has a significant value of 0.059. This study shows that family and social support do not affect the anxiety status of preoperative appendectomy patients. Therefore, future research on the current topic is recommended but with a larger sample to prove the hypothesis.

INTRODUCTION

Appendicitis is an inflammation of the vermiform appendix. It usually presents acutely, within 24 hours of onset, but can also present as a more chronic condition. Appendicitis initially presents with generalized or periumbilical abdominal pain that later localizes to the right lower quadrant. This activity reviews the presentation, evaluation, and treatment of appendicitis and emphasizes the role of the interprofessional team in evaluating and treating patients with this condition.

According to (Yang et al., 2022), in 2019, there were 17.70 million new cases of appendicitis globally, with an age-standardized incidence rate of 229.86 per 100,000 population. There are 259 million cases of undiagnosed appendicitis in men worldwide, while in women, there are 160 million cases of undiagnosed appendicitis. 7% of the population in the United States suffer from appendicitis, with a prevalence of 1.1 cases per 1,000 people per year. The incidence of acute appendicitis has increased from 7.62 to 9.38 per 10,000 from 1993 to 2008. The incidence of acute appendicitis in developing countries is lower than in developed countries. In Southeast Asia, Indonesia ranks first with the highest incidence of acute appendicitis, with a prevalence of 0.05%. Followed by Philippines, with a prevalence of 0.022% and Vietnam of 0.02%. The incidence of acute appendicitis in developing countries is lower than in developed countries (Wijaya et al., 2020).

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In Southeast Asia, Indonesia ranks first as the highest incidence of acute appendicitis with a prevalence of 0.05%, followed by the Philippines at 0.022% and Vietnam at 0.02% (Wijaya et al., 2020). From January to December 2021, the incidence of appendicitis at Sele Be Solu General Hospital, of the total number of inpatients, was recorded as many as 127 patients with appendicitis. All these patients had to undergo surgery. This proves the high number of cases of appendicitis at Sele Be Solu Hospital, Sorong City.

Acute appendicitis represents 4.5% of abdominal pain and is the most common emergency that general surgeons encounter. In Western countries, the lifetime risk of acute appendicitis is calculated to be 1 in 15 people. The severity and associated morbidity can be correlated with the period between initial signs and symptoms and initiation of treatment. Appendicitis in Indonesia ranks highest among several other cases of abdominal emergency (Stephanie, 2022).

The appendix empties itself inefficiently, and its lumen is small, easily obstructed, and prone to infection (appendicitis). Therefore, it is essential to provide treatment to patients with appendicitis immediately. Appendicitis can be treated in two ways, namely, surgery and non-surgical. In mild cases, appendicitis can be cured only with medication, but for appendicitis that has an extensive infection, an appendectomy must be carried out immediately. Appendectomy is surgery to remove inflamed appendicitis.

Anxiety often occurs in preoperative appendictomy patients that affect the course of surgery, such as impacting the cardiovascular system by increasing blood preasure so that the operation can be canceled.. Everyone's response to surgery differs, but most people experience fear and anxiety (Gill & Goldstein, 2022; Lan et al., 2022; Qi et al., 2022). Patient anxiety is caused by various reasons, including anxiety about the operating room and operating equipment, anxiety about body image in the form of defects or restrictions on limb movement, anxiety, and fear of dying while under anesthesia, worry about the effects of surgery if it fails, and worry about costs (Piras et al., 2022; Rodziewicz et al., 2022).

Some patients who experience severe anxiety are forced to postpone the scheduled surgery because the patient feels that he is not mentally ready for surgery. Differences in anxiety levels can affect preparation for surgery. Social support and family support are a source of coping with stress and affect one's health condition (Hanalis-Miller et al., 2022; Salzmann et al., 2022; Wang et al., 2022). One of them is constantly being near the patient, motivating the patient to give confidence that the operation can run smoothly. Social support for patients undergoing surgery will lighten the patient's burden, thereby reducing patient anxiety, and patients will be better prepared for surgery, impacting calm and comfort patients. Therefore, patients who will face surgery need family and social support. The absence of family and social support can affect the psychological of the these patients. This study aims to assess the relationship between family support and social support with the anxiety level of preoperative appendectomy patients.

METHOD

This research design is descriptive-analytic with a cross-sectional approach. The sample consisted of 15 patients who were going to undergo appendectomy, aged between 15-65 years and had been treated for at least 24 hours before. CITO surgery or perforated appendectomy was not included in this study. All samples were recruited by purposive sampling technique. Data collection used four questionnaires: demographic, family support, social support, and anxiety. The demographic questionnaire contains age, gender, education, occupation, living with family, marital status, a caregiver at home, and length of time suffering from appendicitis. Veber Ali Sabana (2016) adopted the family support questionnaire, which consisted of 16 statements containing informational, hopeful, natural, and social support. This statement uses a Likert scale with always, often, sometimes, and never choices. The social support questionnaire consists of 29 statements: Emotional or esteem support, Tangible instrumental support, Informational support, and Companionship support. This statement uses a Likert scale with the choices strongly agree, agree, seldom, and never. This anxiety questionnaire uses The Amsterdam perioperative anxiety and information (APAIS) (ÇETİNKAYA et al., 2019), consisting of 4 statements. This statement will be filled with Likert scale answer choices: not at all, not much, a little, quite a bit, and a lot. This research was conducted in November - December 2022 in the operating room of Sele Be Solu Hospital, Sorong City. The results of this study were processed using the Spearman rank test.

RESULT

A total of 15 respondents contributed to this study. Respondents in this study were dominated by female respondents (53.3%) who were married (60%) and aged 16-25 years (33.3%) and 26-35 years (33.3%) who had junior high school education (40%) and worked in the private sector (46.7%). Most of the respondents had appendicitis for more than six months (53.3%) and lived with their families (100%) and were therefore cared for by their partners (53.3%). The data is presented in Table 1 below.

Table. 1. Characteristic of respondents

Characteristics	n	(%)
Age (years)		
16-25	5	33.3
26-35	5	33.3
36-45	2	13.3
46-55	2	13.3
56-65	1	6.7
Gender		
Man	7	46.7
Woman	8	53.3
Education		
Elementary School	1	6.7
Junior High School	6	40
Senior High School	4	26.7
College	4	26.7

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Profession		
Unemployed	3	20
Self-employed	4	26.7
Civil Servant/Police/Soldier	1	6.7
Private	7	46.7
Live with family		
Yes	15	100
Marital status		
Not married yet	6	40
Marry	9	60
Caring at home		
Couple	8	53.3
Others (siblings)	7	46.7
Long suffered appendicitis (months)		
<1-2	2	13.3
3-4	1	6.7
5-6	4	26.7
>6	8	53.3

A. Family support

Relationship between family support and anxiety level of preoperative appendectomy patients

The distribution of family support based on the anxiety level of preoperative appendectomy patients is presented in Table 2 below.

Table 2. Family support based on the anxiety level of preoperative appendicitis patients

Family support	Anxiety Level							
	Light		Currently		Heavy		Total	
	f	%	f	%	f	%	f	%
Low	2	50	0	0	2	50	4	100
Currently	1	14.3	2	28.6	4	57.1	7	100
Tall	1	25	2	50	1	25	4	100
Total	4	26.7	4	26.7	7	46.7	15	100

Table 2 shows that most respondents who experienced severe anxiety received moderate family support (57.1%). Only a few respondents who experienced mild anxiety received moderate family support (14.3%).

The relationship between family support and the anxiety level of patients with preoperative appendectomy data is presented in Table 3 below.

Table 3. The relationship between family support and the anxiety level of preoperative appendicitis patients

			Level of Family Support	Anxiety Level
Spearman's rho	Level of Family Support	*Correlation Coefficient*	1,000	-.034
		Sig. (2-tailed)	.	.904
		N	15	15
	Anxiety Level	*Correlation Coefficient*	-.034	1,000
		Sig. (2-tailed)	.904	.
		N	15	15

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The results of the Spearman rank analysis showed a correlation coefficient (*rho*) of 0.034 with a significant value (*p*) of 0.904. Based on the analysis above, it was found that the value of *p*=0.904 was more significant than the significance level of 0.05 (*p*<0.05), so there was no relationship between family support and the anxiety level of preoperative appendicitis patients.

B. Social Support

The relationship between social support and the anxiety level of preoperative appendectomy patients

Social support based on the anxiety level of patients with preoperative appendectomy is presented in Table 4 below.

Table 4 Distribution of social support based on the anxiety level of patients with preoperative appendicitis

Social Support	Anxiety Level							
	Light		Currently		Heavy		Total	
	f	%	f	%	f	%	f	%
Low	0	0	1	33.3	2	66.7	3	100
Currently	2	20	3	30	5	50	10	100
Tall	2	100	0	0	0	0	2	100
Total	4	26.7	4	26.7	7	46.7	15	100

Table 4 shows that most respondents who experience severe anxiety receive low social support (66.7%). There were no respondents who experienced mild anxiety, who received low social support, and severe anxiety, who received high social support (0%).

The relationship between family support and the anxiety level of patients with preoperative appendectomy is presented in Table 5 below.

Table 5. The relationship between social support and the anxiety level of preoperative appendectomy patients

			Anxiety Level	Level of Social Support
Spearman's rho	Anxiety Level	*Correlation Coefficient*	1,000	-.498
		Sig. (2-tailed)	.	059
		N	15	15
	Level of Social Support	*Correlation Coefficient*	-.498	1,000
		Sig. (2-tailed)	059	.
		N	15	15

The results of the Spearman rank analysis showed a correlation coefficient (*rho*) of 0.498 with a significant value (*p*) of 0.059. Based on the analysis above, it was obtained that the *p*=0.059 was more significant than the significance level of 0.05 (*p*<0.05), so there was no relationship between social support and the anxiety level of preoperative appendicitis patients.

DISCUSSION

Relationship between family support and anxiety level of preoperative appendectomy patients

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This study's results found that there was no relationship between family support and the anxiety level of preoperative appendicitis patients. This study's results are different from research conducted by Jenita (2010) titled "Relationship of Family Support with Preoperative Patient Anxiety Levels in Room RB2 of HAM Hospital North Sumatra," obtaining the result that there is a relationship between family support and anxiety level of preoperative patients from 62 study respondents analyzed using the Spearman Rank test with the most incredible family support is a good category 53.2%, and the least is the less category 17.7%. For anxiety, the highest category is mild anxiety, 46.8%, and the least is the heavy category, 24.2%.

Family support is also related to a person's level of anxiety, where the role of the family is expected normatively from someone in certain situations to fulfil expectations. However, the anxiety can occur in the conflicted family (Dickson et al., 2022; Morelli et al., 2022)

From the research results that have been done showed that there is no relationship between family support and anxiety levels. Hence, family support must be increased, especially in assessment support, to reduce anxiety in preoperative patients. In addition, health workers need information from the patient's family to always pay attention to their family members because the effects of family support on health and well-being function together (Brandt et al., 2022; Pestana-Santos et al., 2022; Zemp et al., 2022).

More specifically, adequate family support is associated with reduced mortality, easier recovery from illness, cognitive function, and physical and emotional health. Besides that, the positive influence of family social support is on adjustment to stressful life events. Family support should not be in the medium or low category because it directly affects the patient's anxiety level. The level of closeness that is felt will directly impact the client who will undergo surgery. The family can be the closest part of the client, so maximum support must be given (Gao et al., 2022; Schwab et al., 2022; Shi et al., 2022; Theberath et al., 2022).

The relationship between social support and the anxiety level of preoperative appendectomy patients

This study's results found that there was no relationship between social support and the anxiety level of preoperative appendectomy patients. Anxiety about surgery is a dangerous and unpleasant situation that individuals experience during preparation, before, and during surgery. Several factors influence anxiety, namely internal factors such as lack of self-confidence, low self-concept, inadequate preparation by health workers, fear of failure, excessive worry, and irrational thoughts of failure in surgery: external factors, environment, and social support, both material and non-material social support (Akyirem et al., 2022; El-Zoghby et al., 2022; Gatti et al., 2022; Kechine et al., 2022; Zachciał et al., 2022).

That the absence of appropriate social support is a significant determinant for the emergence of anxiety, balance in social exchange will produce interpersonal relationships that satisfy experience, or reciprocal exchange makes individuals believe more than others assist. The high anxiety of facing surgery reflects the need for psychological readiness of the patient. This condition reflects the need for more confidence from the patient in facing surgery (Atalay et al., 2022; Edú-Valsania et al., 2022; Egger & Huber, 2022).

Anxiety is an emotional state characterized by physiological arousal, unpleasant tension, and an uneasy feeling that something terrible will happen. If this condition persists in the long term, it can cause stress or mental pressure, undoubtedly fatal for the person concerned. So, to anticipate mental stress, we need other parties who can provide an easy-to-understand understanding of the problems faced so that anxiety levels can be reduced, and stress can be avoided (Prasko et al., 2022; Putwain et al., 2023; Spiegel2022).

The practical contribution of social support to anxiety about surgery is 40.6%. This sizable contribution is due to a lack of self-confidence and self-concept that makes students unable to calm down and assess themselves as unable to face surgery well. In such conditions, social support is needed in providing alternative solutions to a problem that the person concerned responds to. Surely it will be able to reduce the anxiety that arises.

As part of society, health workers should be able to provide moral support, information, and support facilities during patient care to reduce the patient's anxiety level. Among other things, this can be done by providing the information/counseling needed by the family about the patient is treatment and socializing about patient safety so that the patient is not afraid of undergoing surgery.

CONCLUSION

This study's results indicate that there is no relationship between family support and the anxiety level of preoperative appendicitis patients. This investigation aimed to assess the role of social and family support in preoperative patient anxiety. The most apparent finding from this study is that social and family support does not affect a patient's anxiety about being operated on. Although this study focuses on anxiety, these findings may have something to do with the subjective experience of the surgical situation. This paper suggests that anxiety in a surgical situation is an emotional problem, so external support is not strong enough to influence one's subjective perception. Limited to a small sample size, this would be a fruitful area for further research. Therefore, there is a definite need for a larger sample in this study.

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Risk Factors for Stunting Among Children Under Five Years of Age in The Kokoda Tribe, Sorong City

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A B S T R A C T

Stunting is a chronic nutritional deficiency resulting in short stature and cognitive impairment. Sorong City has the highest incidence of very short and short toddlers in West Papua Province, 52.58%. This study analyzes the risk factors for stunting among children under five years of age in the Kokoda tribe, Sorong City. This study used a case-control design. The population was all parents and children aged 12-59 months registered at Integrated Health Post in 8 selected villages in Sorong City in 2021, totaling 1,890 children. There were 168 samples, 84 in the cases group and 84 in the control group, with the purposive sampling technique. Data collection used a stunting risk factors questionnaire on toddlers and measured body length, weight, and upper arm circumference. The data was processed by analyzing the Odds Ratio (OR) with the SPSS application. Results showed that children with birth lengths less than 48 centimeters had a 2.652 times greater risk of experiencing stunting compared to those more than equal to 48 centimeters. Children with birth weight less than 2,500 grams had a three times greater risk of stunting compared to those more than equal to 2,500 grams. Respondents with no clean water availability had 2.013 times more experienced stunting. Mothers not taking iron supplements during pregnancy could increase the risk of stunting three times. The risk factors for stunting among under-five children in the Kokoda tribe, Sorong City, are birth length, birth weight, the availability of clean water, and iron supplements during pregnancy.

INTRODUCTION

Stunting is a disorder related to chronic malnutrition resulting in short stature and cognitive impairment (Baidho et al., 2021). In 2017, 22.2 percent of children aged 0-5 worldwide, or one in every four children, were stunted. South Asia has the highest stunting frequency (35%), followed by East and South Africa (34.1%) and West and Central Africa (33.7%) (Indonesia, 2018).

According to the Ministry of Health Republic of Indonesia, Nowadays, Indonesia has a stunting rate of 30.8 percent. The trend decreased compared to 2007 (36.8%) and 2013 (37.2%). Nevertheless, it remains the focus of government attention. In 2020, the percentage of stunted children, according to national standards, decreased to 27.6 percent. However, it was still above the World Health Organization (WHO) guidelines that the percentage should not exceed 20% (Rahmadhita, 2020).

The average prevalence rate of very short toddlers in West Papua was 42.64%. Furthermore, its prevalence reached 52.58% in Sorong City, West Papua Province. In addition, according to the 2019 routine reports of the integrated SIGIZI (Nutrition Information System), its number in Sorong City was 994 under five years old children. The highest number was in the working area of East Sorong Health Center, with 247 toddlers (Office, 2021).

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Many factors contribute to the global prevalence of stunting, including maternal age at birth, early pregnancy, and delivery (Nasir et al., 2021). In addition, other factors are inadequate sanitation, child nutrition, and disease history. Moreover, maternal awareness about nutrition, family income, exclusive breastfeeding, genetics, and level of nutritional adequacy are also predisposing factors for stunting (Budiastuti & Rahfiludin, 2019; Supariasa & Purwaningsih, 2019; Wulandari Leksono, 2021).

Previous studies showed that, apart from an infection, stunting was also associated with nutritional deficits of micronutrients and macronutrients. Stunting children also correlated with a lack of protein, iron, zinc, calcium, and vitamins D, A, and C. In addition, other predisposing factors for stunting were hormonal factors, genetics, inadequate parental knowledge, poverty, poor environmental sanitation, and limited access to food. Moreover, low-income families and limited access to health services also contributed to stunting. Efforts to overcome issues of wealth inequality between provinces were also critical, especially in vulnerable areas (Sudiarmanto, 2019; Wahyuni et al., 2021; Andriansyah et al., 2022).

Stunting is a sensitive indicator of economic decline and a long-term predictor of mortality and morbidity. Thus, the continuing incidence of stunting in under-five children is worrying. This study analyzes the risk factors for stunting among children under five years of age in the Kokoda tribe, Sorong City.

METHOD

This research was a retrospective or case-control study to determine risk factors for stunting. The case-control study is observational research assessing the exposure-disease correlation by identifying a group of people with the disease (called cases) and a group without the disease (called controls) and then comparing the frequency of exposure in both groups. Cases are subjects with negative effect characteristics selected from the same conditions as controls, especially in this paper, by matching the respondent's age. This research was conducted in Sorong City from January 2021 to November 2022. The population was all parents and children aged 12-59 months registered at Integrated Health Post in 8 selected villages in Sorong City in 2021, totaling 1,890 children. There were 168 samples, 84 in the cases group and 84 in the control group, with the purposive sampling technique. The Cases were selected from the three Integrated Health Posts with the most significant stunting incidence, while children under five years of age as controls. Data collection used a stunting risk factors questionnaire on toddlers and measured body length, weight, and upper arm circumference. The data was processed by analyzing the Odds Ratio (OR) with the SPSS application. The magnitude of the OR can estimate the strength of the association. The OR calculation uses a 2 x 2 cross table. When the OR value = 1, indicates that the independent variable no is a risk factor for the dependent variable. In addition, OR< 1 means that the independent variable is a protective factor against the dependent variable. Moreover, OR>1 implies the independent variable is a

risk factor for the dependent variable. The analysis results are meaningful if the upper (UL) and lower limits (LL) are above the value of 1 or 1, and vice versa.

RESULT

Results showed that 32.1% of children in this study were 24-35 months, and 53% were boys. In addition, 36.3% of mothers graduated from elementary school, and 80.4% were unemployed. Furthermore, 36.9% of fathers graduated from Senior High School, and 48.8% were farmers or fishermen. Most respondents' family incomes were less than IDR 1,000,000 (71.4%).

Table 1. The Characteristics of Respondents (n=168)

The characteristics of respondents	Case		Control		Total	
	n	%	n	%	n	%
Child's age:						
12-23 months	28	33.3	22	26.2	50	29.8
24-35 months	30	35.7	24	28.6	54	32.1
36-47 months	15	17.9	26	31.0	41	24.4
48-59 months	11	13.1	12	14.3	23	13.7
Child's sex:						
Boy	47	56.0	42	50.0	89	53.0
Girl	37	44.0	42	50.0	79	47.0
Maternal education:						
University	1	1.2	4	4.8	5	3.0
Senior High School	21	25.0	27	32.1	48	28.6
Junior High School	22	26.2	18	21.4	40	23.8
Elementary School	30	35.7	31	36.9	61	36.3
No School	10	11.9	4	4.8	14	8.3
Paternal education:						
University	9	10.7	11	13.1	20	11.9
Senior High School	25	29.8	37	44.0	62	36.9
Junior High School	20	23.8	14	16.7	34	20.2
Elementary School	26	31.0	20	23.8	46	27.4
No School	4	4.8	2	2.4	6	3.6
Maternal profession:						
Civil servant	2	2.4	0	0	2	1.2
Private employee	0	0	1	1.2	1	0.6
Entrepreneur	9	10.7	12	14.3	21	12.5
Farmer / Fisherman	5	6.0	4	4.8	9	5.4
Unemployment	68	81.0	67	79.8	135	80.4
Paternal profession:						
Civil servant	1	1.2	5	6.0	6	3.6
Private employee	8	9.5	14	16.7	22	13.1
Entrepreneur	10	11.9	2	2.4	12	7.1
Farmer / Fisherman	42	50.0	40	47.6	82	48.8
Unemployment	23	27.4	23	27.4	46	27.4
Family income:						
Less than IDR 1,000,000	64	76.2	56	66.7	120	71.4
From IDR 1,000,000 to 3,000,000	18	21.4	27	32.1	45	26.8
More than 3,000,000	2	2.4	1	1.2	3	1.8

Four of the five variables in this research were risk factors for stunting. They were birth weight with an OR=3, birth length with an OR= 2.652, availability of clean water with an OR=2.013, and iron tablet supplements during pregnancy with OR = 3. Thus, children with birth lengths less than 48 centimeters

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had a 2.652 times greater risk of experiencing stunting compared to those more than equal to 48 centimeters. Children with birth weight less than 2,500 grams had a three times greater risk of stunting compared to those more than equal to 2,500 grams. Respondents with no clean water availability had 2.013 times more experienced stunting. Mothers not taking iron supplements during pregnancy could increase the risk of stunting three times.

Table 2. Analysis of Risk Factors for Stunting among Under Five Children in Kokoda Tribe, Sorong City (n=168)

Variable	Case		Control		Total		OR	LL-UL
	n	%	n	%	n	%		
Birth weight:								
< 2,500 grams	42	50.0	21	25.0	63	37.5	3.000	1.561 – 5.766
≥ 2,500 grams	42	50.0	63	75.0	105	62.5		
Birth length:								
< 48 centimeters	42	50.0	23	27.4	65	38.7	2.652	1.395 – 5.043
≥ 48 centimeters	42	50.0	61	72.6	103	61.3		
Maternal nutritional status during pregnancy:								
Undernutrition	50	59.5	47	56.0	97	57.7	1.158	0.627 – 2.136
Normal	34	40.5	37	44.0	71	42.3		
Availability of Clean Water:								
High	41	48.8	27	32.1	68	40.5	2.013	1.076 – 3.767
Low	43	51.2	57	67.9	100	59.5		
Taking Iron tablet supplements during pregnancy:								
No	28	33.3	12	14.3	40	23.8	3.000	1.401 – 6.422
Yes	56	66.7	72	85.7	128	76.2		

DISCUSSION

Stunting is the leading cause of malnutrition in children, resulting in less optimal adult height, decreased cognitive capacity, and increased susceptibility to disease, primarily degenerative diseases. Short (stunting) or very short (severe stunting) is a term that refers to nutritional status by measuring body length for age or height for age (Apriluana & Fikawati, 2018).

Our findings showed that birth length was one of the predisposing factors for stunting. Children with birth lengths less than 48 centimeters in this study had a 2.652 times greater risk of experiencing stunting compared to 48 cm. The body length measurement in the supine position is suitable for children aged 0 to 24 months when measured. It is because the findings increased by 0.7 cm when measured in a standing position. Meanwhile, height measurement in the upright position is for children >24 months (Abdullah & Sari, 2017).

Furthermore, this study indicated that children with birth weight less than 2,500 grams had a three times greater risk of stunting compared to those more than equal to 2,500 grams. According to Apriluana's research (Apriluana & Fikawati, 2018), low birth weight (LBW) significantly increased the incidence of

stunting in children by 3.82 times. Nutrient deficiency during pregnancy can affect the birth weight, resulting in LBW or weighing less than 2500 grams in babies. Low birth weight was also associated with birth length. The importance of nutritional intake during the first 1000 days of life begins at 270 days during pregnancy and 730 days during the first two years of the baby's life. That golden period will affect growth and development from childhood to adulthood (Tatu et al., 2021).

In this paper, respondents with no clean water availability had 2.013 times more experienced stunting. Rahayu Research also found that children who lived in homes with clean water and toilet facilities had a lower prevalence of diarrhea and stunting (Rahayu et al., 2018). Water availability also affects maternal health, pregnant women, and toddlers. Thus, the availability of safe drinking water is closely related to human development issues, particularly in the health sector, and mainly to prevent stunting. Clean wells and water sources can minimize the chances of spreading infectious diseases, especially gastrointestinal infections, and diarrhea. Thus, inadequate water sanitation potentially increases the prevalence of diarrhea in children. Further, diarrhea can cause food malabsorption in children (Usman & Umar, 2020).

This investigation revealed that mothers not taking iron supplements during pregnancy could increase the risk of stunting three times. Women with anemia during pregnancy potentially give birth to babies with stunting and LBW. Thus, iron supplements are essential to prevent anemia and iron deficiency during pregnancy.

CONCLUSION

The risk factors for stunting among under-five children in the Kokoda tribe, Sorong City, are birth length, birth weight, the availability of clean water, and iron supplements during pregnancy.

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Association between Individual Characteristics and Long COVID Severity among COVID-19 Survival in Jabodetabek

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A B S T R A C T

Long COVID has a prevalence of between 10 and 30 percent in patients with a history of SARS-CoV-2 infection and has different levels of symptom severity. This study aimed to determine the individual characteristics based on age and sex along with the severity of Long COVID in Jabodetabek. This study used a cross-sectional design and purposive sampling technique to determine the sample size. The inclusion criteria were COVID survivors who lived in Jabodetabek and had been exposed to COVID-19 based on examination by health workers. Furthermore, the analysis carried out in this study consisted of univariate and bivariate analyses. Data collection was collected online via social media using the Post (Long) COVID-19 Syndrome Questionnaire. The Chi-square statistical test results showed that of 399 respondents, there was a statistically significant relationship between gender and the severity of Long COVID, and women were 1.6 times more at risk of experiencing more severe Long COVID-19 symptoms than men. In addition, all symptoms such as fatigue, shortness of breath, chest pain, sleep disturbances, headaches, muscle aches, anosmia, dry cough, and concentration disorders are related to the severity of long COVID. The severity level based on sex and gender in this study could be used as the basis for providing intervention and prevention of COVID-19 according to the needs of each individual's body so that the proper intervention can help reduce the severity and control of COVID-19.

INTRODUCTION

COVID-19 is causing a public health crisis by infecting millions of people and resulting in deaths globally (Neng et al., 2020). The number of COVID-19 cases globally is 613,410,796, with a case fatality rate of 1.06% as of September 2022 (Organization, 2022). The number of new cases of COVID-19 is still being reported. There are several countries with the highest cases of COVID-19, such as America (94,833,079), India (44,579,088), Brazil (34,638,288), and Indonesia (6,427,764) (Organization, 2022). These countries generally have a relatively dense population, especially Indonesia. The cities in Indonesia like Jakarta, Bogor, Depok, Tangerang and Bekasi have an accumulated number of COVID-19 cases of 1 million cases that contribute to the increase in COVID-19 cases nationally (Kementerian, 2021).

In general, survivors of COVID-19 still experience COVID-19 symptoms after passing through the acute phase (Sivan & Taylor, 2020). These symptoms include breathing difficulties, fatigue, headaches, and even anosmia (Kamal et al., 2021). If this condition occurs in survivors of COVID-19, it can be referred to as long COVID (Orrù et al., 2021). Long COVID is a term used to describe the presence of various symptoms after being infected by SARS-CoV-2 infection for weeks or even months (Ziauddeen et al., 2022).

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The National Institute of Health and Care Excellence (NICE) has defined long COVID-19 as symptoms that persist for more than four weeks after the onset of acute illness (Bai et al., 2022). These lingering symptoms of long COVID occur because the body takes a long time to recover from damaged organs due to an exaggerated inflammatory response to viruses that enter the body (Garg et al., 2021). In addition, the aggressive treatment of COVID-19 by giving more drugs to patients with severe and critical case can cause the long COVID (Asadi-Pooya et al., 2021).

Long COVID has 10–30% prevalence in patients with a history of SARS-CoV-2 infection (Buonsenso et al., 2021). The research results related to assessing and characterizing post-COVID-19 manifestations stated that only 10.8% of COVID-19 survivors did not experience symptoms after being declared cured (Kamal et al., 2021). A study conducted in Netherlands on 273,618 people who recovered from COVID-19, 57% had one or more symptoms of long COVID, recorded over 6 months (Taquet et al., 2021). A systematic review and meta-analysis of long COVID-19 in Italy reported that 80% of patients who contracted COVID-19 had at least one symptom of long COVID, the five most common of which were fatigue (58%), headache (44%), restlessness, and concentration (27%), hair loss (25%), and dyspnea (24%) (Parisi et al., 2021). However, the prevalence of long COVID in Indonesia is uncertainty (Asy'ari, 2022). Several factors that increase the chances of COVID survivors experiencing long COVID are individual characteristics. Research on long COVID-19 in England, Sweden, and the United States stated that individual characteristics, including age and gender, are associated with long-term COVID (Sudre et al., 2021).

The International Severe Acute Respiratory and Emerging Infection Consortium (ISARIC) observed that older age is associated with a higher risk of long COVID symptoms (Ortona & Malorni, 2022). In addition, research in China found that women have a greater chance of experiencing long COVID (Huang et al., 2021). However, research conducted in Turkey found that men and the younger age group had more severe long COVID symptoms compared to women and those in the older age group (Ozgocer et al., 2022). The research shows that the incidence of long COVID varies by age and gender. However, little is known about the incidence of long COVID in Indonesia. Therefore, this study aims to examine the association of individual characteristics, namely age, and gender, with the severity of long COVID in Jabodetabek.

METHOD

The research design used was an analytic observational study using cross-sectional. The participants in this study were survivors of COVID-19 who live in Jabodetabek. The sample size was calculated using a different proportion test with a prevalence value of long covid events in adolescents of 45% in previous

studies, and the precision value used was 5% with an absolute significance level of 95% (Lemeshow et al., 1990). Based on sample calculations, a minimum of 420 samples was obtained. The inclusion criteria in this study were COVID survivors who lived in Jabodetabek and had been exposed to COVID-19 based on examination by health workers. While the exclusion criteria were the subject who suffered serious ill and unable to participate in the study, had a chronic illness that had occurred long before the presence of COVID-19 such as respiratory disease, and other comorbidities, the subject did the vigorous physical activity within 15-30 minutes before the research was conducted, and did not stay in Jabodetabek during the research. The technique used to determine the sample size was the purposive sampling technique. As for those who participated in this study, there were 433 respondents. However, 34 respondents were excluded during the study because they did not meet the inclusion criteria so the number of participants who entered the study was 399.

The independent variables in this study are individual characteristics, including age and gender. Meanwhile, the dependent variable is long COVID symptoms as measured using the Post (Long-term) COVID-19 Syndrome Questionnaire. Long COVID is a condition in which a survivor of COVID-19 still feels symptoms of the disease (fatigue, shortness of breath, chest pain, sleep disturbances, headaches, muscle aches, anosmia, dry cough, and impaired concentration) after being declared cured of COVID-19. Symptoms experienced by respondents were measured using a Likert scale of 1-10 with nine questions. Among the nine questions related to perceived symptoms, they said they had no symptoms or felt mild symptoms if the Likert score was 1-5, while they had symptoms or felt severe symptoms if the Likert score was 6-10. Then the accumulated results of the nine symptoms are categorized as mild if the score is < mean (value of 0,5) and severe if the score is ≥ mean. Data collection was carried out from September-November 2022 online via social media.

The analysis conducted in this study consisted of univariate and bivariate analyses. A univariate analysis is intended to describe the distribution of each variable studied. Then, in this study, the bivariate analysis used the chi-square test and binary logistic regression to see the relationship between individual characteristics (age and gender) and the severity of long COVID. This research has obtained permission for the health code of ethics through the Ethics Commission of the Faculty of Health Sciences, UIN Syarif Hidayatullah Jakarta, with number Un.01/F.10/KP.01.1/KE.SP/07.08.050/2022

RESULT

The analysis results of the description of the distribution of respondent characteristics and the long COVID event can be seen in Table 1.

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Table 1 Individual Characteristics of Long COVID Event in Jabodetabek

Variable	Frequency (n)	Percentage
Gender		
Female	314	78.7
Male	85	21.3
Age (Years)		
12-25	274	68.7
26-45	120	30.1
>45	5	1.3
Residence		
Jakarta	105	26.3
Bogor	68	17
Depok	90	22.6
Tangerang	105	26.3
Bekasi	31	7.8
Severity Level		
Mild	195	48.9
Severe	204	51.1

Table 1 shows that 399 respondents (93.9%) experienced long COVID events. The distribution of female respondents (78.7%) is higher than that of males (21.3%). Respondents with long COVID were primarily young people aged 12 to 25 (68.7%). The respondents' average body mass index (BMI) is 20.5, which is normal. Meanwhile, based on domicile, two regions have the highest distribution of long COVID events with the same proportion (26.3%), namely Jakarta and Tangerang.

Table 2 Symptoms of Long COVID based on Severity of Long COVID

Symptoms of Long COVID	*Long* COVID *Severity*				P *value*
	Mild		Severe		
	Frequency	Percentage	Frequency	Percentage	
Fatigue	158	44.1	200	55.9	<0.001
Dyspnea	110	37.8	181	62.2	<0.001
Chest pain	93	35.1	172	64.9	<0.001
Sleep Disorders	107	35.7	193	64.3	<0.001
Headache	81	30.0	189	70.0	<0.001
Muscle ache	96	34.2	185	65.8	<0.001
Anosmia	108	40.4	159	59.6	<0.001
Dry Cough	78	32.5	162	67.5	<0.001
Disorders of Concentration	83	32.0	176	68.0	<0.001

Table 3 shows that each survivor of COVID-19 can feel symptoms with different levels of severity, such as fatigue, which is experienced by many long COVID survivors with a severe category of 200 (54.9%) and long COVID survivors with a mild category of 158 (44.1%). Based on the statistical test results, all symptoms have a significant relationship with the severity of long COVID.

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Table 3 Relationship between individual characteristics and long COVID severity

Variable	*Long* COVID *Severity*				P *value*	OR (95% CI)
	Mild		Severe			
	Frequency	Percentage	Frequency	Percentage		
Gender						
Male	50	25.6	35	17.2	0.039*	0.665 (1.025-2.706)
Female	145	74.4	169	82.8		
Age (Years)						
12-25	131	67.2	143	70.1	0.720	1.665 (1.025-2.706)
26-45	62	31.8	58	28.4		
≥ 46	2	1.0	3	1.5		

*= There is a statistically significant relationship

Table 3 shows that the Chi-square statistical test results showed a P value of 0.039, meaning that there was a statistically significant relationship between gender and the severity of long COVID in COVID-19 survivors in Jabodetabek in 2022. It is known that women are 1.6 times more at risk and experience more severe symptoms of long COVID-19 than men.

DISCUSSION

The severity level felt by respondents in the severe category has a proportion of 51.1%. Each survivor of COVID-19 can experience symptoms with different levels of severity, such as fatigue, which is experienced by many survivors of long COVID with a severe category of 55.9% and survivors of long COVID with a mild category of 44.1%. The statistical test results show that all symptoms significantly correlate with the severity of long COVID. The results of similar studies state that there is a relationship between difficulty sleeping and coughing with the incidence of long COVID. However, this study showed no association with symptoms of fatigue, shortness of breath, chest pain, headaches, muscle aches, anosmia, and concentration problems. This is because most symptoms can heal over time (Asadi-Pooya et al., 2021). Regardless of the severity, survivors of long COVID often experience symptoms are fatigue, sleep disturbances, disorders of concentration, and muscle aches (Mińko et al., 2022). The pathophysiology of long COVID is not fully understood. This can be due to other influences, such as a history of obesity (Sykes et al., 2021). The statistical test results show a relationship between gender and long COVID. This is in line with previous studies, which found a statistically significant relationship between gender and the incidence of long COVID (Brodin, 2021; Fernández-de-Las-Peñas et al., 2022; Sudre et al., 2021). Other studies state that women are more at risk of experiencing a more severe long COVID than men (Asadi-Pooya et al., 2021; Ludvigsson, 2021; Simani et al., 2021; Yong, 2021). This greater risk in women is associated with differences in the body's immune response (Sylvester et al., 2022). In addition, differences in sex hormones also contribute to the risk of long COVID based on gender because woman, the symptoms of long COVID co-occur with perimenopause and menopause (Stewart et al., 2021).

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The age characteristics of the individuals in this study indicate that there is no relationship with long COVID as proven in statistical tests. This is because there are more subjects in this study aged 12-25 years. Meanwhile, other studies have shown that older people are more susceptible to persistent symptoms after COVID-19 infection (Mińko et al., 2022). Complaints of persistent symptoms of COVID-19 that older individuals often report are disturbance in carrying out daily activities, while younger individuals experience intensive mental health disorders (Mińko et al., 2022). Symptoms of persistent anosmia and taste disturbance are often experienced by younger people (<65 years) (Akbarialiabad et al., 2021). In addition, a study used a telephone survey to evaluate 292 young patients (mean age: 42.5 years) who experienced mild COVID-19 after being diagnosed for 16 days. There were 35% of adults who still had residual symptoms of COVID-19 within 2-3 weeks with the main symptoms being cough, fatigue, and shortness of breath (Tenforde et al., 2020).

The strength of this research is that topic raised is one of the topics that has yet to be done much in Indonesia. However, this study has limitations such as the sampling technique that uses something other than probability sampling so this study cannot be generalized to a broader population. The study design used could not see a causal relationship, and clinical trials did not confirm the collection of data related to perceived symptoms.

CONCLUSION

The results of a study conducted on 399 respondents showed that the gender characteristics of the respondents had a relationship with the severity of long COVID, while age had no relationship. The female sex is 1.6 times more at risk of experiencing more severe symptoms of long COVID-19 than men. The symptom of long COVID that respondents often experience is fatigue, which occurs at both mild and severe levels of severity. For future researchers, a case-control design can be used to identify casual relationships. In addition, so that research can be generalized to a wider population, a sampling technique with probability sampling can be used. The results of this study are also expected to provide information regarding the risk of long COVID so that this assessment can support decision-making or policy. The severity level based on individual characteristics in this study can be the basis for providing intervention and prevention of COVID-19 according to the needs of everyone's body so that the proper intervention can help reduce the severity and control of COVID-19.

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Analysis of PPE Use with Occupational Disease Risk Control: Analytical Study of Ppe Use at The Sudiang Raya Public Health Center, Biringkanaya District, Makassar City

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A B S T R A C T

The use of PPE is closely related to occupational diseases caused by work factors or diseases acquired while doing work and occur over a long period. This study aimed to determine the relationship between Knowledge, Compliance with the use of PPE, Availability of PPE, Implementation of Standard Operating Procedures (SOP) for the use of PPE and PPE Implementation Policy with Occupational Disease Risk Control. This research is quantitative with an analytic survey approach using a cross-sectional study method. The population in this study were all health workers with a total sample of 28; the sample was all nurses/doctors and midwives. Based on the square or comparative test results to determine the relationship between occupational disease risk control. The results showed that there was no relationship between knowledge (P=0.608), there was a relationship between the availability of Personal Protective Equipment (PPE) (P=0.002), Standard Operating Procedures (SOP) (P=0.004), Compliance with using Personal Protective Equipment (PPE) (P = 0.000). There is no relationship between policy (P = 0.0604) and controlling the risk of occupational diseases. Interventions are needed to ensure the availability of personal protective equipment (PPE) such as masks, and protective goggles, adherence to the use of self-protection equipment (PPE), and the implementation of Standard Operating Procedures (SOP) in each unit requires complete control so that the Standard Operating Procedures (SOP) are implemented, and adherence to the use of Personal Protective Equipment (PPE) requires awareness/not negligence in using Personal Protective Equipment (PPE) when serving patients to avoid risks occupational illness.

INTRODUCTION

The Community Health Center, better known as the Community Health Center is a health service facility that organizes community health efforts and individual health efforts. According to Hendrik L. Blum, quoted by Khaerun Mawartisna Azzahra (2021), Health Services are one of the factors in improving the degree of public health by prioritizing the security and safety of patients, officers and visitors so that the Community Health Center is a workplace that has a high risk of diseases caused by work or occupational diseases, the risk of contact with infectious agents with blood and body fluids (biological hazard) as well as needle sticks of sharp instruments which can act as the transmission of various diseases such as hepatitis B, Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/Aids) of the patients they treat. These hazards can cause health problems for health workers and can be at risk of illness and even death (Azzahra, 2021).

Nurses are the most health workers, comprising almost all health workers in Community Health Centers. Nurses beside and in direct contact with patients take many actions using sharp instruments and a work atmosphere with high stress and fatigue, which can potentially cause occupational diseases. The cause of

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the risk of occupational disease due to non-compliance with the use of Personal Protective Equipment (PPE), the occupational health and safety behaviour of nurses at the Public Health Center is fundamentalbecause even the slightest action of a nurse can pose a risk to nurses and patients. According to the World Health Organization (WHO), nurses are a group that is at risk of injury. The annual injury rate reaches 10-20 people per 1000 workers while the cleaning staff reaches 180 people per 1000 workers, which means it comes from incised and stabbed wounds in sharp waste (Kemenkes R I, 2015). While data from the Occupational Safety and Health Administration (OSHA) in 2013 found in the study that the causes of injury to health workers included fatigue due to movement related to patient handling 48%, sprains or falls 25%, contact with dangerous tools 13% acts of violence in patients 1% exposed to exposure to hazardous substances 4%.

Efforts to implement Occupational Health and Safety must be implementedin all workplaces, especially workplaces that have a risk of health hazards being easily infected with disease or have the least number of employees to reduce the presence of hazards that can have an impact on the health of workers or patients who are taking medication for improve service quality by prioritizing occupational health and safety aspects at the Public Health Center.

The existence of incidents in patients is the basis for the importance of patient safety efforts in health care facilities, such as the use of Personal Protective Equipment (PPE), because several factors cancause incidents of patient safety, namely health care facilities besides that, the impact arising from patient safety incidents decreased patient satisfaction so that it affects the quality of health services.

Personal Protective Equipment (PPE) is a tool used to protect oneself or the body against the hazards of work accidents which technically can reduce the severity of work accidents in nurses and patients. This Personal Protective Equipment (PPE) only reduces the number of hazardous contacts by placing a barrier between the workforce and patient dangersand vice versa. Nurses mustuse Personal Protective Equipment (PPE) to avoid occupational safety risks in serving patients at the Public Health Center. Unsafe behaviour in nurses when working without using personal protective equipment (PPE) according to standards can result in work accidents and cause work-related illnesses. Injury due to needle sticks in nurses is a significant problem in healthcare institutions. When nurses accidentally stab themselves with needles that have previously entered the body tissues of nursing patients are at risk of contracting at least 20 potential pathogens.

In this case, related to Personal Protective Equipment (PPE), the Government has established Occupational Safety and Health, regulated in Law No. 1 of 1970, concerning Occupational Health Safety enforced in Industry (Presiden RI, 1970). Apart from that, there is also an instruction from the Minister of Manpower No. 02/M/BW/BK/1984 regarding the approval of Personal Protective Equipment (PPE) and an instruction

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from the Minister of Manpower No. Ins 05/M/BW/1997 concerning supervisingPersonal Protective Equipment (PPE) and Circular No. SE/05/BW/1997 concerning Personal Protective Equipment (PPE) (Menteri Tenaga Kerja, 1997; Direktur Jenderal Pembinaan Hubungan Industrial dan Pengawasan Ketenagakerjaan, 1997).

From the description above, the researcher is interested in researching the factors related to usingpersonal protective equipment (PPE) in health workers at the Sudiang Raya Community Health Center, Biringkanaya District, Makassar City. By the initial observations, the researchers found that the working area of the Public Health Center was expansive. The availability of Personal Protective Equipment (PPE) needed to be improved to meet the needs of nurses, midwives, doctors and other officers, and the use of Personal Protective Equipment (PPE) needed to be improved. Not by procedures such as in the action and Maternal and Child Health rooms. The availability of Personal Protective Equipment (PPE) is crucial. It mustbe adequate, as well as the application of Standard Operating Procedures (SOP), which must be clear that using Personal Protective Equipment (PPE) for health workers can be prevented occupational diseases and avoid existing infectious diseases. at the Sudiang Raya Community Health Center, Biringkanaya District, Makassar City.

METHOD

The research design used is a cross-sectional study design. Analytic research aims to examine the relationship between the independent variables and the dependent variable. The cross-sectional study approach collects the independent variable data and the dependent variable simultaneously. The variables examined in this study were the dependent variables, namely the analysis of the use of personal protective equipment (PPE) in controlling the risk of occupational diseases. This study used an observational analytic survey to determine the use of Personal Protective Equipment (PPE) for controlling the risk of occupational diseases at the Sudiang Raya Community Health Center, Biringkanaya District, Makassar City. This research was conducted at the Sudiang Raya Community Health Center, Biringkanaya District, Makassar City, from July 19 to September 14, 2021.The population in this study were all health workers at the Sudiang Raya Public Health Center, Biringkanaya District, Makassar City, totalling 28 people. At the same time, the sample in this study was all officers on duty at the Sudiang Raya Public Health Center, Biringkanaya District, Makassar City with 28 Officer Respondents. The sampling technique in this study is total sampling. Total sampling is when the number of samples equals the population (Sugiyono, 2017).

The data used in this study were obtained through data collection in the form of primary data and secondary data. Primary data was obtained by conducting a direct survey to obtain data that was not obtained from the local Community Health Center to obtain data by observation or direct observation.

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Besides that, a questionnaire was also used to look at the risk factor variables that were considered related to the risk of occupational diseases. Inform consent was signed first by the respondent, and then the researchers collected data directly by conducting interviews and filling out questionnaires with nurses as respondents by visiting the Sudiang Raya Community Health Center. Before filling out the questionnaire, respondents received an explanation of the purpose and method of filling out the questionnaire from the researcher. Meanwhile, secondary data was obtained from institutions or other parties that could be trusted, namely data at the Sudiang Raya Community Health Center, Biringkanaya District, Makassar City.

While data analysis was carried out in two stages, namely 1) Univariate Analysis and 2) Bivariate Analysis. The independent variables in this study are knowledge, availability, SOP, compliance, and policies. Meanwhile, the dependent variable in this study was an occupational disease. The statistical tests used were the chi-square test and the Fisher's exact test to see the relationship with a significant total value ($p < 0.05$) if the p-value obtained was less than 0.05, then there is a significant relationship.

RESULT

This research was carried out in the work area of the Sudiang Raya Public Health Center, Biringkanaya District, Makassar City, South Sulawesi Province, in 2021. Data were collectedfrom July 19, 2021, to September 14, 2021. risk of occupational diseases" with a total sample of 28 respondents. The research results obtained are as follows:

Univariate analysis

Based on the results of research at the Sudiang Raya Community Health Center from 19 July to 14 September 2021, the following results were obtained:

Table 1. Distribution of respondents based on age, gender, length of work, last education of health workers at the Sudiang Raya Community Health Center

Characteristics of Respondents	n	%
Age		
20-25 years	1	3.6%
26-40 years	15	53.6%
41-50 years	7	25%
51-65 years	5	17.9%
Gender		
Man	2	7.1%
Woman	26	92.9%
Length of work		
2-15 years	17	60.7%
16-31 years	11	39.3%
Last education		
Diploma	15	53.6%
Bachelor-Professional Nurse	13	46.4%
Total	28	100%

Source: Primary Data, 2021

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Based on Table 1 above, it is known that the most age groups of respondents are 26-40 years, namely 53.6% and ages 41-50 years by 25% than those aged 51-65 years 17.9% while the minorage is 20-25 years of 3.6%. As for gender, it is known that the male respondent is 7.1%, while the female respondent is 92.9%, and the total percentage is 100%.

Table 1 above also explains the length of work, it is known that the length of work of Health Officers at the Sudiang Raya Community Health Center has the longest working time at the Community Health Center, 2-15 years at 60.7%, while the lowest is 16-31 years at 39.3 %. As for the respondents' education.It is known that the last education of health workers at the Sudiang Raya Public Health Center is 2021. The education level of the most respondents is 15 people, 53.6%, while the education level that is the least Bachelor-Professional Nurse is 13 people with a percentage of 46.4%.

Research variable

Table 2. Distribution of respondents based on occupational diseases, knowledge of Personal Protective Equipment (PPE), availability of Personal Protective Equipment (PPE), Standard Operating Procedures (SOP), adherence to the use of Personal Protective Equipment (PPE) and policies for health workers at Community Health Centers Sudiang Raya

Research variable	n	%
Occupational illness		
Risky	17	60.7
No Risk	11	39.3
PPE knowledge		
Not enough	0	0
Enough	28	100
Availability of PPE		
Not available	11	39.3
Available	17	60.7
SOP		
Not done	16	57,1
Done	12	42,9
Obedience		
Not obey	20	71,4
Obey	8	28,4
Policy		
There are not any	0	0
There is	28	100
Total	28	100%

Source: Primary Data, 2021

Based on Table 2 above, it is known that 17 officers are at risk of work-related diseases with a percentage of 60.7%, and those who are not at risk of work-related diseases are 11 people with a percentage of 39.3%. It is known that the respondents' knowledge about Personal Protective Equipment (PPE) needs to be improved by a percentage of 0%. Respondents' knowledge is sufficient for as many as 28 people, with a percentage of 100%. As for the availability of Personal Protective Equipment (PPE), it was found that it was not available, with 11 respondents, with a percentage of 39.3%. Meanwhile, there were 17 respondents with a percentage of 60.7%.

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Table 2 above also shows the Standard Operating Procedure (SOP) variable. It is known that the Standard Operating Procedure at the Sudiang Raya Public Health Center in 2021 was not carried out by a percentage of 57.1% of the respondents, 16 people, while it was carried out with a percentage of 42.9% of the respondents, 12 people. For the compliance variable, it was found that 20 respondents were non-compliant with the use of Personal Protective Equipment (PPE), with a percentage of 71.4%. At the same time, eight people were obedient, with a a percentage of 28.4%. As for the policy on using Personal Protective Equipment (PPE), 0% of the respondents stated that there were none, while those who stated that there were as many as 28 people, a percentage of 100%.

Bivariate Analysis

The statistical results of the relationship between knowledge of using Personal Protective Equipment (PPE) and controlling the risk of occupational diseases.

Table 3. Relationship between Knowledge, Availability of Personal Protective Equipment (PPE), SOP Standard Operating Procedures (SOP), Compliance and Policy with the Risk of Occupational Diseases at the Sudiang Raya Public Health Center

Research variable	Occupational illness				Total		*p*
	Risky		No Risk				
	n	%	n	%	n	%	
Knowledge							
Not enough	0	0.0	0	0.0	0	0.0%	0.608
Enough	11	39.3	17	60.7	28	100%	
Availability							
Not available	8	6.7	3	6.7	11	100	0.002
Available	9	10.3	8	4.3	17	100	
SOP							
Not Implemented	9	6.3	7	9.7	16	100%	0.004
Done	10	7.3	2	4.7	12	100%	
Obedience							
Not obey	9	12.1	11	7.9	20	100%	0.000
Obey	8	8.0	0	3.1	8	100%	
Policy							
There is no	0	0.0	0	0.0	0	100%	0.608
There is	11	39.3	17	60.7	28	0.0%	

Source: Primary Data, 2021

Based on the table above, 28 respondents who stated lack of knowledge were 0 (0.0%) at risk of 0 (0.0%) and not at risk of 0 (0.0). Then, 11 people (39.3%) had sufficient knowledge of using Personal Protective Equipment (PPE) and were at risk of exposure to work-related diseases. In comparison, those who were not at risk of exposure were 17 (60.7%) people. According to statistical tests using chi-square, a value (p-value = 0.608) was obtained because P> 0.05, then Ha was rejected. H0 was accepted (no significant relationship existed between knowledge and occupational disease risk control). These results show no relationship between knowledge and the risk of occupational diseases at the Sudiang Raya Community Health Center, Biringkanaya District, Makassar City. As for the variable availability of Personal Protective Equipment (PPE), it is known that from 28 respondents who stated that Personal Protective Equipment

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(PPE) was not available, 8 (6.7%) people were at risk of experiencing work-related diseases, and 3 (3) were not at risk of experiencing work-related diseases- 4.3%) people. Meanwhile, there were 9 (10.3%) people who stated that Personal Protective Equipment (PPE) was available and at risk of experiencing work-related diseases, and 8 (6.7%) people who were not at risk of experiencing work-related diseases. Based on data analysis using the square test shows that the value (p-value = 0.002), because P <0.05, then H0 is rejected, and Ha is accepted (there is a significant relationship between the availability of Personal Protective Equipment (PPE) and controlling the risk of occupational diseases).

Table 3 above also shows the relationship between the implementation of Standard Operating Procedures (SOP) and found that 16 respondents stated that it was not implemented and that 9 (6.3%) people were at risk of experiencing work-related illnesses, 7 (9.7%) people were not at risk. Meanwhile, 12 respondents stated that Standard Operating Procedures (SOP) had been implemented, and 10 (7.3%) were at risk of experiencing work-related illnesses, 2 (4.7%) people were not at risk. Based on data analysis using the square test, it shows that P-value = 0.004 because (P <0.05) then Ho is rejected, and Ha is accepted (there is a significant relationship between Standard Operating Procedures (SOP) and occupational disease risk control). For the variable adherence to the use of Personal Protective Equipment (PPE), it was found that from 20 respondents who stated that they were not adherent to the use of Personal Protective Equipment (PPE) and were at risk of occupational diseases as many as 9 (12.1%) people, and not at risk of occupational diseases as many as 11 (7.9%) people. Meanwhile, 8 respondents stated that they were obedient to the use of Personal Protective Equipment (PPE) and 8 (8.0%) people were at risk, 0 (3.1%) people were not at risk. Based on data analysis using the square test, it shows that P-value = 0.000, because (P <0.05) then Ho is rejected, and Ha is accepted (there is a significant relationship between compliance with occupational disease risk control). As for the policy variable, it was found from respondents stated that there was no 0 (0.0) risk 0 (0.0%) and no risk 0 (0.0%). In comparison, 28 respondents stated that there were and were at risk of experiencing occupational diseases, as many as 11 (39.3) people, who were not at risk as many as 17 (60.7) people. By the statistical test using chi-square, the value (p-value = 0.608) was obtained because P> 0.05, then Ha was rejected, and Ho was accepted (there was no significant relationship between policy and occupational disease risk control). These results show no relationship between policy and the risk of occupational diseases at the Sudiang Raya Community Health Center, Biringkanaya District, Makassar City.

DISCUSSION

This study aims to determine the use of Personal Protective Equipment (PPE) to control the risk of occupational diseases at the Sudiang Raya Public Health Center, Biringkanya District, Makassar City, in

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2021. The discussion of the bivariate analysis results between the dependent and independent variables can be narrated as follows.

Knowledge about the use of Personal Protective Equipment (PPE) is the knowledge of nurses/doctors/other health workers about the use of Personal Protective Equipment (PPE) in which the respondents' understanding of Personal Protective Equipment (PPE) includes the acronym, definition, purpose, benefits and uses of Personal Protective Equipment (PPE) that is used daily in serving patients at the Public Health Center.

The results of this study indicate that these 28 respondents demonstrated sufficient knowledge about the use of Personal Protective Equipment (PPE) with a frequency of 100% in this study indicating that health workers at the Sudiang Raya Community Health Center as a whole know the meaning, purpose, benefits of using as well as the requirements for Personal Protective Equipment (PPE) that are used daily in serving patients. However, of 28 respondents, 11 people were at risk of developing occupational diseases due to the negligence and indifference of nurses and other health workers in using Personal Protective Equipment (PPE) when handling or serving patients. 17 respondents were not at risk of experiencing occupational diseases who stated that they had sufficient knowledge. Furthermore, none of the respondents stated a lack of knowledge in using Personal Protective Equipment (PPE) to Control the risk of occupational diseases.

From the results of the analysis to see the relationship between knowledge and occupational disease risk control using the statistic chi-square test, it obtained a value (p-value = 0.608) because P> 0.05 then Ho was accepted and Ha was rejected (there was no significant relationship between the availability of protective equipment (PPE) by controlling the risk of work-related diseases.

This study's results differ from research conducted by Sarinah and Supri (2015) with the title Relationship between Knowledge and Attitudes to occupational health and occupational diseases in brick workers. It was stated that the better health workers' knowledge about Personal Protective Equipment (PPE) and work-related diseases, the lower the incidence of work-related diseases. Conversely, the less knowledge of health workers, the higher the risk of work-related diseases (Sarinah and Supri, 2015).

This result happens because independent (free) variables such as knowledge in conducting research at Public Health Centers with respondents such as doctors, nurses and midwives could be more efficient. After all, additional knowledge can be obtained through information dissemination and other technological tools, so doctors, nurses and midwives can easily access information.

Availability is the availability of sufficient facilities and personal protective equipment (PPE), ensuring that sufficient personal protective equipment (PPE) is available, in type and quantity, to protect all or part of the body for nurses, doctors and other health workers. Personal Protective Equipment (PPE) is available at the Sudiang Raya Community Health Center, Biringkanya District, Makassar City. There are sufficient

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quantities and types, but several amounts of Personal Protective Equipment (PPE) are lacking and sometimes run out and need to be sufficiently used by all health workers such as masks. The number of stocks ordered, namely Personal Protective Equipment (PPE), is indeed in a less long period and only as needed shortly.

This study's results indicate a relationship between availability and risk control for occupational diseases at the Sudiang Raya Public Health Center, Biringkanaya District, Makassar City. Of 28 respondents who stated that it was not available, 11 were at risk of experiencing occupational diseases. As many as 8 (72.7%) and not 3 (27.3%) are at risk of experiencing occupational diseases. Meanwhile, 9 (52.9%) of respondents said that Personal Protective Equipment (PPE) was available and that they were at risk of experiencing work-related illnesses. As many as 9 (52.9%) and six respondents (47.1%) were not at risk.

From the results of the analysis to see the relationship between availability and risk control for occupational diseases using the statistic chi-square test, a value (p-value = 0.002) is obtained because P <0.05 then Ho is rejected and Ha is accepted (there is a significant relationship between the availability of Personal Protective Equipment (PPE) with occupational disease risk control.

The availability of Personal Protective Equipment (PPE) that does not comply with procedural standards causes the behaviour of nurses who do not use Personal Protective Equipment (PPE) when carrying out medical procedures. This research is in line with research conducted by Muhammad Zaki, Agnes Ferusgel and Dian Maya Sari Siregar (2018), which states that there is a significant influence between the availability of facilities and the use of Personal Protective Equipment (PPE) which is the risk or can endanger health (Zaki, Ferusgel and Siregar, 2018).

The results of the respondents' answers indicate that there is some availability of Personal Protective Equipment (PPE) which is not available in sufficient quantity for nurses and other health workers, such as masks for Emergency Room (ER) nurses and protective glasses used in treating patients because the items ordered are not according to the needs of nurses and other health workers.

Standard Operational Procedure (SOP) is any action based on existing rules the reference implements. In this study, the Standard Operating Procedure (SOP) in question assessesthe implementation that has been agreed upon and carried out at the Sudiang Raya Community Health Center, Biringkanaya District, Makassar City. Sixteen people who stated that it was not implemented were at risk of experiencing work-related diseases, as many as 7 (43.8%) and not at risk of experiencing/exposed to work-related diseases, as many as 9 (56.3%) people. Meanwhile, as many as 12 people stated that it was implemented, 10 (83.3%) were at risk of experiencing/being exposed to work-related diseases, and 2 (16.7%) were not at risk. However, from the 12 respondents who stated that it was implemented, ten people were at risk of experiencing work-related illnesses. It happened because the controls carried out by each unit were carried

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out in a partial amount. The report data were not verified, and the Standard Operating Procedures (SOP) such as Maternal and Child Health and pharmacies were unavailable. Thisstatement can be seen/completed from the results of the questionnaire that was filled in by the respondent.

From the results of the analysis to see the relationship between Standard Operating Procedures (SOP) and controlling the risk of occupational diseases using the chi-square statistical test obtained p-value = 0.004 because (P <0.05) then Ho is rejected and Ha is accepted (there is a significant relationship between Standard Operating Procedures (SOP) with occupational disease control).

The results of this study are in line with research conducted by Mega Ceria Purnama Zebua (2020) and research conducted by Monica Gabriella Maliangkay, Mesak Rambitan and Prycilia Mamuaja (2021) at the Noongan Regional General Hospital. It was found that there is a relationship between Standard Operating Procedures (SOP) regarding behaviour nurses in the use of Personal Protective Equipment (PPE) with a p-value of 0.000. This result indicated the need for Standard Operating Procedures (SOP) in increasing control of the risk of occupational diseases among nurses and other health workers (Zebua, 2020; Maliangkay, Rambitan and Mamuaja, 2021).

Compliance is the obedience of nurses/doctors/other health workers in carrying out regulations regarding using Personal Protective Equipment (PPE) and obedience to using it. Of which, 20 respondents who stated that they were not compliant with using Personal Protective Equipment (PPE) were at risk of experiencing/exposed to work-related diseases by 9 (45.0%) and not at risk of experiencing work-related diseases by 11 (55.0%) people. Meanwhile, respondents stated that they adhered to using Personal Protective Equipment (PPE) at risk of experiencing/exposure to work-related diseases by 8 (100%), not at risk by 0 (0.00%).

From the results of the analysis to see the relationship between compliance with occupational disease risk control at the Sudiang Raya Public Health Center, Biringkanaya District, Makassar City, using the chi-square statistical test, a p-value = 0.000 was obtained because (P <0.05) then Ho was rejected and Ha accepted (there is a significant relationship between Compliance with occupational disease risk control).

According to the results of the respondent's answers, the proper use of Personal Protective Equipment (PPE) must be carried out completely and correctly, such as using incorrect gloves and protective clothing, which are sometimes not used when treating patients. The reasons for using Personal Protective Equipment (PPE) are used when only for risky work, such as when treating injured patients and changing bandages on patients.

The results of this research are in line with research conducted by Rizka Ayu Zahara, Santoso Ujang Effendi and Nurul Khairani (2017) at the Bengkulu City Hospital (IPSRS) based on the results of their research 27 officers were not compliant in using Personal Protective Equipment (PPE) and use it correctly

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and adequately because nurses and other officers are not aware that their place is very at risk of causing occupational diseases (Zahara, Effendi and Khairani, 2017). As well as research conducted by Inayah Husna Sibarani (2014) with the title occupational diseases for Nurses on Duty at the Hospital, in this study, it was said that adherence to the use of Personal Protective Equipment (PPE) was influenced by several factors, including the attitudes and behaviour of the nurses themselves and limitations tools such as the availability of sufficient Personal Protective Equipment (PPE) to be used in serving patients as well as communication or outreach about the use of Personal Protective Equipment (PPE) to nurses and other health workers (Sibarani, 2014).

Policies are rules, both verbally and in writing, that are implemented and made by the leaders of the Public Health Center to increase the use of Personal Protective Equipment (PPE), namely all written and unwritten rules regarding policies on the use of Personal Protective Equipment (PPE) at the Sudiang Raya Public Health Center, Biringkanya District, Makassar City. The policy referred to in this study is everything related to using Personal Protective Equipment (PPE) for health workers issued by the Public Health Center when providing services to patients who visit the Public Health Center.

The results of this study indicate that out of 28 respondents, no respondents stated that there was no policy. In comparison, 11 respondents (39.3%) stated that there was a policy at risk of exposure to occupational diseases, and 17 (60.7%) did not have a risk. However, of the 28 respondents who stated that there was a policy, 11 people were at risk of experiencing work-related illnesses. The result happened due to a need for more awareness of the importance of using Personal Protective Equipment (PPE) when serving/handling/examining patients, as well as attitudes and reprimands from other nurse friends for one another. Remember to use Personal Protective Equipment (PPE).

From the results of the analysis to see the relationship between policy and occupational disease risk control using the statistic chi-square test, it obtained a value (p-value = 0.608) because P> 0.05, Ha was rejected, and Ho was accepted (there was no significant relationship between the availability of protective equipment (PPE) by controlling the risk of work-related diseases.

The results of this study are not in line with research conducted by Nia Supiana, Supriyatiningsih and Elsye Maria Rosa (2015) with the title implementing policies and Assessing the Use of Personal Protective Equipment (PPE) by Doctors and Midwives in the delivery and postpartum wards at the Muhammadiyah General Welfare Development Hospital. Yogyakarta Unit I 2014/2015 states that a significant relationship exists between existing and well-implemented policies, reducing the risk of work-related diseases and not implementing the policy correctly, affecting health workers' risk of work-related diseases. This result because the policy that regulates workers' use of Personal Protective Equipment (PPE)

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that states that workers need Personal Protective Equipment (PPE) to protect themselves and must be obeyed was unwritten(Supiana, Supriyatiningsih and Rosa, 2015).

According to Notoatmodjo, quoted by Inayah Husna Sibarani (2014) with the title of the article, occupational diseases for nurses on duty in hospitals policy is a driving or reinforcing factor for the occurrence of a behaviour. These factors include laws, regulations, supervision and other factors, then refer to the rules of Law No. 1 of 1970 concerning Work Safety (Presiden RI, 1970; Sibarani, 2014). Permenakertrans No: Per: 01/Men/1981, in the Minister of Manpower and Transmigration of the Republic of Indonesia regulations No. Per 08/VII/2010, it is explained that: a) Article 4 paragraph 3, "administrators are required to provide free of charge all self-protection equipment required to use by workers under their leadership to prevent occupational diseases. b) Article 5, paragraph 2, workers must wear mandatory self-protection equipment to prevent occupational diseases" (Kementerian Tenaga Kerja dan Transmigrasi, 1981; Menteri Tenaga Kerja dan Transmigrasi, 2010). Furthermore, the Standard Operating Procedures (SOP) Regulations at the Sudiang Raya Public Health Center, Biringkanaya District, Makassar City, regarding the use of personal protective equipment must be developed, and determine the qualifications for implementing officers who can recognize the types of self-protection equipment and officers who can know the function of personal protective equipment.

CONCLUSION

Based on the results of this study regarding the analysis of the use of Personal Protective Equipment (PPE) with occupational disease risk control at the Sudiang Raya Public Health Center, Biringkanaya District, Makassar City, the following conclusions can be drawn: 1) There is no significant relationship between knowledge and risk control occupational disease; 2) There is a significant relationship between the availability of Personal Protective Equipment (PPE) and controlling the risk of occupational diseases; 3) There is a significant relationship between Standard Operating Procedures (SOP) and occupational disease risk control; 4) There is a significant relationship between compliance with occupational disease risk control; and 5) There is no significant relationship between policy and occupational disease risk control. So it is suggested to the Sudiang Raya Health Center that the availability of PPE should be carried out with a maximum stock of goods (PPE) such as masks and protective goggles. Then the SOP implementation policy is implemented in each unit while maintaining complete control so that each officer can properly and correctly use PPE.

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Occupational Health Programs at PT. Barata Indonesia Cilegon

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A B S T R A C T

Occupational health is a specific part of the health perspective focusing more on improving the quality of the workforce through implementing health efforts. This paper describes the occupational health programs in the Limited Liability Company (here and after called PT) Barata Indonesia Cilegon. This study was qualitative research using field observation and literature studies. The population was all workers at PT. Barata Indonesia, Cilegon, Banten Province. The data collection technique used was field observation. Then, the author descriptively examined occupational health programs using literature from theory, laws and regulations, ministerial regulations, and ministerial decrees. The results showed that the implementation of occupational health programs at PT Barata Indonesia Cilegon, among others, checking canteen facilities, medical checks up, gymnastics, giving Extra Fooding, HIPERKES, HIV/AIDS prevention policies, COVID-19 regulations, and a work environment that meets occupational hygiene and health requirements. In conclusion, PT Barata Indonesia Cilegon is very concerned about the occupational health of its workers. Therefore, PT Barata Indonesia Cilegon runs occupational health programs. PT Barata has made occupational health procedures so that they can be carried out following written procedures. The implementation of occupational health programs at PT Barata Indonesia Cilegon has been going well following the Republic of Indonesia Government Regulation Num. 88 of 2019 concerning occupational health.

INTRODUCTION

Occupational health is a specific part of the health perspective focusing more on improving the quality of the workforce through implementing health efforts (Schulte et al., 2019). Its goals and objectives are to create a program in the workplace by involving elements of management, labor, working conditions, and the environment that are integrated to prevent and reduce accidents and occupational diseases (Badrianto & Ekhsan, 2020). In addition, it affects employment relations and creates a safe, efficient workplace, and productive. Furthermore, it designs work facilities and environments by increasing functional effectiveness (Hasnanisa et al., 2022). Moreover, in human aspects, it maintains health, safety, and satisfaction among the workforces (Holland et al., 2019). Occupational health also aims to ensure that workers obtain the highest degree of health both physically, mentally, and socially. Therefore, there are preventive, curative, and rehabilitative efforts against diseases or health problems caused by work factors, work environment, and general illnesses (Pangkey et al., 2018). Worker capacity, workload, and work environment should interact properly and harmoniously to achieve optimal occupational health (Muslih & Damanik, 2022).

Occupational health aims to make the workforce obtain the highest physical, spiritual, and social health. It is an effort to prevent and treat diseases or health problems caused by work and the work environment, as

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well as general illnesses (Ardana, 2012). Workers have the right to obtain protection through occupational health programs. Each company must implement occupational health programs integrated with the company's programs (Syukri, 1997). The occupational health program created by the company is an obligation to enforce government regulations regarding Occupational Safety and Health (OSH) (Duryan et al., 2020). OSH program aims to protect workers on their rights in health during their work and improve their performance also welfare. In addition, it ensures the health of workers in the workplace. Furthermore, production sources can be maintained and used safely and efficiently (Mangkunegara, 2004).

Thus, occupational health programs are critical to ensure occupational health through the company's systems and equipment. It is a company's effort to reduce and prevent the incidence of occupational diseases. This paper describes the occupational health programs in the Limited Liability Company (here and after called PT) Barata Indonesia Cilegon.

METHOD

This study was qualitative research using field observation and literature studies. It was conducted at PT. Barata Indonesia Cilegon, Banten Province, from July to August 2022. The population was all workers at PT. Barata Indonesia, Cilegon, Banten Province. The data collection technique used was field observation. Then, the author descriptively examined occupational health programs using literature from theory, laws and regulations, ministerial regulations, and ministerial decrees. The data presentation used a descriptive method that describes the occupational health programs according to existing conditions, developing commitments and policies, ongoing processes, or ongoing company trends. Then, it discussed the results of the field observation data regarding programs, procedures, implementation, and follow-up of the application of the occupational health programs. Further, it compared with applicable theories or standards compiled in the literature review.

RESULT

PT Barata Indonesia Cilegon implemented several occupational health programs to prioritize workers' health, among others:

1. Checking canteen facilities. This program is carried out so that the company's facilities are good maintenance and prevent diseases caused by canteen activities in all areas.
2. MCU (Medical Check-Up). Employee Medical Check-up is one of the requirements from the government in Law Num. 1 of 1970 and Law Num. 21 of 2003, which ratifies ILO Convention Num. 81 and Law Num. 13 of 2003 concerning employment regulate occupational health and safety.

3. Gymnastics. PT Barata Indonesia Cilegon implemented a morning exercise program every Friday. This exercise aims to increase the physical and psychological health of workers. In addition, it prevents workers from work stress. However, during the COVID-19 pandemic, gymnastic activities were suspended to break the chain of COVID-19.
4. Extra Fooding. PT Barata Indonesia provided extra food in the form of vitamin C supplements and milk to keep workers healthy.
5. Company Hygiene & Occupational Health (here and after called HIPERKES). Its main goal is to create a healthy and productive workforce by maintaining and improving health status. It also aligns workers with work and technology (Suma'mur P.K, 2014).
6. HIV/AIDS Prevention & Control Policy to comply with the Decree of the Minister of Manpower and Transmigration of the Republic of Indonesia Number. KEP. 68/MEN/IV/2004 Regarding HIV/AIDS prevention and control in the workplace. PT Barata Indonesia Cilegon is committed to implementing HIV/AIDS prevention and control programs through education, seminars, company health promotions, regular meetings, and other influential media.
7. Covid-19 Regulations. PT Barata Indonesia Cilegon implemented a new normal system for every employee during this pandemic. Workers must maintain their health by hand washing hands, wearing masks, and social distancing.
8. The work environment met occupational hygiene and health requirements. The cleanliness of the work environment is critical for employee health. The unclean work environment can influence occupational health program implementation.

The procedures of the occupational health programs at the PT Barata Indonesia Cilegon were:

1. Checking Canteen Facilities was based on document number PR-HSE-08 regarding the hygiene of canteen personnel and food serving.
2. MCU (Medical Check Up) according to document number PR-PRS-05 regarding preparing and implementing Medical Check Up.
3. Extra Fooding followed company policy to increase the immune system of the company's employees by giving one box of milk and two tablets of vitamin C every day.
4. HIV/AIDS prevention and control policies.
5. Covid-19 regulations
6. The work environment meeting occupational hygiene and health requirements was based on the Government Regulation of the Republic of Indonesia Num. 88 of 2019 concerning Occupational Health, article 5 (Pemerintah RI, 2018). It states that occupational health standards are efforts to improve health through increasing health knowledge, cultivating a clean and healthy lifestyle, building

occupational health and safety culture in the workplace, implementing work nutrition, and improving physical and mental health.

Thus, the implementation of occupational health programs at PT Barata Indonesia Cilegon, among others, checking canteen facilities, medical checks up, gymnastics, giving Extra Fooding, HIPERKES, HIV/AIDS prevention policies, COVID-19 regulations, and a work environment that meets occupational hygiene and health requirements.

DISCUSSION

PT Barata conducted inspections regarding the occupational health program following the procedures and work instructions at PT Barata Indonesia Cilegon. It also held joint sports such as gymnastics every Friday and futsal and badminton on Saturday.

1. Checking Canteen Facilities

Figure 1. Canteen Facilities Checklist Sheet

The (Health, Security, and Environment) HSE team checks the canteen facilities every six months by filling out the checklist sheet.

2. MCU (Medical Check Up) is done once a year.
3. Extra Fooding is given every day according to company policy.

Figure 2. Extra Fooding by providing milk and Vitamin C at each table

4. HIPERKES is carried out by HIPERKES doctors who come on Monday and Friday. Employees who want to check or consult about health can go directly to the HIPERKES doctor on duty.

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5. PT. Barata Indonesia Cilegon implemented HIV/AIDS prevention and control policies by socializing with workers about HIV/AIDS to improve workers' insight. In addition, there was no discrimination for employees with HIV/AIDS.
6. PT Barata Indonesia Cilegon has also carried out the COVID-19 prevention procedures properly, from social distancing, washing hands with soap, wearing masks, and other COVID prevention protocols.

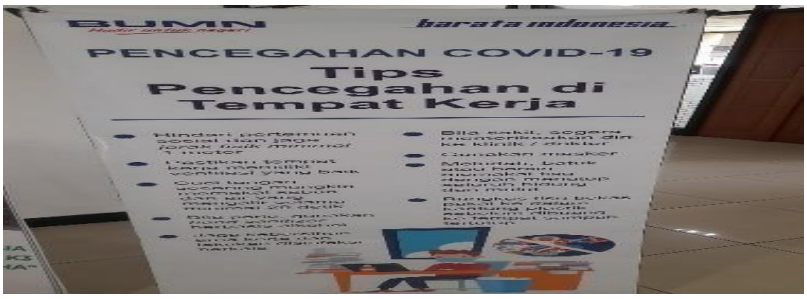

Figure 3. Covid-19 Health Protocol

7. PT Barata implemented a 5S program to meet occupational hygiene and health requirements. The program was cleaning the work area diligently. Thus, workers are committed to maintaining the cleanliness of their work environment to avoid diseases interfering with their health.

Figure 4. 5S Program

CONCLUSION

PT Barata Indonesia Cilegon is very concerned about the occupational health of its workers. Therefore, PT Barata Indonesia Cilegon runs occupational health programs. PT Barata has made occupational health procedures so that they can be carried out following written procedures. The implementation of occupational health programs at PT Barata Indonesia Cilegon has been going well following the Republic of Indonesia Government Regulation Num. 88 of 2019 concerning occupational health.

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The Effect of REKIS Innovation in Increasing The Resilience of Mothers Who Have Stunted Children

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A B S T R A C T

The community still perceives stunting as a negative stigma. It potentially risks the mental health of both the child and the mother. Mother resilience is crucial to deal with biopsychosocial stressors because of stunting. This research analyzes the effects of the REKIS (Resiliensi Komunitas Ibu Dengan Anak Stunting) innovation on knowledge, attitudes, behavior, and resilience regarding stunting in mothers with stunted children. This research was a quantitative study with a quasi-experimental design. The population was mothers with children diagnosed with stunting in the Gilingan Surakarta Health Center. There were 60 respondents with the total sampling technique, 30 in the control and 30 in the intervention groups. Pre-test and post-test data were collected using knowledge, attitude, behavior, and maternal resilience questionnaires. Data analysis used the Wilcoxon Rank Sum Test to test the difference in mean scores between the control and intervention groups. In addition, the Wilcoxon Signed Rank Test analyzes the difference in mean scores between the pre-and post-test. The results showed that all respondents had similar demographic characteristics (age, occupation, and education). Both groups had significant differences in pre and post-test mean scores on maternal knowledge, attitudes, behavior, and resilience ($p<0.05$). Significant differences were in the overall pre- and post-test mean scores on maternal knowledge, attitudes, and resilience ($p<0.05$). However, there was no significant difference in the pre-and post-test on maternal behavior. In conclusion, The REKIS innovation can increase the resilience of mothers with stunted children. It improves maternal knowledge and attitudes regarding stunting.

INTRODUCTION

Based on data from the World Health Organization, 150 million children were stunted, with the most significant proportion beings on the Asian continent (WHO, 2018). Stunting cases in Southeast Asia were 25.7 percent, the second highest after South Asia (WHO, 2018). Children under five who are stunted show poor growth during childhood. Global figures showed that 22.2 percent of children were stunted, while the national prevalence based on height divided by age was 27.3 percent (Kementerian Kesehatan RI, 2021; WHO, 2018). Thus, Indonesia's stunting prevalence rate was still above the world average. In 2019, the stunting prevalence rate in Central Java was 27.2 percent (Kementerian Kesehatan RI, 2021). Based on Indonesia Nutritional Status Monitoring Survey, the prevalence rate of stunting among toddlers in Central Java was 27.2 percent. Furthermore, Surakarta City had a prevalence of 18.76 percent (Kementerian Kesehatan RI, 2021).

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Three main drivers of stunting are poor diet in children in the first years of life, poor nutrition of women before and during pregnancy, and poor sanitation practices in households and communities (Ali, 2021). The predisposing factors for stunting in Southeast Asia are low family income and education, impacting inadequate practices in providing nutrition for babies. In addition, other factors are poor sanitation and hygiene and inappropriate treatment of sick children (Rosiyati et al., 2019). Over the last decade, there has been little change in the national stunting prevalence rate in Indonesia. It shows that variations in population exposure to the determinants of child stunting appear to be more vulnerable. The causes of stunting in Indonesia include maternal nutritional status, breastfeeding practices, complementary feeding practices, exposure to infection, educational levels, food intake, health care systems, water, and sanitation.

Stunting is the cause of one million annual child mortality. Complications of stunting in infancy and early childhood can cause lasting damage, including increased morbidity, poor cognition and educational performance in youth, short stature in adulthood, increased risk of perinatal and neonatal death for women, and lower productivity. When accompanied by excessive weight gain, low income in adults could increase the risk of chronic disease. Therefore, stunting can hinder the development of the whole society (Black et al., 2008; de Onis & Branca, 2016; Dewey & Begum, 2011; Victora et al., 2008).

Increasing maternal ability in food and childcare patterns is necessary to prevent stunting. Unfortunately, the community still perceived stunting as a negative stigma (Jamil, 2020; Widiastuti, Ulkhasanah, and Sani, 2022). Negative stigma in stunted children poses a risk to mental health, both the child's and the mothers. Support for mothers is empirically known to correlate with a child's health (Kusumaningrum, Anggraini, and Faizin, 2022). Various studies found that family factors, sociodemographic characteristics, knowledge, and parental attitudes contribute significantly to the risk of stunting in children (Habimana & Biracyaza, 2019; Mzumara et al., 2018; Vonaesch et al., 2017).

Efforts to prevent stunting in Surakarta City include: (1) Providing additional food to infants/toddlers and pregnant women with A lack of energy; (2) Providing food reserves by giving rice; (3) Implementing Integrated Health Post; (4) Forming groups of fish and livestock cultivators in environments where stunting occurs; (5) Procuring *Kit Siap Nikah Anti Stunting*; (6) Procuring *BKB Kit Stunting*; (7) Providing education regarding reproductive health and stunting for prospective brides; (8) Providing education regarding parenting for the first 1000 days of life for pregnant women and their families; (9) Implementing *Bina Keluarga Balita*, *Bina Keluarga Remaja*, and *Bina Keluarga Lansia*; (10) Training for prospective cadres for handling stunting at the early childhood education level, (11) Providing information center for youth counseling and efforts to increase the family income. The authors did a preliminary study by conducting a focus group discussion (FGD) with the Surakarta Health Office and in-

depth interviews with nutrition officers at the Public Health Services in Surakarta City in April 2021. The preliminary study revealed that predisposing factors for stunting in Surakarta City were poor economic status, inadequate parental knowledge and food pattern behavior, infectious factors, poor environment, and premature and low birth weight babies. Furthermore, the COVID-19 pandemic exacerbated stunting because programs dealing with stunting are not running as they should.

The Surakarta Health Office conducts the stunting management program by counseling pre-marital couples and pregnant women. It is done to prevent anemia in women due to menstruation and less nutritious food intake. In addition, there are providing additional food for pregnant women and monitoring child growth and development in infants and toddlers. However, there was no effort to strengthen the resilience of mothers with stunted children.

Stunting is a global problem that has negative impacts in most aspects. So far, programs to overcome stunting focus on prevention, but there have not been many studies on psychological management for mothers with children diagnosed with stunting. Therefore, the community resilience program for mothers with stunted children (here and after called *Resiliensi Komunitas Ibu Dengan Anak Stunting* or *REKIS*) can be one solution to those challenges and obstacles. This research analyzes the effects of *REKIS* innovation on knowledge, attitudes, behavior, and resilience regarding stunting in mothers with stunted children.

METHOD

This research was a quantitative study with a quasi-experimental design. The population was mothers with children diagnosed with stunting in the Gilingan Surakarta Health Center. There were 60 respondents with the total sampling technique, 30 in the control and 30 in the intervention groups. The inclusion criteria were mothers with children under five diagnosed with stunting and living in the Milling area, while the exclusion criteria were mothers with mental retardation. The authors informed respondents that their involvement in this study was voluntary and could stop anytime. All respondents gave written consent for their participation. This research was approved by the UNS FK Research Ethics Committee with number 121/UN27.06.11/KEP/EC/2022 on 30 October 2022.

The research was conducted from November 2022 to January 2023. It was divided into three stages. First, a pre-test assessed maternal knowledge, attitude, behavior, and resilience. Second, besides routine counseling from the Integrated Health Post, the authors gave *REKIS* innovation to mothers in the intervention group. Meanwhile, the control group only received health education from the Public Health Center. *REKIS* innovation aims to increase mothers' resilience to lead good lives despite a negative stigma against stunting children. It educates mothers about stunting and resilience to increase knowledge,

attitudes, behavior, and resilience against stunting. Third, there was a post-test after four weeks of the intervention. The instruments used knowledge, attitude, behavior, and maternal resilience questionnaires. The characteristics of respondents were presented through the mean score in the numerical data and the frequency distribution in the ordinal data. The authors used the Wilcoxon Rank Sum Test to test the difference in mean scores between the control and intervention groups. In addition, the Wilcoxon Signed Rank Test analyzes the difference in mean scores between the pre-test and Post-test. Statistical analysis used Stata version 13.

RESULT

The study results were divided into the respondents' demographic characteristics (Table 1) and pre-and post-test of respondents' knowledge, attitudes, behavior, and resilience (Table 2). The mean age of mothers in the control and intervention groups was almost the same, between 30 and 31 years. In addition, most respondents in the control and intervention groups were unemployed (70% in control and 66.7% in intervention) and graduated from Junior High School (43.4% in both groups). Furthermore, most of their husbands graduated from Senior High School (70.1% in control and intervention groups).

Table 1. Demographic characteristics of the respondents (n=60)

Demographic characteristics	Control Group (n=30)		Intervention Group (n=30%)	
	(Mean score ± SD)a	n(%)b	(Mean score ± SD)a	n(%)b
Age	30± 4.76		31± 4.56	
Husband's Age	37± 6.15		36± 9.30	
Profession				
Unemployment		21(70)		20(66.7)
Entrepreneur		8(26.7)		8(26.7)
Private employees or civil servants		1(3.3)		2(6.6)
Education				
Elementary School		5(16.7)		3(10)
Junior High School		13(43.3)		13(43.4)
Senior High School		9(30)		10(33.3)
University		3(10)		4(13.3)
Husband's Education				
Elementary School		5(16.7)		5(16.7)
Junior High School		2(6.6)		2(6.6)
Senior High School		21(70.1)		21(70.1)
University		2(6.6)		2(6.6)

a.: Description of the distribution of numerical data
b.: Description of nominal/ordinal data distribution

Table 2 shows that the control group's knowledge mean score before intervention was slightly higher than the intervention group (11.36:10.53), but this difference was not statistically significant (p=0.442). However, after the intervention, the average in the control group was much lower than in the intervention group (11.70: 20.12). This difference was statistically significant (p=0.001). There were also statistically significant differences in the knowledge mean scores of all respondents before and after the intervention (p=0.001).

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In addition, the attitude mean score before the intervention in the control and intervention groups was almost the same (43.60: 43.73). However, after the intervention, the average in the control group was much lower than in the intervention group (44.06: 48.80). This difference was statistically significant (p=0.001). There were also statistically significant differences in the attitude mean scores of all respondents before and after the intervention (p=0.037).

Furthermore, the behavior mean score was almost the same before the intervention in the control and the intervention group (45.26: 45.53). However, after the intervention, the average in the control group was much lower than in the intervention group (44.16: 50.01). This difference was statistically significant (p=0.041). However, there were no statistically significant differences in the behavior mean scores of all respondents before and after the intervention (p=0.1027).

Moreover, the resilience mean score before intervention in the control group and the intervention group was almost the same (44.86: 44.20). However, after the intervention, the average in the control group was much lower than the intervention group (44.96: 53). This difference was statistically significant (p=0.001). There were also statistically significant differences in the resilience mean scores of all respondents before and after the intervention (p=0.001).

Table 1. The results of the Pre-and Post-test of respondents' knowledge, attitudes, behavior, and resilience and statistical analysis

Variables	Study period, N=60		*p* (b)
	Pre-test (mean score ±SD)	Post-test (mean score ±SD)	
Knowledge of Stunting			
Control Group(n=30)	11.36±5.32	11.70±5.44	0.001***
Intervention group(n=30)	10.53±5.03	20.13±4.19	
p (a)	0.442	0.001***	
Attitudes toward stunting prevention			
Control Group(n=30)	43.60±6.72	44.06±6.44	0.037*
Intervention group(n=30)	43.73±6.38	48.80±5.90	
p (a)	0.922	0.001***	
Stunting prevention behavior			
Control Group(n=30)	45.26±14.08	44.16±11.07	0.1027
Intervention group(n=30)	45.53±13.92	50.06±12.40	
p (a)	0.964	0.041*	
Maternal resilience			
Control Group(n=30)	44.86± 10.03	44.96±9.51	0.001***
Intervention group(n=30)	44.20±8.61	53±9.58	
p (a)	0.727	0.001***	

a: Test the difference in the mean score with the Wilcoxon Rank Sum Test; *, P<0.05;**P<0.01;***, P<0.001

b: Test the difference in the mean score with the Wilcoxon Signed Rank Test

DISCUSSION

This study found that *REKIS* innovation effectively increased maternal knowledge regarding stunting. The increase in post-test mean score proved it. Information delivery can increase knowledge and attitudes through acceptance and understanding during the behavioral adoption stage (Lee & Li, 2021). Improved

knowledge and attitude can build maternal behavior in stunting prevention and resilience. Furthermore, readiness in the attitude domain is a stimulus's emotional characteristic (Notoatmodjo, 2010).

An understanding potentially creates changes in positive attitude during the information-receiving process. Good knowledge about stunting can build a positive attitude toward stunting. In addition, the attitude is influenced by respondents' personal experiences, culture, mass media, and emotional factors (Rahmawati, Sudargo, and Paramastri, 2007). *REKIS* innovation significantly increased the attitude mean score toward stunting. Thus, the REKIS intervention has successfully changed positive maternal attitudes toward stunting.

Meanwhile, although there was a significant difference in behavior mean scores among the control and intervention groups, there was no significant difference in the overall pre-test and post-test data. It naturally happens because changing one's behavior requires a longer time and stages (Yulia, 2018). Thus, it is necessary to provide more knowledge regarding stunting and environmental support.

Positive coping strategies for mothers can reduce biopsychosocial stressors. It is called resilience (Hendriani, 2022). Resilience in parenting can reduce the risk of stress and encourage caregivers to adapt (Palacio G et al., 2020). Providing information regarding resilience through the *REKIS* innovation increased the resilience mean scores in mothers with stunted children. The *REKIS* innovation taught respondents to identify the positive aspects of caring for stunted children. It can create a sense of strength and confidence in parenting. It also allows mothers to get better self-esteem in adjustment (Greeff and Thiel, 2012; Semiatin and O'Connor, 2012).

CONCLUSION

The *REKIS* innovation can increase the resilience of mothers with stunted children. In addition, it improves maternal knowledge and attitudes regarding stunting. So it can be recommended for mental support for mothers who have stunted children.

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The Levels of Authentic Happiness Among Women Who Married at A Young Age at Kaliwungu Village, Ngunut Sub-District, Tulungagung District

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A B S T R A C T

Early to late adolescents (aged 12-21) experience diverse and fluctuating psychological, mental, mind, and physical dynamics. Living in a household is also not easy and faces many problems. Thus, getting married at a young age potentially influences authentic happiness among women. This paper describes the levels of authentic happiness among women who married at a young age. This research used a quantitative method and literature studies. The population was women who married at a young age in Kaliwungu Village, Ngunut Sub-District, Tulungagung District. There were ten respondents. Data collection was by distributing authentic happiness questionnaires to respondents. The questionnaire consists of 25 statements from the instrument Authentic Happiness Inventory owned by Martin Seligman. Results showed that the score of authentic happiness in all respondents ranges from 75 to 125. In addition, two respondents have moderate levels of authentic happiness, and eight have high. In conclusion, most women who married at a young age had high levels of authentic happiness, and little had moderate.

INTRODUCTION

Marriage is one of the stages of life passed by adult humans that are physically and mentally mature. They should have a sense of responsibility for running the household. Married couples can experience authentic happiness when they feel immense marital satisfaction (Batra, 2000).

Statistics Indonesia revealed a significant increase in young marriage incidence in Indonesia, from 14.18% in 2017 to at least 15.66% in 2018. Further, young marriage can influence Human Development Index (HDI) (Nkhoma et al., 2020).

A harmonious and happy married life influences children's mindsets, behavior, and lives (Mansir, 2022). A child must grow and develop healthily. Happy prospective parents, especially wives or mothers, are critical (Gonçalves, 2019). It is because a woman's hormones will affect her child during pregnancy. Besides other external factors, unhappy pregnant women potentially cause health problems in the child (Przybyła-Basista et al., 2020).

Early to late adolescents (aged 12-21) experience diverse and fluctuating psychological, mental, mind, and physical dynamics. Living in a household is also not easy and faces many problems (Stepanous et al., 2023). Thus, getting married at a young age potentially influences authentic happiness among women. However, authentic happiness in women who married at a young age was unknown (Bennett, 2019). This paper describes the levels of authentic happiness among women who married at a young age.

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METHOD

This research used a quantitative method and literature studies. The population was women who married at a young age in Kaliwungu Village, Ngunut Sub-District, Tulungagung District. There were ten respondents. Data collection was by distributing authentic happiness questionnaires to respondents. The questionnaire consists of 25 statements. It comes from the instrument Authentic Happiness Inventory owned by Martin Seligman, accessed from the website https://www.authenticappiness.sas.upenn.edu/. Thus, the questionnaire is reliable and valid. The literature study was obtained from the program guidebook and documents belonging to Dinas KB PP dan PA of Tulungagung District.

RESULT

Table 1 shows the number of married women in Kaliwungu Village, Ngunut Sub-District, by age group Based on the Family Data Collection in 2021 held by The National Population and Family Planning Board (BKKBN). There were 29 women aged 20-24 years old who married at a young age.

Table 1. Number of married women by age group in Kaliwungu Village

TABEL 1

JUMLAH WANITA KAWIN (10-49 TAHUN) MENURUT KELOMPOK UMUR
PENDATAAN KELUARGA INDONESIA

PERIODE : 2021

WILAYAH : Kelurahan

KODE	RW	JUMLAH WANITA KAWIN	KELOMPOK UMUR															
			10 - 14		15 - 19		20 - 24		25 - 29		30 - 34		35- 39		40 - 44		45 - 49	
			JUMLAH	%	JUMLAH	%	JUMLAH	%	JUMLAH	%	JUMLAH	%	JUMLAH	%	JUMLAH	%	JUMLAH	%
1	2	3	4	5=4/3*100	6	7=6/3*100	8	9=8/3*100	10	11=10/3*10	12	13=12/3*10	14	15=14/3*10	16	17=16/3*10	18	19=18/3*10
0101	DUSUN KRAJAN/01	60	0	0.00	0	0.00	2	3.33	8	13.33	8	13.33	9	15.00	18	30.00	15	25.00
0102	DUSUN KRAJAN/02	65	0	0.00	0	0.00	3	4.62	13	20.00	12	18.46	14	21.54	14	21.54	9	13.85
0103	DUSUN KRAJAN/03	63	0	0.00	0	0.00	5	7.94	5	7.94	11	17.46	14	22.22	17	26.98	11	17.46
0104	DUSUN KRAJAN/04	53	0	0.00	1	1.89	3	5.66	6	11.32	5	9.43	9	16.98	17	32.08	12	22.64
0105	DUSUN KRAJAN/05	47	0	0.00	1	2.13	5	10.64	3	6.38	7	14.89	11	23.40	9	19.15	11	23.40
0201	DUSUN UMBUT SEWU/01	86	0	0.00	0	0.00	2	2.33	12	13.95	14	16.28	11	12.79	27	31.40	20	23.26
0202	DUSUN UMBUT SEWU/02	98	0	0.00	0	0.00	4	4.08	4	4.08	12	12.24	31	31.63	32	32.65	15	15.31
0203	DUSUN UMBUT SEWU/03	86	0	0.00	0	0.00	5	5.81	15	17.44	11	12.79	19	22.09	18	20.93	18	20.93
JUMLAH TOTAL		558	0	0.00	2	0.36	29	5.20	66	11.83	80	14.34	118	21.15	152	27.24	111	19.89

Sumber: Pendataan Keluarga; Tanggal dan Jam laporan diambil/download

Table 2 revealed that the score of authentic happiness in all respondents ranges from 75 to 125. In addition, two respondents have moderate levels of authentic happiness, and eight have high.

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Table 2. Authentic Happiness among Women Who Married at a Young Age

Initials Respondents	Age	Total Score	The Levels of Authentic Happiness
AG	21	84	Moderate Authentic Happiness
VE	22	109	High Authentic Happiness
AW	20	118	High Authentic Happiness
EL	24	116	High Authentic Happiness
RW	20	113	High Authentic Happiness
SP	26	119	High Authentic Happiness
ER	21	91	Moderate Authentic Happiness
RM	21	121	High Authentic Happiness
BA	25	119	High Authentic Happiness
RR	23	120	High Authentic Happiness

DISCUSSION

This study revealed that eight out of ten women who married at a young age had high levels of authentic happiness, and two had moderate. Authentic happiness is natural, pure, and original happiness. In addition, Carr (2013) states that a psychological condition that is so positive is one part of authentic happiness. Authentic happiness means having high life satisfaction and low levels of negative emotions. The dominance of positive emotions can make a person happy beyond the control of the environment, also known as the external body.

Carr (2013) defines happiness as a positive psychological condition characterized by a high level of satisfaction of an individual with his past, high levels of positive emotions, and low levels of negative emotions. Furthermore, Kun & Gadanecz (2019) explains happiness as a positive feeling about his state manifested in past satisfaction, present pleasure, and future optimism. It is in line with the definition according to Robbins (2021), happiness is a result of self-assessment and life, which contains positive emotions, such as overflowing comfort and joy, as well as positive activities. So, happiness describes someone focusing more on pleasant circumstances than what happened.

Referring to Heaverly & EWK (2020), marriage is an important event experienced by all humans in their life. It is one of the life journey processes that almost everyone goes through based on a person's developmental period and age. Because the destiny of every human being is to be in pairs, marry between men and women, and establish a household that contains husband and wife. In addition, Hurlock (2012) explained that marriage is one of the tasks during adult development, which is essential for everyone to live as a learning process and complete developmental tasks at an age that includes adulthood. According to the Law of the Republic of Indonesia Num. 1 of 1974, marriage is inner and outer bonds between men and women as husband and wife to form a happy, everlasting family based on Belief in God. Marriage should be carried out by someone who is physically and mentally mature.

Puteri (2023) states that young marriage is usually carried out by a man or woman aged 16-21 years, which is still classified as during the development of early adolescence to late adolescence. A marriage is

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considered ideal at 20-35 for a woman and 25-40 for a man (BKKBN, 2021). Marriage at a young age is carried out by a couple or one of their partners who is still categorized as a teenager aged less than 19. Meanwhile, marriages performed before 20 years are marriages at a young age (BKKBN, 2021).

CONCLUSION

In conclusion, most women who married at a young age had high levels of authentic happiness, and little had moderate. *Dinas KB PP dan PA* (n): a government agency that assists the Regent in carrying out government affairs under the district's authority in the field of Family Planning, Women's Empowerment, and Child Protection.

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