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# The Relationship between Air Quality and COVID-19 Pandemic



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## ABSTRACT

Respiratory droplet and contact transmission are the main transmission routes for COVID-19 transmission. Many chronic diseases, such as cardiopulmonary and metabolic diseases, result from long and short-term contributions to air pollution. This article aims to examine the relationship between air quality and the COVID-19 pandemic. This article uses a literature study. Google Scholar is used as the main source in the literature search. The studies selected based on the title and keywords were 14 journals, then the studies selected for further evaluation were 6 journals and 3 journals that could be relevant to this article. The COVID-19 pandemic and air quality have a reciprocal relationship.

On the one hand, exposure to air pollution indirectly increases the severity of patients infected with COVID-19 by becoming one of the factors that cause comorbidities. The pandemic has had a positive impact on air quality. Business closures, loss of traffic jams, and the cessation of construction projects and non-essential industries during the lockdown have impacted improving air quality.

**Keywords:** air quality; pollution; COVID-19; Pandemic.

## INTRODUCTION

The COVID-19 pandemic has become one of the serious global health disasters of this century faced by mankind after world war 2. In December 2019, the first case of infection was found in Wuhan, Hubei Province, China and was named COVID-19 (coronavirus disease 2019) by WHO. The cause is the SARS-Cov-2 virus (severe acute respiratory syndrome coronavirus 2), a new class of coronavirus.<sup>1</sup> The spread of COVID-19 has affected 192 countries and millions of people worldwide. As of April 13, 2021, more than 136 million people have been confirmed to be infected with the novel coronavirus, and 2,946,568 of them have died from this disease.<sup>2</sup>

Initial symptoms may include fever, dry cough, tachypnea, and shortness of breath. Other symptoms found in patients with COVID-19 include confusion, chest pain, vomiting, nausea, sore throat, sneezing, nasal congestion, sputum production, anosmia, dyspepsia, skin rash, or discoloration of the fingers or big toe, and viral conjunctivitis. Several laboratory studies have demonstrated the occurrence of cytokine storm, sepsis, and MRSAemia in COVID-19.<sup>3</sup>

Respiratory droplet and contact transmission are the main transmission

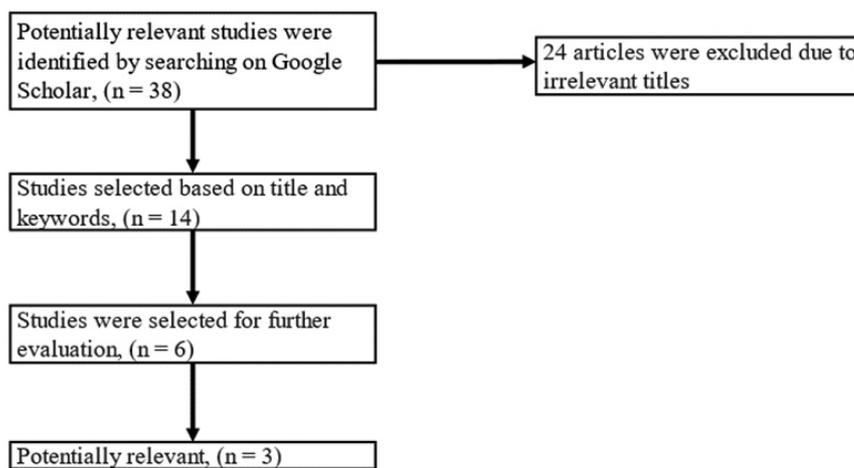
routes for COVID-19 transmission. Air pollution is the most pressing environmental health risk facing our global population. Air pollution contributes to 7 million premature deaths annually, while 92% of the world's population is estimated to breathe toxic air quality. Ambient air pollution worldwide accounts for 29% of all lung cancer deaths and illnesses, 17% of all deaths and illnesses from acute lower respiratory tract infections, 24% of all stroke deaths, 25% of all deaths and illnesses due to ischemic heart disease, 43% of all deaths and diseases due to chronic obstructive pulmonary disease.<sup>4</sup>

Therefore, this article was aimed to examine the relationship between air quality and the COVID-19 pandemic.

## METHOD

### Search Strategy

Google Scholar was used as the primary source in journal searches for this article. A literature search uses keywords: air quality, COVID-19, and Relation Between air Quality and COVID-19 Pandemic. The literature/articles used are published in English.



**Figure 1.** Article Review Process

## Literature Search Result

Many related articles are obtained from search results. Furthermore, some of the articles that are considered most relevant to the title of the article to be written are taken for further study. The literature used is published for the period 2019-2021.

## RESULTS AND DISCUSSION

### Result

There were 38 potentially relevant journals using Google Scholar. The studies selected based on the title and keywords were 14 journals, then the studies selected for further evaluation were 6 journals and 3 journals that have the potential to be relevant to this article.

### Discussion

Indonesia first announced covid-19 cases through an official presidential statement on March 3, 2020, with the first two people infected (64 and 31 years old).

The Indonesian government reported that on May 22, 2020, 21,430 cases were confirmed; The latter, 14,413 people (69.3%) were in treatment, 5,057 people recovered (24.32%) and 1,326 people died (6.4%). Based on the incidence ratio, there was an increase to 173 cases/1 million people.<sup>5</sup>

As an emerging infectious disease, populations of all races and ages are generally vulnerable. In mainland China, people aged 30~65 makeup 71.45%, and children under 10 make up 0.35%. Older people and people with congenital diseases such as asthma, diabetes, cardiovascular disease, and cancer may be more susceptible to SARS-CoV-2. Smoking and obesity are also susceptible factors. People in close contact with patients or subclinically infected people are part of the high-risk population. A high risk of infection is also considered in healthcare workers and family members of patients.<sup>4,6</sup> Nowadays public is very knowledgeable

about COVID-19. They used various practices to prevent contracting COVID-19 and its spread.<sup>7</sup>

Respiratory transmission of droplets and contacts became the main transmission routes of COVID-19 transmission.<sup>4</sup> Lung activities such as coughing, breathing, sneezing or talking, are sources of bio-aerosols that can contain respiratory infection-infecting pathogens.<sup>8</sup>

Among the weather components, only average temperature and humidity correlated with COVID-19. Climatic conditions could function as peak predictors of the virus. Weather changes can potentially spread infectious diseases rising temperatures, increasing variability in the rainy season, and extreme weather intensities have a significant impact on human health, such as an increase in the incidence of infectious diseases.<sup>9</sup>

In a study conducted by Travaglio et al. (2020), positive relationship results were obtained between the concentration

**Table 1. Case Study of the Relationship between Air Pollution and COVID-19**

Studies and Language	Research Area	Data set	Method	Data Findings
English	Italian	Effect of PM <sub>2,5</sub> Exposure on hospitalization risk	Observational analytics	Exposure to PM <sub>2,5</sub> accounts for 21% of hospitalization cases. If the average PM <sub>2,5</sub> concentration is reduced by 4%, there is a possibility of a reduction of 7339 (-11%) hospitalization cases due to COVID-19
English	French	Long-term NO <sub>2</sub> exposure to the distribution of COVID-19 Cases	Observational analytics	The High Risk of hospitalization, cases involving intensive care in Hospitals, deaths in Hospitals, and recovering and returning home in eastern France are associated with overcrowding and long-term exposure to NO <sub>2</sub> .
English	German	PM <sub>10</sub> short-term exposure to the severity and number of COVID-19 cases	Observational analytics	Short-term PM <sub>10</sub> exposure has an impact on increasing the number of COVID-19 deaths and cases
English	In vitro, animal, and human studies	The effect of air pollution on COVID-19	Reviews	Many chronic diseases, such as cardiopulmonary and metabolic diseases, are the result of contributions to long- and short-term exposure to air pollution. This explains why exposure to air pollution can indirectly affect a person, causing severe and more deadly COVID-19 infection.
English	Delhi, London, LA, Madrid, Mumbai, NY, Rome, Sao Paulo, Seoul, Wuhan	Impact of Lockdown on air quality	Observational descriptive	There was a drop in pollution concentrations in those countries after the lockdown. Business closures, the loss of traffic congestion, and the halt of construction projects and non-essential industries during the lockdown have impacted improving air quality.
English	Madrid	Impact of COVID-19 on air quality	Observational descriptive	Improvements in outdoor air quality are especially noticeable in major cities in China, where outdoor pollution levels (NO <sub>2</sub> and PM <sub>2,5</sub> ) have decreased significantly during the lockdown. In European cities such as Barcelona, the concentration of NO <sub>2</sub> was halved during the lockdown, the PM decreased lower, and the concentration of O <sub>3</sub> increased by about 50%. But on the contrary, there is a decrease in indoor air quality due to a lack of ventilation (due to energy savings), the use of cleaning materials <sup>2</sup> , and disinfectants.

of air pollutants, NO particles, and the mortality and infectivity of COVID-19. A slight increase in air pollution led to many increases in infectivity and mortality due to COVID-19 in the UK.<sup>10</sup>

Air pollution and COVID-19 affect the same organs. Comorbidities in COVID-19 patients play an important role in increasing patient risk. Many chronic diseases, such as cardiopulmonary and metabolic diseases, are the result of contributions to long- and short-term exposure to air pollution. This explains why exposure to air pollution can indirectly affect a person, causing severe and more deadly COVID-19 infection. In addition, air pollution can facilitate the entry of viruses into the body through several processes.<sup>11</sup>

Exposure to pollutants can interfere with the function of the epithelial barrier, making it easier for SARS-CoV-2 infection and pathogenesis of COVID-19.<sup>12</sup> PM<sub>2.5</sub> may facilitate viral infection through interactions with the Renin-Angiotensin (RAS) system of the lungs.<sup>13</sup> Chronic exposure to particulate matter (PM) can lead to impaired hypothalamic-pituitary-adrenal (HPA) axis activation that modulates the immune and cytokine responses thereby contributing to COVID-19 mortality.<sup>14</sup> In addition, inadequate health facilities for the poor living in highly polluted industrial areas further increase the incidence and mortality due to COVID-19.<sup>15</sup>

On the other hand, the COVID-19 pandemic has positively impacted air quality. Business closures, the loss of traffic congestion, and the cessation of construction projects and non-essential industries during lockdown have impacted improving air quality.<sup>1</sup> Improvements in air quality are especially noticeable in major cities in China, where outdoor pollution levels (NO<sub>2</sub> and PM<sub>2.5</sub>) have decreased significantly during the lockdown. In European cities such as Barcelona, the concentration of NO<sub>2</sub> was halved during the lockdown, the PM decreased lower, and the concentration of O<sub>3</sub> increased by about 50%.<sup>16</sup>

## CONCLUSION

The COVID-19 pandemic and air quality have a reciprocal relationship. On the

one hand, exposure to air pollution increases the severity of patients infected with COVID-19 indirectly by becoming one of the comorbid factors such as chronic obstructive pulmonary disease, cardiovascular disease, and metabolic diseases. On the other hand, the pandemic has positively impacted air quality. Business closures, the loss of traffic congestion, and the halt of construction projects and non-essential industries during the lockdown have impacted improving air quality.

## CONFLICT OF INTEREST

This research has no conflict of interest.

## FUNDING

The researcher bore all costs required in this study.

## ETHICS

Not applicable

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article

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## ABSTRACT

This study was to analyze the determinants of anemia in adolescent pregnant women in the coastal area of North Buton Regency. The population in the study was 74 pregnant women aged <20 years in the Puskesmas area in North Buton Regency in 2022 and a sample of 62 people. The analysis used is the chi-square test. The results showed a significant relationship between nutritional status, knowledge about nutrition, consumption of blood-added tablets, socio-economic status, and food availability on the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency.

**Keywords:** Anemia; Teenage Pregnant Women.

## INTRODUCTION

The Maternal Mortality Rate (MMR) is the number of maternal deaths due to pregnancy and childbirth complications and the puerperium recorded for one year per 1000 live births in the same year. Indonesia's Maternal Mortality Rate (MMR) is still high, namely 228/100,000 live births from the target of 102/100,000 live births in 2015.<sup>1</sup> Efforts to improve maternal health have become the government's top priority, even before the 2015 Millennium Development Goals were set. The maternal mortality rate (together with the infant mortality rate) is one of the main indicators of a country's health status. MMR also shows the ability and quality of health services, capacity of health services, quality of education and community knowledge, quality of environmental health, socio-culture and obstacles in obtaining health services. WHO estimates that 15-20% of pregnant women in developed and developing countries will experience high risk and complications.<sup>2</sup>

The prevalence of anemia in pregnancy in Indonesia in 2019 was 48.9% and this figure has increased quite high compared to the 2013 Riskesdas results of 37.1%. Anemia in pregnancy which is most common in Indonesia is caused by iron deficiency as much as 62.3% which can cause miscarriage, premature labor, uterine inertia, prolonged labor, uterine

atony and cause bleeding and shock.<sup>3</sup> Iron deficiency anemia can impact pregnant women by 12% - 28% of fetal deaths, 30% of perinatal deaths and 7% - 10% of neonatal deaths.<sup>3</sup> Based on the results of the 2018 Susenas, 1 in 9 girls is married and the number of women aged 20-24 who were married before the age of 18 is estimated to be 1,220,900 women. (BPS, 2020).<sup>1</sup> Data from the North Buton District Health Office stated that until the end of semester I of 2022 there were 74 pregnant women aged <20 years who were detected to have anemia in the North Buton District Health Center area.<sup>4</sup>

From the various phenomena above, researchers are interested in conducting research on the Determinant Factors of Anemia in Adolescent Pregnant Women in the Coastal Area of North Buton Regency.

## METHOD

This study used a cross sectional research design. This method is used to determine the determinants of anemia in adolescent pregnant women in the coastal areas of North Buton Regency. This study focused on the Determinant Factors of Anemia in Adolescent Pregnant Women, including nutritional status, knowledge of nutrition, consumption of blood-added tablets, socioeconomic status, and food availability. This study uses a quantitative approach. The data obtained from the results of observations (observations),

documentation and interviews using a questionnaire guide conducted on the respondents then processed the data. They are presented in the form of tables and explanations. The population in this study were all pregnant women aged <20 years who came to check their pregnancy in all Public Health Centers of North Buton Regency in 2022 as many as 74 people. The number of samples in this study were 62 people. The sampling technique used in this study is probability sampling (simple random sampling).

## RESULT

Several factors significantly influence the incidence of anemia in adolescent pregnant women. The proportion of anemic subjects was significantly higher in mothers with malnutrition, low nutrition knowledge, irregular iron supplement consumption, low-income status, and insecure food status.

## DISCUSSION

**The relationship between nutritional status and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency**

Based on **Table 1**, the results obtained from 34 respondents with malnourished nutritional status there were 24 (38.7%) respondents with the incidence of anemia, while from 28 respondents with normal

**Table 1. The relationship between determinant factors and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency**

Determinant Factors	Anemia		No Anemia		Total		p Value	
	f	%	f	%	f	%		
Nutritional status	Malnutrition	24	38,7%	10	16,1%	34	58,8%	0,001
	Normal	8	12,9%	20	32,3%	28	45,2%	
	<b>Total</b>	<b>32</b>	<b>51,6%</b>	<b>30</b>	<b>48,4%</b>	<b>62</b>	<b>100%</b>	
Knowledge about nutrition	Not enough	22	35,5%	8	12,9%	30	48,4%	0,001
	Enough	10	16,1%	22	35,5%	32	51,6%	
	<b>Total</b>	<b>32</b>	<b>51,6%</b>	<b>30</b>	<b>48,4%</b>	<b>62</b>	<b>100%</b>	
Take blood-boosting tablets	Not obey	24	38,7%	10	16,1%	34	54,8%	0,001
	Obey	8	12,9%	20	32,3%	28	45,2%	
	<b>Total</b>	<b>32</b>	<b>51,6%</b>	<b>30</b>	<b>48,4%</b>	<b>62</b>	<b>100%</b>	
Socio-economic (income/ salary)	< RMW*	18	29%	28	45,2%	46	74,2%	0,001
	≥ RMW**	14	22,6%	2	3,2%	16	25,8%	
	<b>Total</b>	<b>32</b>	<b>51,6%</b>	<b>30</b>	<b>48,4%</b>	<b>62</b>	<b>100%</b>	
Food availability	Food insecurity	18	29%	28	45,2%	46	74,2%	0,001
	Food Resistant	14	22,6%	2	3,2%	16	25,8%	
	<b>Total</b>	<b>32</b>	<b>51,6%</b>	<b>30</b>	<b>48,4%</b>	<b>62</b>	<b>100%</b>	

Note: < RMW\* = income status below the Regional Minimum Wage.

≥ RMW\*\* = income status more than or equal to the Regional Minimum Wage

nutritional status there were 8 (12.9%) respondents with anemia. The results of statistical tests using the chi square test obtained P value = 0.001 which means P value <0.05, meaning that there is a relationship between nutritional status and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency.

#### **The relationship between knowledge about nutrition and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency**

Based on [Table 1](#), it was found that from 30 respondents with insufficient knowledge of nutrition there were 22 (35.5%) respondents with the incidence of anemia, while from 32 respondents with sufficient knowledge of nutrition there were 10 (16.1%) respondents with the incidence of anemia. The results of statistical tests using the chi square test obtained a P value = 0.001 which means the P value <0.05, meaning that there is a nutritional status with the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency.

#### **The relationship between the consumption of blood-added tablets and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency**

Based on [Table 1](#), the results of 34 respondents with non-adherent status consuming blood-added tablets were 24 (38.7%) respondents with anemia, while from 28 respondents with compliant status consuming blood-added tablets there were 8 (12.9%) respondents with anemia. The results of statistical tests using the chi square test obtained a P value = 0.001 which means the P value <0.05, meaning that there is a relationship between the consumption of blood-added tablets and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency.

#### **The relationship between socioeconomic and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency**

Based on [Table 1](#), the results obtained from 46 respondents with income status below the Regional Minimum Wage, there were

18 (29%) respondents with the incidence of anemia, while from 16 respondents with income status more than or equal to the Regional Minimum Wage, there were 14 (22.6%) respondents with the incidence of anemia. The results of statistical tests using the chi square test obtained P value = 0.001 which means P value <0.05, meaning that there is a socio-economic relationship with the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency.

#### **The relationship between food availability and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency**

Based on [Table 1](#), the results obtained from 46 respondents with food insecurity status there were 18 (29%) respondents with the incidence of anemia, while from 16 respondents with food security status there were 14 (22.6%) respondents with anemia. The results of statistical tests using the chi square test obtained P value = 0.001 which means P value <0.05, meaning that there is a relationship between food availability and the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency.

## CONCLUSIONS

There is a significant relationship between nutritional status, knowledge of nutrition, consumption of blood-added tablets, socioeconomic, and food availability on the incidence of anemia in adolescent pregnant women in the coastal area of North Buton Regency. It is hoped that the Health Office will be more proactive in providing counseling to the community, especially pregnant women in their teens so that they are not affected by anemia.

## ACKNOWLEDGEMENTS

Thank you to all respondents who have contributed to this research.

## CONFLICT OF INTEREST

This research has no conflict of interest.

## FUNDING

All costs required in this study were borne by the researcher.

## ETHICS

This research is subject to and follows the code of ethics issued by the Southeast Sulawesi Association of Indonesian Public Health Experts. This research was conducted after obtaining approval from the ethics committee and a research permit from the puskesmas where the research was conducted. All research subjects were given an explanation regarding the purpose and procedure of the study and asked for written informed consent. The subject has the right to refuse to participate without any consequences. The identity of the research subjects is kept secret.

## AUTHOR CONTRIBUTIONS

The results of this study can be used as material for the development of science in the health sector. This research is expected to be a source and reference for future researchers who will examine the prevention of anemia in pregnant women in their teens.

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## ABSTRACT

**Introduction:** Hospitals have an important role in local and regional disaster management. Inche Abdoel Moeis is a general hospital belonging to the regional government, which can be the center for disaster management<sup>1</sup>. This study aims to assess the preparedness of Inche Abdoel Moeis Hospital in dealing with disasters in terms of hazards, structural safety, non-structural safety, and emergency and disaster management.

**Methods:** Qualitative research was conducted at the Inche Abdoel Moeis Hospital Samarinda from January to October 2022, with purposive sampling. The data was collected by interview, observation, and document review based on the Hospital Safety Index. A triangulation method was used to ensure the validity of the data.

**Results:** The hospital safety index was low, thus requiring immediate intervention for disaster preparedness.

**Conclusions:** Several suggestions for improvement have been written to improve hospital building structural safety, non-structural building safety, and emergency and disaster management.

**Keywords:** disaster; hospital safety index; preparedness; hazards; structural safety; non-structural safety.

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## INTRODUCTION

Disaster is one of the phenomena in the international realm that requires special attention because of the suffering it causes the community in the form of human casualties, property losses, and environmental damage.<sup>2</sup> When a disaster occurs, the hospital will be faced with a situation where the number of victims far exceeds the ability of the number of medical personnel to provide emergency care, so the hospital is forced to apply additional resources for treatment to a large number of victims.<sup>3</sup> Indonesia is a country prone to natural disasters and social disasters. Year after year, this country is not free from disasters. The case of the Aceh tsunami on December 26, 2004, which killed up to 228,432 people, and the earthquake in Yogyakarta and Central Java on May 27, 2006, which killed around 6000 people and destroyed more than 100,000 houses.<sup>4</sup> On October 30, 2009, more than 1000 people died in an earthquake in Padang, West Sumatra<sup>5</sup> Even the humanitarian tragedy that just happened to spectators at the football match at the Kanjuruhan Stadium in Malang on October 01, 2022, there were out of a total of 754 victims, 132 of them died, 596 were lightly and moderately injured, and 26 others were injured.<sup>6</sup>

In general, the potential threat of disaster in Samarinda City is almost the same as the potential threat in the city of Jakarta.<sup>7</sup> Potential threats from a geographical and demographic point of view are extreme weather, floods, fires, and landslides. In other words, if these existing threats are met with vulnerable socio-cultural, economic, physical, and environmental conditions without being supported by good community capacity, the threat can turn into a disaster.<sup>8</sup> Inche Abdoel Moeis Samarinda Hospital, which is located in Samarinda Seberang, is the only government hospital that has become a referral hospital and has become a Disaster Alert Hospital because, apart from its location in an area prone to flooding, landslides, and fires, the hospital is also close to Palaran Stadium, which is 5.1 kilometers away or about 10 minutes away, and holds events that have the potential to cause mass tragedy when the number of visitors exceeds capacity.

Inche Abdoel Moeis Hospital will play an important role during disasters, such as the provision of health services to reduce mortality and morbidity associated with disaster victims. Hospital preparedness in dealing with disasters plays an important role in disaster mitigation so that the impact of disasters on public health can be

minimized. However, until now, a study on the preparedness of the Inche Abdoel Moeis Hospital in dealing with disasters has never been carried out, so this study is very important. This study aimed to analyse the preparedness of Inche Abdoel Moeis Hospital in dealing with disasters, and recommend providing disaster preparedness interventions for Samarinda City.

## METHOD

Qualitative research was conducted at the Inche Abdoel Moeis Hospital Samarinda from January to October 2022, with purposive sampling. To ensure the validity of the data, a triangulation method was used through interviews, documentation studies, and surveys until desaturation was obtained. Inclusion criteria used for informants in this study include: expert staff who have worked for more than 5 years in the Emergency Room, Environmental Health Unit, and Hospital Facility Maintenance Installation and can be a source of policymakers in emergencies. The instrument used in this study was a hospital safety index<sup>2</sup>, with Hospital preparedness indicators consisting of Hazard, Structural Safety, Non-Structural Safety, and

Emergency and Disaster Management. The primary data were collected from interviews, documents, and observations obtained from the Emergency Room, Environmental Health Unit, and Hospital Facilities Maintenance Installation related to disaster management using an interview guide based on the second edition of the safe hospital checklist published by WHO and PAHO in 2015.<sup>2</sup>

## RESULTS

Inche Abdoel Moeis Hospital is the only hospital in the Samarinda Seberang district. It consists of an old building and a new building. The old building on the 1st floor is used for patient services (pharmacy depot, isolation room, clinical pathology laboratory room, anatomical pathology laboratory room, environmental health room, nutrition, laundry, morgue, operating room, laboratory, radiology, registration, and polyclinic), floor 2 is a treatment room for class I, II, and III patients and VIPs. In the new building, Floor 1 consists of an emergency room connected to a pharmacy warehouse on the first floor, a triage room, an intermediary room, and a resuscitation room. On the 2nd floor, there is a Neonatal Intensive Care Unit (NICU) and an Intensive Care Unit (ICU); on the 3rd floor, there is an operating room. Overall, Inche Abdoel Moeis Hospital has a capacity of 141 inpatients.

### Hospital Building Structural Safety

Hospitals have not implemented safety standards optimally. The safety aspect of the building, especially the structural system of the building, has a poor design, does not have a floor plan, and some damage has been seen due to weathering or aging factors. There are cracks larger than 3 mm in the concrete and excessive deformation of the steel and wood. There are significant discontinuous or irregular elements, significant variations in building elevation, which can be seen in the emergency room drop zone and the path leading to the operating room. There are collapsed ceilings and holes, and the inscription in front of the ER has also fallen. Repairs have been made light on some of the damaged buildings. The structural design system of the

building does not allow the addition of an additional floor at the top. For foundation safety, the safety rating is low because there is no design design, no evidence that the foundation was designed to standards or there is evidence of damage.

### Non-Structural Building Safety

Architectural safety conditions are average; additional structural damage, such as exit doors and ceilings, is still found, and some have been repaired. The condition of the floor has cracked, which is dangerous for visitors. The condition of infrastructure protection, access, and physical security is still in a low safety rating; no protection measures; exit and evacuation routes are not clearly marked, and many are blocked. The physical safety of buildings, equipment, staff, and patients has a low safety rating because no measures are implemented. The electrical system has documented external maintenance and restoration of power supplies and alternative sources; up-to-date maintenance and inspection records; personnel has been trained; and resources are available to carry out emergency maintenance and recovery. Telecommunications and water supply systems have an average safety rating, guaranteed to cover at least 72 hours.

### Emergency and Disaster Management

Coordinating emergency and disaster management activities at Inche Abdoel Moeis Hospital has low, average, or high scores. Low on the point of a hospital emergency/disaster committee because there is no socialization related to the existence of a disaster team in the hospital. Policies in emergency operations have also not gone well because there has been no socialization of the formation of an emergency operation team when a disaster occurs. Communication and information management are considered to be lacking because there is no standard operating procedure for internal communication. Hospital emergency or disaster response plans have not been documented. There are no hospital-hazard-specific sub-plans yet. There is no hospital emergency disaster response plan exercise, evaluation, or corrective action yet, and no procedure prepared for communication with the public and the media. The expansion of

usable space for mass casualty incidents has not been identified. The area for the field hospital is not yet ready. The triage rate for major emergencies and disasters is still low, and disaster conditions with more than 100 victims require adequate space and human resources. There are no triage tags and other logistical supplies for mass casualty incidents yet. There is also no post-mortem procedure for mass fatality incidents because the hospital does not yet have a permanent forensic expert. Emergency security procedures are few; there are no emergency security procedures in the form of documents. The hospital also does not have a plan or procedures for computer security systems in place.

## CONCLUSIONS

From the research above on the Inche Abdoel Moeis Hospital building structure, it is necessary to plan and study the hospital building, which begins with an analysis of hospital safety. Need evaluation for uneven floors to prevent accidents. For non-structural factors, there is a need for continuous examination of hospital supporting factors, including computer networks, information technology, and door and window ornaments that are not up to standard. Emergency doors, smoke detectors, fire extinguishers, and water availability for fire disaster management, it is necessary to have policies and standard operating procedures for handling victims beyond the hospital's capacity, including standard procedures for internal coordination to mobilize human resources in dealing with disasters.

## CONFLICT OF INTEREST

This research has no conflict of interest.

## FUNDING

The researcher bore all costs required in this study.

## ETHICS

This research was conducted after obtaining approval from the ethics committee and a research permit from the Inche Abdoel Moeis Hospital Samarinda.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article

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## ABSTRACT

The post-COVID-19 management in Indonesia mostly deals with the economic, business, and educational sectors. This management focuses on making most citizens may neglect the latent danger of the pandemic. This modified systematic literature reviewed relevant articles to synthesize relevant practices of post-COVID-19 management in Indonesia. The researcher concludes that post-COVID-19 management is an important aspect to be promoted by the government and citizens in Indonesia. Post-COVID-19 management deals with promoting the COVID-19 health protocol and management measures. Health institutions must integrate the efforts with other sectors in order post-COVID-19 management could provide better solutions for Indonesia's citizens and all sectors.

**Keywords:** Post-COVID-19 management; Integrated post-COVID-19 management.

## INTRODUCTION

Since the beginning of 2022, COVID-19 prevalence in Indonesia has decreased. It indicates the policy of the government to re-open the activities of various as well as increase the vaccination rate.<sup>1</sup> Unfortunately, the management of the post-COVID-19 era mostly deals with the economic, business, and educational sectors. Therefore, the health institution should integrate the efforts with other sectors to realize better post-COVID-19 management. This paper aims to formulate the best solution for the management of post-Covid-19 for all sectors and citizens. The author's aim was to fulfill the course requirement on campus.

## METHOD

In this research, the researcher used a modified systematic literature review, modified PRISMA procedure, *Preferred Reporting Items for Systematic Review, and Meta-Analyses*.<sup>2</sup> The researcher applied some stages starting from 1) finding the article, 2) checking the duplication, 3) screening the articles, and 4) reviewing the articles. For each modified PRISMA step, the researcher applied specific steps: a) applying specific keywords of post-Covid-19 management and handling in post-Covid-19, b) downloading the accessible articles, and c) reviewing the only downloaded articles with DOI. Then,

the researcher reviewed the six articles and synthesized relevant practices of post-Covid-19 management in Indonesia.

## RESULT

The researcher presented six reviewed articles, namely Vanapalli et al. (2021), Filimonau (2021), Reyes et al. (2021), Danne et al. (2021), Li et al. (2022), and Scordo et al. (2021).

### A Study by Vanapalli et al (2021)<sup>3</sup>

The authors found that the increased use of plastics and protective equipment led to massive global waste since the disposed of materials could not be degraded naturally. Three strategies to manage waste during the post-COVID-19 era namely scientific sterilization including incineration, feedstock recycling, and circular base material shift.

### A Study by Filimonau (2021)<sup>4</sup>

The researcher focused on waste management in the hospitality sector after the COVID-19 pandemic and proposed following strategies to handle it namely to create a direct connection between hospitality sector doers and farmers as the alternative supply chain, useful to deal with the plastic waste problem including disposable protective equipment, and encouraging the implementation of plant-based material alternatives.

### A Study by Reyes et al (2021)<sup>5</sup>

Reyes et al. (2021) promoted a study to provide updated management for multiple sclerosis patients during and after the COVID-19 pandemic. The study's underlying background was the concern that people with multiple sclerosis suffer morbidity and mortality with COVID-19 even after the pandemic.

### A Study by Danne et al (2021)<sup>6</sup>

Danne et al. (2021) studied the paradigm change for diabetes risk management in the post-COVID-future. The researchers found that the implementation of telemedicine and telemonitoring was very useful for patients with diabetes to keep their health from COVID-19 and other diseases.

### A Study by Li et al (2022)<sup>7</sup>

Li et al. (2022) studied the mental health management system for children during a post-COVID-19 pandemic. The research results were the proposal of applying a 'four-level model' that can be promoted both top-down and bottom-up.

### A Study by Scordo et al (2021)<sup>8</sup>

The underlying research background of Scordo et al. (2021) was the possibility of long-term effects of COVID-19. The researcher suggested implementing serologic testing to detect specific antibodies to SARS-Cov-2 in the blood,

serum, or plasma. The test results were useful in encouraging patients to seek the appropriate care.

## DISCUSSION

Preventing Covid-19 transmission has increased the disposal of face masks. In this systematic literature review research, the researcher also conducted preliminary observation to support Vanapalli et al. (2021).<sup>3</sup> The researcher argues that these problems require feedstock recycling and circular base material shift to control the waste amount because the facilities to promote incineration procedures are limited in Indonesia. The second management in this post-COVID-19 era dealt with food wastage management. Citizens should utilize their food heaters and buy raw ingredients in traditional markets where farmers bring their harvested plants to meet their buyers. This strategy should also be the choice of hospitality sector doers so that physical mobility will be shortened, limited and severe the plastic uses. The other post-COVID-19 management was hospitalization and health care service. Implementing telemedicine and telemonitoring can severe any potential disease transmission because people can get the waiting list numbers without visiting the hospitals and experiencing long queues. Implementing post-COVID-19 management for mental health problem care for children seems to focus only on economic, education, and health protocol promotion. Hidayat et al. (2021) found that health promotion was not entailed by specific post-COVID-19 management.<sup>9</sup>

## CONCLUSION

Post-COVID-19 management is an important aspect to be promoted by the government and all Indonesia's citizens. Post-COVID-19 management does not

only deal with promoting the COVID-19 health protocol promotion but also deals with the management measures. In this case, health institutions cannot formulate the management individually. Health institutions must integrate the efforts with other sectors so that post-COVID-19 management could provide a better solution for Indonesia's citizens' surrounding environment, economy, health, and well-being.

## CONFLICT OF INTEREST

This research has no conflict of interest.

## FUNDING

The researcher bore all costs required in this study.

## ETHICS

Not Applicable

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article

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## ABSTRACT

**Introduction:** Telehealth is a medical service solution that can minimize the transmission of COVID-19 by conducting health care remotely. This study aims to analyze the challenges and opportunities of using telehealth to improve public health quality in the post-pandemic period.

**Methods:** The PRISMA method was used to synthesize 28 articles in this study. Furthermore, the research variable data is compared with empirical/theoretical support.

**Results:** Online treatment programs through telemedicine have economic benefits for the health care system and patients because they can efficiently use costs, time, and energy. However, several challenges come from the readiness of service providers, the capacity of service users, network affordability, and local government support.

**Conclusion:** The preparation of resources is needed so that telehealth can be used more efficiently and reach all elements of society in the post-pandemic period.

**Keywords:** COVID-19; health care; telemedicine, telehealth in pandemic era

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## INTRODUCTION

Telehealth/telemedicine is an alternative solution for medical services during the Covid-19 crisis. The existence of telehealth/telemedicine can minimize the use of healthcare infrastructure and allow healthcare to be carried out remotely. The massive use of telehealth is used especially during the COVID-19 pandemic. In a study conducted in Nebraska, 50 of the 51 agencies that sampled the study stated that they offer telehealth services and there has been an increase in usage during the COVID-19 pandemic.<sup>1</sup> This relates to the ease with which users can access health services due to social distancing rules that prevent users from meeting face-to-face with health providers.

Another thing that causes the increasing use of telehealth is the high level of participation of health workers in using telehealth. In addition, health practitioners plan to continue using telehealth services even after the pandemic ends. This is slightly different from the study in Amsterdam, which examined the factors associated with using contact tracing applications in individuals diagnosed with SARS-CoV-2, which stated that out of 29,766 positive cases, only 4824 reported using this tracking app.<sup>1</sup> This is related to

sociodemographic characteristics where parents, women and people not born in the Netherlands are less likely to download contact tracing applications. The number of users of the application in the Netherlands is also relatively low compared to other countries in Europe, where in other countries additional features are added to the contact tracing application that make the application more attractive. This needs the attention of the Dutch government to further promote this application's use and add additional features to this application.

Patients consider the ease of using telemedicine necessary so that they feel familiar with the application used. In a study conducted in Canada, some patients felt that the inconvenient application made them choose not to use the telemedicine application and thought it was not suitable for them.<sup>2</sup> The obstacles they face are not related to the speed of internet access which is already quite good, but related to their habit of using applications that they find comfortable. It should be noted that some patient inputs, such as applications that are comfortable to use, can accommodate the deaf with additional text and images, provision of dialog boxes to be able to communicate privately with doctors and additional reminder features for further treatment should be a

concern for providers to be able to develop telemedicine.

The use of telehealth in various health service providers is a form of change in health care practices that have been carried out since the beginning of the COVID-19 pandemic. Telehealth is an alternative to remotely evaluate patients who are quarantined and unable to come to health facilities for various reasons and to reduce the risk of exposure to covid-19.<sup>3</sup> Before the COVID-19 pandemic, not all academic health centers in the United States and Canada provided video conferencing platforms; some places still require service providers and users to be in designated locations. Still, since the beginning of the pandemic, these places have provided video conferencing services that allow service providers and users to participate from home.<sup>4</sup> A survey conducted on 247 pediatric surgeons in the Americas showed that the use of telehealth during the COVID-19 pandemic was more (62.3%) than before the Covid-19 pandemic (19.8%).<sup>5</sup> Another survey was also conducted on 74 doctors and 271 nurses in wound care management in Turkey. The survey results show that 47.3% of doctors and 33.9% of nurses use telehealth to assess and treat chronic wounds.<sup>6</sup> At this time, the pandemic

will turn into an endemic. Will the use of telehealth still be a useful application to be applied in all countries in terms of providing long-distance health services? Therefore, this study aims to analyze the challenges and opportunities of using telehealth to improve public health quality in the post-pandemic period.

## METHODS

This literature review was conducted using the PRISMA method to determine scientific articles to answer research questions “What are the challenges and opportunities for using telehealth in improving the quality of public health in the post-pandemic period?”. Article searches were conducted on 3 databases: ScienceDirect, Pubmed, and Proquest. The keywords used were the inclusion criteria for the search for scientific articles, namely ‘Telehealth’ AND ‘Covid-19’ OR ‘SARS-Cov-2’ OR ‘Pandemic’ AND ‘Health Quality’ OR ‘Public Health Quality’. Inclusion criteria for the search for scientific articles included: (i) articles from peer-reviewed journals that are the result of original research that discusses the evaluation of the use of telehealth in improving the quality of public health during the COVID-19 pandemic; (ii) speak English; (iii) published in 2020-2022; and (iv) is a full-text article. After filtering and adjusting the research variables, 28 articles were analyzed, consisting of 8 articles published in the ScienceDirect database, 10 in the Proquest database, and 10 in the Pubmed database. Data analysis was carried out by synthesizing and comparing variable research data with empirical/

theoretical support and presenting it through tables and descriptions. The results of this study are described in a narrative form that contains a complete description of 2 sub-discussions, namely the opportunities and challenges of using telehealth in the post-pandemic era.

## RESULTS

The analysis results of the 28 selected articles are described in several sub-discussions, namely the use of research methods and geographic distribution of the research site. The results of the classification of research methods show that so far the most widely used data collection technique in various countries regarding the use of telehealth is the survey technique. Many researchers have chosen this data collection technique to identify telehealth implementation in improving public health quality. (Table 1)

This acceptance of telemedicine is shown by a significant increase in the use of telemedicine before and after the pandemic.<sup>7</sup>

Based on the results of the analysis of article distribution (Figure 1), over

the last 3 years (2020-2022), scientific publications of research results related to the topic of telehealth have spread across the continents of Europe, Africa, North America, South America, and Asia. The largest number of research for the development of telehealth technology occurs in North America, an association of developed countries.

### The Opportunities of Using Telehealth In the Post-Pandemic Era

Telemedicine, which was rarely used before the pandemic, is potentially used and will be maintained in the post-pandemic period because it has provided many benefits. Telemedicine is seen as effective in the treatment process compared to direct treatment.<sup>8</sup> Based on the identification and analysis of the 28 articles used, 3 major opportunities can improve the quality of post-pandemic telehealth implementation, including (1) Patient satisfaction that developed during the implementation of telehealth; (2) Telehealth can minimize disease transmission; (3) Economic benefits that patients experience while using telehealth.

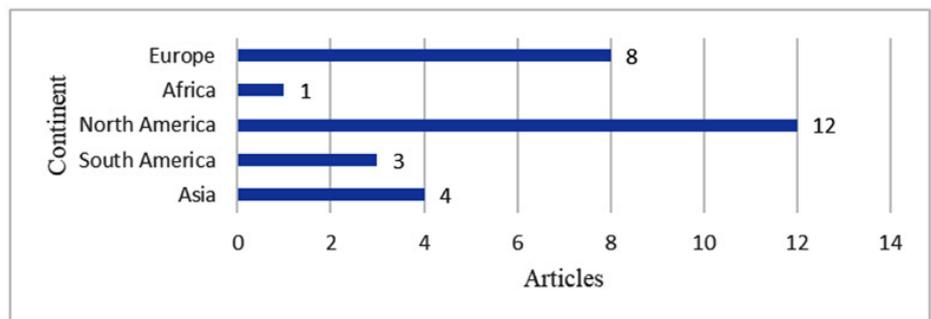


Figure 1. Geographical Area Study

Table 1. Data Collection Technique Distribution are Reviewed in A Database of 28 Articles

Research Methodology (data collection technique)	Authors (Year)	Total Articles
Survey	Arne Peine, et al (2020); Ashwin Ramaswamy, et al (2020); Stathopoulos et al (2021); Da Silva Aquino, et al (2021); Ellehuus et al (2021); Wu, et al (2020); Olivo, et al. (2021); Martinengo, et al (2021); Elhadi, et al (2021); Ritsema et al (2022); Lima, et al (2022); Wright, et al (2020); Shih, et al (2022); Reynolds, et al (2021); Gifford, et al (2021); Shah, et al (2022); Karadag, et al (2021); Folk, et al (2022); Capusan and Fenster (2021); Rao, et al (2022)	20
Experimental study	Lai, et al (2020); Calvo-Paniagua, et al (2022); Muschol, et al (2022)	3
Secondary data	Miller et al (2021)	1
Qualitative study	Freske and Malczyk (2021); Burton, et al (2022); Turner, et al (2022); Van Citters, et al (2021)	4

## The Challenges of Using Telehealth In the Post-Pandemic Era

The use of telehealth is increasing, but obstacles can also occur in rural communities due to a lack of ability to access technology and internet access.<sup>1</sup> These challenges can be categorized into several groups based on who is responsible: (1) Service provider (difference in perception, lack of education, finance, customized type of service); (2) Service users; (3) Network provider; (4) Government.

## DISCUSSION

### The Opportunities of Using Telehealth In the Post-Pandemic Era

A study in the UK and Denmark on patients found that most patients could accept and positively respond to telemedicine as a substitute for face-to-face treatment. However, in certain critical cases, they still wanted to meet face-to-face with medical personnel.<sup>9,10</sup> Telemedicine, which was rarely used before the pandemic, is considered very potential to be used and will be maintained in the post-pandemic period because it has provided many benefits. Telemedicine is seen as effective in the treatment process compared to direct treatment.<sup>8,9</sup> A study in a health service even revealed that patient satisfaction with telemedicine was better than in-person visits during the past year and during the COVID-19 pandemic.<sup>11</sup> The use of telemedicine can also reduce the risk of exposure to Sars-Cov-2 for both medical staff and patients, especially those with special vulnerabilities. The popularization of online care programs through telemedicine is likely to have economic benefits for both the healthcare system and patients because it can efficiently use costs, time, and energy.<sup>12</sup> Telemedicine in the future needs to be more tailored to the preferences of its users. A study found that patients of different ages have different preferences.<sup>10</sup>

Telehealth is a service that is needed during the COVID-19 pandemic because it can minimize the risk of contact between health practitioners and patients. COVID-19 is indeed a factor that can encourage the use of telehealth, but weather factors, time spent traveling and other challenges increase the need for telehealth use. In practice, telehealth also

plays an important role in improving treatment plans, increasing attendance according to schedule, and in certain cases, increasing the efficacy of treatment management. Some health practitioners also revealed that telehealth services make patients more open to expressing their complaints.<sup>1</sup>

After the COVID-19 pandemic period ends, telehealth in all health care facilities is likely to be continued because the benefits felt are not only related to preventing the spread of COVID-19. The survey conducted at the Children's Lung Clinic regarding satisfaction with the use of telehealth was very high, which was indicated by 82% of participants strongly agreeing or agreeing that they would use telehealth services again. The reasons for the satisfaction of respondents in this survey were felt in several aspects, such as the convenience of communicating with doctors, easy to learn and use of telehealth, still being able to see doctors as if meeting in person, patients being able to express their feelings effectively, increasing access to health services.<sup>13</sup>

In addition, telehealth also has advantages in terms of time and cost efficiency, ease of making appointments, and time/schedule flexibility.<sup>6,14,15</sup> The benefits of this time/schedule flexibility are felt especially for students.<sup>16</sup> The more flexible time impacts increasing access to health services.<sup>16</sup> Research conducted on 546 contraceptive service providers revealed that several positive perspectives regarding telehealth services enable continuous, more efficient care, including updating prescriptions, simplifying the coordination process, and accommodating patients who are difficult to visit in person.<sup>16</sup>

### The Challenges of Using Telehealth In the Post-Pandemic Era

The use of telehealth before, during and after the end of the pandemic faces many challenges in its implementation. Limitations in the physical examination are one of the obstacles that are quite clearly visible in telehealth services compared to face-to-face services, making it difficult to conduct a comprehensive assessment.<sup>6,17</sup> Barriers to the lack of technological support, such as access to the internet, are

a challenge to using telehealth.<sup>5,6,16,18</sup>

In this case, telehealth/telemedicine service providers are health service providers, including regional hospitals, teaching hospitals, private clinics, private practice clinics, rehabilitation clinics, and so on. The parties directly involved in telehealth/telemedicine are doctors, nurses and other health workers. Compared to private practice clinics, positive perceptions of telehealth/telemedicine were found in hospitals. Positive perceptions about telehealth/telemedicine were also significantly higher among doctors than nurses.<sup>19</sup> This is, of course, a challenge, especially for private practice clinics, to improve the management of the implementation of telehealth/telemedicine to create a high positive perception of telehealth/telemedicine. Perception can be formed of them through the educational process. Education about telehealth/telemedicine is also a challenge for the future sustainability of this method. In a study, knowledge about telehealth/telemedicine among health workers was deemed inadequate. Service providers should provide specific budgets to increase the effectiveness and efficiency of telehealth/telemedicine, such as additional investment in infrastructure, upgrading of clinical staff, and additional clinical and administrative staff training, potentially impacting telehealth/telemedicine implementation.

The challenges regarding service users, in this case, our patients, related to social aspects such as language and lack of technical skills in using technology for telehealth/telemedicine. For example, in telehealth/telemedicine hematology, not all older patients are comfortable with electronic devices.<sup>10</sup> Furthermore, telehealth/telemedicine relies heavily on the internet network. It takes a stable and strong connection for this service to run smoothly. Based on this, the quality of internet connections by network providers needs to be improved to ensure the widespread use of internet services during the COVID-19 outbreak and beyond. This is important considering that the satisfaction level of telehealth/telemedicine users is strongly influenced by the high speed of teleconsultation and the accuracy of the information received

in the consultation process.

The government has an important role in maintaining safe and effective telehealth/telemedicine. Several studies on telehealth/telemedicine stated that the challenge ahead for the government is how the government can provide and use the state financial budget to support the popularization of modern electronic devices and internet services, which are important to support telehealth/telemedicine. In addition, the government is also deemed necessary to make relevant laws to regulate and protect the privacy of patients/telehealth/telemedicine patients/users.<sup>13</sup>

## CONCLUSION

There are so many positive impacts arising from the application of telemedicine during a pandemic. Online treatment programs through telemedicine have economic benefits for the healthcare system and patients because they can streamline costs, time, and energy. However, several challenges must be faced to further improve the effectiveness and satisfaction of telehealth/telemedicine users. These challenges can come from service providers' readiness, service users' capacity, network affordability, and local government support. Therefore, it is necessary to prepare resources so that telehealth/telemedicine applications can be more efficient and reach all elements of society in the post-pandemic period.

## MANDATORY:

### Conflict of interest

None declared.

### Funding

This literature review research uses articles available in open access and free of charge. So that the financing comes from each researcher independently

### Ethics

This literature review research does not use research ethics studies.

### Author contributions

RI, AIS, and DIA contributed equally to

this work. RI, AIS, and DIA contributed to the conception and design of this viewpoint and drafted the primary version of the manuscript. GN contributed to the conception and design of this viewpoint, drafted the primary version of the manuscript, edited the manuscript, and reviewed the final version. All authors discussed and agreed on the implications of the study findings and approved the final version to be published.

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## ABSTRACT

From 2019 to mid-2022, cases of Dengue Hemorrhagic Fever (DHF) in Banyuwangi had the highest number of 71 cases in August 2022. From May 2022 until October 2022, cases of DHF surpassed cases in the previous three years. Although the regent's regulations related to DHF control were available as a legal basis, the relevance of their implementation still requires performance-based financing priority. This study analyzes health policies and financing strategies in managing DHF control in Banyuwangi District in 2023. The type of study was non-experimental with a descriptive and qualitative design. Informants were coordinators and staff of the infectious disease and disease control section (P2PM), sanitarians, and DHF program at Puskesmas in Banyuwangi District. Primary data was obtained from interviews, while secondary data used the operational health assistance budget plan (BOK). It needs regulations derived from regional policies that explain the involvement and active participation of cross-stakeholders/ programs and their procedures. An effort is needed to analyze across program workload and update policies containing resource requirements, including funds in more detail and priority setting. It can conclude that the BOK budget plan in 2023 between the DHO and Puskesmas shows that the priority of DHF and other infectious diseases is higher than the financing at Puskesmas. Still, Puskesmas is more performance-based than the DHO. The priority of BOK financing for the prevention of DHF can be further increased, and it can focus more performance-based budget.

**Keywords:** policy; financing; DHF; health operational assistance

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## INTRODUCTION

The increasing trend of dengue infection occurred in Banyuwangi District, East Java Province. In 2022, the number of dengue cases in Banyuwangi was extremely high. Based on the trend of the month of DHF cases from April to October 2022, the number of DHF cases exceeded the same months in the previous three-year periods, from 2019 to 2021. The peak of the highest cases was in August 2022, as many as 71 cases, so from April to October 2022, there were 71 cases of dengue fever. There were 309 cases of a total of 434 cases of DHF that occurred in Banyuwangi District in 2022.

Through Banyuwangi District Regulation No. 15 of 2012 concerning the Control of DHF in Banyuwangi District, Banyuwangi District seeks to implement DHF control based on what has been intended in East Java Governor Regulation No. 20 of 2011. According to Presidential Decree No. 72 of 2012 concerning the National Health System,

there are seven components or subsystems in the development of a health system in the state, one of which is health financing. It was explained that the finance of public health services is a public good which is the responsibility of the government. Meanwhile, financing individual health services is private, except for financing for the poor and unable to become the government's responsibility.<sup>1</sup>

In addition to DHF being an environmental-based disease and looking at the economic nature and the impact it causes, the prevention of DHF is a health service commodity that tends to be public good so it is the responsibility of the government, both the central government through the State Revenue and Expenditure Budget (APBN) and local government through the Regional Revenue and Expenditure Budget (APBD). One of the sources of funding for dengue control is the Health Operational Assistance (BOK) sourced from the APBN. Problems in financing are quite complex, including inappropriate and

limited funding sources and ineffective and inefficient budget allocations that can be used as indicators in viewing budget performance for overcoming public health problems, including the prevention of dengue fever. The study aimed to analyze health financing policies and strategies for controlling DHF in Banyuwangi District in 2023.

## RESEARCH METHOD

This study was descriptive and qualitative with interview techniques. A descriptive analysis was carried out to describe the policy and health financing of the DHF program at Banyuwangi District Health Office (DHO) in 2023. The analysis was carried out by looking at the availability and suitability of funds for the funding needs of the DHF program. The qualitative approach was conducted through in-depth interviews with the Coordinator and Control of Diseases and Infectious Diseases (P2PM) staff and Sanitarians at Puskesmas.

## RESULT

### Financing Strategy for the Control of Dengue Hemorrhagic Fever (DHF)

The realization budget related to dengue prevention from 2020 to 2022 is IDR 180,750,000; IDR 112.800.000; IDR 154,800,000 consisting of spending on themes (abate materials) for larva control, fogging tools/machines, and one-time staff meetings per year with a budget of IDR 3,000,000 million.

## DISCUSSION

### Policy for the Control of Dengue Hemorrhagic Fever (DHF)

#### Communication and Disposition

Communication plays an important role in nursing intervention services, increases patient satisfaction in obtaining nursing services, as well as protects the health workers themselves.<sup>2</sup> The clarity of regulation will facilitate the implementation of cross-sectoral cooperation in the control of DHF in the district so that existing programs and activities across sectors are integrated and sustainable. Therefore, the evaluation

system through communication is very needed to assess after a health program involving activities communication.<sup>3</sup>

#### Resources and Bureaucratic Structure

The next resource is related to clarifying the source of costs and transparency in managing costs in implementing activities. The emergence of dengue has resulted in considerable damage to the population's health and significant economic cost.<sup>4</sup> The clarity of the source of prices is expected to guarantee accountability for the budget provision.

### Evaluation of Financing Strategy in Dengue Hemorrhagic Fever Control

The analysis based on the District RABBOK in 2023 on the budget for early detection, prevention, and disease response efforts has a total of IDR 638,582,350 however, only IDR 237,327,350 (37.16%) has been allocated for DHF and other infectious diseases. If the budget is screened again for special financing for DHF, the percentage value would be smaller. To see the performance of the BOK budget plan, the planned costs can be compared based on

the budget items (investment, operational, and maintenance costs) and the nature of the activities (direct and indirect). The total budget planned for the needs of the DHO in efforts to detect early, prevent, and respond to disease is all operational, otherwise for direct activities, it is only 17.16%, while for indirect activities is 82.84%. Meanwhile, at Puskesmas, the budget for early detection, prevention, and disease response efforts has a total of IDR 6,486.313,000; however, only IDR 1,193,647,000 (18.40%) is earmarked for DHF and other infectious diseases. To see the performance of the BOK budget plan, the planned costs can be compared based on the budget items (investment, operational, and maintenance costs) and the nature of the activities (direct and indirect). The total budget planned for the needs of the Puskesmas in the effort of early detection, prevention, and response to disease is purely operational, which is IDR 1,193,647,000 (100%) because the allocation is only for direct operational activities.

**Table 1. Recapitulation of the BOK Budget Plan at the DHO for the Prevention of DHF and other Communicable Diseases in 2023**

COMPONENT		EXPENDITURE	TOTAL (IDR)
a	Contact tracing of potential outbreaks/ outbreaks (mandatory)	Official Trips	30,160,000
b	Implementation of active surveillance (optional component)	Same as above	10,560,000
c	Assistance and technical guidance at Puskesmas	Same as above	26,980,000
d	Coordination meetings and evaluation	Rental Building	169,627,350
TOTAL			237,327,350

Source: Banyuwangi DHO (2022)

**Table 2. Recapitulation of the BOK Budget Plan at the Community Health Center for the Prevention of DHF and other Communicable Diseases in 2023**

COMPONENT		EXPENDITURE	TOTAL (IDR)
a	Active case finding of diseases (optional)	Ordinary Official Trips	112,800,000
b	Empowerment of community cadres	Ordinary Official Trips,	147,043,000
c	Delivery and examination of disease specimens	Same as above	3,550,000
d	Investigation and response to cases or outbreaks	Same as above	329,150,000
e	Malaria vector survey, DHF etc. (mandatory component)	Same as above	208,900,000
f	Spraying/ fumigating DHF larvicides (mandatory)	Same as above	68,754,000
g	Implementation in eradicating mosquito nests (PSN)	Same as above	154,550,000
h	Contact tracing of potential outbreaks/ outbreaks (optional)	Same as above	168,900,000
TOTAL			1,193,647,000

Source: Banyuwangi DHO (2022)

## CONCLUSIONS

BOK budget plan in 2023 between the DHO and the Puskesmas shows that the priority of DHF and other infectious diseases is higher than the financing at the Puskesmas. Still, the financing at the Puskesmas is more performance-based than at the Health Office. From this condition, the priority of BOK financing for the prevention of DHF can be further increased, and it can focus more on activities that can be directly felt in the community. The strategy to increase priorities and allocation is more performance-based, namely by proposing changes to the Non-Physical DAK activity plan to the MOH in the fourth week of February.<sup>5</sup>

## ACKNOWLEDGEMENTS

Thank you to all informants who have contributed to this research

## CONFLICT OF INTEREST

This study has no conflict of interest.

## FUNDING

The researcher bore all costs required in the study.

## ETHICS

The study was conducted after obtaining approval from the ethics committee and a research permit from the institutions where the research was conducted.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in this study

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## ABSTRACT

**Introduction:** Near-miss is an incident without injury, illness or damage. Its data reports have become popular as a proactive approach to preventing accidents. However, PT Semen Bosowa Maros (SMB) is still unreported due to biased understanding and an inappropriate reporting system. Therefore, this research aims to verify the effect of near-miss education on workers' knowledge to identify the incident and attitude toward making a report.

**Methods:** This study used a quasi-experimental approach, and the modules and leaflets used were first designed and justified. The questionnaire used provided information about demography, knowledge, and attitude. The participants were clustered, which included 25 for the intervention group as safety employees and 35 for the control group as production support. The intervention group conducted lectures on near-miss, while the control group will have only a leaflet for self-study.

**Result:** Based on the paired T-Test, there is a significant effect of knowledge and attitude on the intervention group with values (MD 7.68, p 0.000) and (MD 7.64, p 0.000), while the control group (MD 3.57, p 0.000) and (MD 3.88, p 0.01), respectively. Mann-Whitney Test verifies that using a module is preferable in changing knowledge and attitude.

**Conclusion:** Near-miss education has proven to be effective in upgrading employees' knowledge and attitude. Hence, it was recommended to involve near-miss topics within safety awareness programs and provide a reporting system.

**Keywords:** attitude, knowledge, near-miss education

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## INTRODUCTION

The OSHA Leading Indicator<sup>1</sup> states that the inputs used as a reference in implementing OHS must be proactive, preventive, and predictive. As a leading indicator, near-miss data can provide effective information and recommendations, especially for management and operational improvements.<sup>3</sup> In clause 3.35 of ISO 45001:2018, a near-miss is an incident where there is no injury or illness but has the potential to occur. In line with Alliance,<sup>4</sup> it was stated that a near-miss is an unplanned event that does not lead to injury, illness, or damage but has the potential to occur.

The benefit of the proactive approach to preventing an accident does not correspond to understanding the importance of reporting near-miss. Therefore, an intervention method through module and leaflet was formulated to introduce near-miss as well as establish a fundamental theoretical understanding. Near-miss investigation is generally carried out on companies that

have implemented a report with a non-experimental study design.<sup>2,3,7,8</sup>

Therefore, this research aims to assess i) the significant changes in knowledge and attitude in reporting after the intervention and ii) the preferable effectiveness between the two media.

## METHOD

This research applies a quasi-experiment non-equivalent control group design. The participants involved 60 employees, who were clustered based on job responsibilities. This includes 25 for the intervention group as safety employees and 35 for the control group as production support, such as operators, mechanics, electricians, and warehouse workers. The data were collected before (pre-test) and directly after the intervention (post-test).

Media was developed through three steps, namely 1) Module was created by modifying the near-miss training outline by McKinnon, [5] 2) Media was justified by experts' language, media, and 3) Media simulation, including a small-class presentation, was performed.

The questionnaire provides information such as demography, knowledge, and attitude. Knowledge involves 23 statements, followed by 4 measurement options calculated based on scores. Attitude consisted of 11 descriptions and was measured through a questionnaire with a Likert scale. Including strongly agree, agree, neutral, disagree, and strongly disagree. Subsequently, the questionnaires were validated through a Google form and were sent to workers across different industries (15 participants involved). This questionnaire was also tested during the simulation.

## RESULTS

### Univariate analysis

Experience homogeneity for both groups ( $p > 0.05$ ).

### Bivariate analysis

Table 1 shows the increasing scores on knowledge and attitude for both groups. The results indicated that the two variables for the intervention group inclined with an MD 7.68 ( $p < 0.05$ ), and MD 7.64 (

p<0.05), respectively. The trend was the same for the control group, with a slight rise in the post-test with MD 3.57 (p,< 0.05) and 3.88 (p,< 0.05 ), respectively.

### The comparison between the two media

Table 2 presents information about the different effects of the two media in influencing knowledge and attitude. This is shown in the module effect on knowledge with a mean difference score of 7.68 (SD 7.63), while leafletting only had 3.57 (SD 2.52). Based on the mean difference scores for both media (4.10), this figure implies that the harnessing module is more effective than the leaflet in affecting knowledge (p <0.05). There was a significant result, where the effect of the module on attitude has a mean score of 7.64 (SD 5.19) while leafletting only has 3.88 (SD 5.11). Based on the mean difference score between the two media (3.75), this amount indicates that using modules also are preferable in changing attitude ( p >0.05).

## DISCUSSION

This research focused on the mutual effect of knowledge and attitude. The results of the final analysis describe that near-miss education significantly affects knowledge to identify clear near-miss occurrences and attitudes in reporting such incidents.

The result supports the evidence of former research by Darmin, where education effectively increased the knowledge of workshops in cement factories.<sup>12</sup> According to Karunikara,<sup>13</sup> education for workers at

risk of exposure to silica increases the knowledge, attitudes, and practices of employees. This is because the intervention received by the participant on daily activities will affect their self-confidence and encouragement. Furthermore, putting pictures presentation leads to a clear and easy understanding of problems. It is also advantageous to neutralize biased understanding and make it affordable across different ages.<sup>13</sup> Since it is a cognitive domain part of behavior, increasing participant knowledge is beneficial in the future. This is because practice based on knowledge may contribute to the long-term effect<sup>14</sup>

**Table 1. Results of bivariate analysis**

Variables	Test	Groups					
		Intervention		p-Value	Control		p-Value
		n=25			n=35		
mean	MD	mean	MD				
Knowledge	Pre-Test	51.60	7.68	0.000	49.03	3.57	0.000
	Post-Test	59.28			52.60		
Attitude	Pre-Test	37.88	7.64	0,000	34.46	3.88	0.000
	Post-Test	45.52			38.34		

**Table 2. Result of comparison between module and leaflet**

Variables		Mean Diff. (SD)	Mean Diff. (CI 95%)	p- Value
Knowledge	Module	7.68 (7.63)	4.10(1.34 - 6.87)	<b>0.040</b>
	Leaflet	3.57 (2.52)		
Attitude	Module	7.64 (5.19)	3.75 (1.06 - 6.45)	<b>0.010</b>
	Leaflet	3.88 (5.11)		

According to Pedrosa[8], knowledge is important in enabling employees to recognize true near-misses. To ensure effective identification, there must be a) a clear definition of near-miss and b) a means to ensure that every employee in the entire facility knows this definition at all times.<sup>9</sup> Meanwhile, near-miss detection denotes that workers can detect all near-miss events.<sup>6,7</sup> It was also discovered that an adequate understanding of near-miss greatly can significantly influence identification ability, affecting negative workplace behavior.<sup>15</sup>

Attitude in reporting also plays a crucial role, where the near-miss report is a Learning Instrument.<sup>6</sup> Near-miss reporting is a method of identifying hidden dangerous events for proactive actions to control potential accidents.<sup>10</sup> Therefore, timely reporting helps reduce risks, prevent accidents, and ensure a safer working environment.<sup>11</sup> In this research, both groups gained sufficient supplements and valued them with the fundamental issues considering near-miss in the workplace. In terms of media, the harnessing module includes two ways discussion affects higher on knowledge and attitude.

Workers' improperly maintained attitudes can lead to negative performance in reporting incidents. This can be identified through previous research gaps that mentioned barriers in reporting near-miss.<sup>4,14</sup> However, the program revealed increasing participant attitude scores and ensured workers put safety as top personal responsibility. Workers also tend to adopt something that may value them and present an advantageous reverse impact. This was in line with the simulated risk disaster education, which effectively increased positive attitudes, responsiveness, and teamwork.<sup>16</sup> Yang<sup>17</sup> also stated that attitude can moderate positive action in workforces, especially for those with a leader and/or senior-level responsibility. Moreover, the media took part in influencing their willingness. This is because the illustration provided had strong connectivity to their daily exposure risks such as potential falling, slips, collisions, hit by material, etc.

## LIMITATION

The first limitation of this research is the intentional narrowing of the number of participants. Therefore, applying for

the program on a large scale instead of the clustering sampling method is recommended. Secondly, it did not assess the variable of practice to ensure the completeness of the near-miss effect on workers. Future investigation is required to add contributing factors that affect knowledge and attitude. Furthermore, educating near-miss through whole-group, discovery, distance learning, computer conferencing, and instructional aids can also be tested.

## CONCLUSION

Near-miss education is a program that presents loopholes for tackling barriers in reporting related incidents. It was discovered that training is needed as a guide to design sufficient topics that rely on the particular situation for the company. The programs have proven to be successful in enhancing participants' knowledge and attitude. Meanwhile, education through modules and leaflets significantly influenced workers to adopt the material easily. Based on these results, it was suggested to involve near-miss topics within safety awareness programs such as new-employee induction, visitor briefing, information board, alerts, talks, and regular reports. The management was also recommended to establish a near-miss reporting system.

## CONFLICT OF INTEREST

All authors declared that there is no conflict of interest related to this article

## AUTHORS' CONTRIBUTION

HM: research application, data analysis, reporting and presenting, AW: a critical review of\uscript. SSR.: correction of data analysis and interpretation. All authors have read and agreed to the published version of the manuscript.

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## ETHICS APPROVAL

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## ABSTRACT

**Introduction:** Welding is a metallurgical process in which metal joints are applied in a liquefied and molten state. Strong exposure to light can cause eye fatigue since the cornea absorbs ultraviolet-B radiation. Therefore, this study aims to investigate the risk factors of ultraviolet-B radiation exposure towards eye fatigue symptoms from workers at PT. X Balikpapan

**Methods:** A descriptive-analytic method with a case-control approach was applied to select 66 workers as subjects. Furthermore, data were processed using SPSS (*Statistical Package for the Social Sciences*) and analyzed using chi-square and logistic regression.

**Result:** The result showed a significant relationship between age, years of work, duration of exposure, ultraviolet-B radiation, and use of personal protective equipment (PPE) with eye fatigue. The relationship factor of eye fatigue symptoms was age ( $p=0.021$ ), years of working ( $p=0.031$ ), duration of exposure ( $p=0.013$ ), Ultraviolet-B radiation ( $p=0.024$ ), use of PPE (personal protective equipment) glasses ( $p=0.0001$ ). In the multivariate analysis, no significant relationship was found between the independent and the dependent variables, but there was the highest OR value for the age of workers at 0.721 times.

**Conclusion:** Therefore, the company is supposed to implement radiation ultraviolet-B control in the working area following the Hierarchy of Control Principle.

**Keywords:** radiation, ultraviolet-B, eye fatigue, welding hazard

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## INTRODUCTION

Fatigue is a factor that hinders the proper functions of human nerves and muscles and is often experienced by workers with high physical work demands.<sup>1</sup> One of the occupations prone to fatigue is welders, constantly exposed to ultraviolet-B radiation with 280-315 nanometer wavelength.<sup>2</sup> A previous study found nearly 60% of the 520 welders experienced eye fatigue, such as watery eyes, blurred vision, and pain.<sup>3</sup> Therefore, this study aims to identify the impact and risk factors of welding rays, especially ultraviolet B, on eye fatigue complaints for welders at PT X Balikpapan, East Kalimantan.

## METHODS

This study used a descriptive-analytic and case-control approach where workers are grouped as follows (1) case group, workers who conduct welding directly, (2) control group, workers with indirect welding procedures. The population is PT X Balikpapan workers who worked in the workshop environment in 2022 for more than 3 months and fulfilled the inclusion

and exclusion criteria. The total sample used was 66 respondents selected using purposive sampling.

Primary data was obtained from questionnaires, while secondary data was derived from medical records and personnel information from Human Resource Development (HRD) PT X Balikpapan. Furthermore, the statistical tests used were the univariate, bivariate, and multivariate analyses in SPSS.<sup>4</sup> The independent variables tested included age, years of working duration of exposure, ultraviolet-B radiation, and compliance with eye PPE, while the dependent was complaints of eye fatigue.

## RESULTS

The results of the univariate analysis showed that 12.1% of respondents used glasses while others had normal vision. Radiation standards, according to the Minister of Manpower Regulation No. 5 of 2018 with indicators > NAB (Threshold Value), are experienced by 49 workers at 74.2%. The age of the respondents is quite young, with the number of workers under

30 years old at 51.5%. The average duration of exposure to light during the welding process is more than 4 hours experienced by 51.5%.

The bivariate analysis showed that workers' age as a risk factor  $\geq 1$  for eye fatigue complaints in welders aged more than 30 years was greater than in the younger group. This is indicated by the Odds Ratio (OR) value of 1.259, where workers aged 30 years have a 1.259 times greater risk of eye fatigue than the younger group. Years of working as a risk factor  $\geq 1$  for eye fatigue complaints in workers with more than five years of service are greater than those with lesser service. This is indicated by the Odds Ratio (OR) of 1.241 and the Confidence Interval (CI) of 95%, where workers with more than five years of service have a risk of eye fatigue 1.241 times.

The analysis results with the Chi-Square test have a  $p$ -value = 0.031, which proves a significant relationship between years of service and eye fatigue complaints. Ultraviolet-B radiation as a risk factor  $\geq 1$  for eye complaints in workers exposed to ultraviolet-B radiation  $\geq 3$  W/cm<sup>2</sup> was

**Table 1. Chi-square test distribution on the respondent at PT. X Balikpapan in 2022**

	Eye fatigue				Total	Percentage (%)	OR	95 % CI	
	≥ 1 complaint		< 1 complaint					Lower	Upper
	n	%	n	%					
Age (Year)									
≥ 30	32	48.5	0	0.0	32	48.5	1.259	1.061	1.494
< 30	27	40.9	7	10.6	34	51.5			
Total	59	89.4	7	10.6	66	100.0		<i>p</i> _Value = 0.021	
Years of service (Annual)									
≥ 5	30	45.5	0	0.0	30	45.5	1.241	1.057	1.457
< 5	29	43.9	7	10.6	36	54.5			
Total	59	89.4	7	10.6	66	100.0		<i>p</i> _Value = 0.031	
Exposure (Hours)									
≥ 4	34	51.5	0	0.0	34	51.5	1.280	1.066	1.538
< 4	25	37.9	7	10.6	32	48.5			
Total	59	89.4	7	10.6	66	100.0		<i>p</i> _Value = 0.013	
UVB rays (μW/cm <sup>2</sup> )									
≥ 3	47	71.2	2	3.0	49	74.2	9.792	1.688	56.805
< 3	12	18.2	5	7.6	17	25.8			
Total	59	89.4	7	10.6	66	100.0		<i>p</i> _Value = 0.014	
PPE for eye									
Poor	49	74.2	0	0.0	49	74.2	1.700	1.142	92.530
Good	10	15.2	7	10.6	17	25.8			
Total	59	89.4	7	10.6	66	100.0		<i>p</i> _Value = 0.000	

**Table 2. Distribution of Logistics Binary Regression Test for PT X Balikpapan workers respondents in 2022**

Variable	B	OR	95 % CI		P_Value
			Lower	Upper	
Age (Year)	- 0.328	0.721	0.000		1.000
Years of service	- 14.945	0.000	0.000		1.000
Exposure	- 2.124	0.120	0.000		1.000
UVB rays	- 1.427	0.240	0.027	2.116	0.199
PPE for eye	- 19.225	0.000	0.000		0.997

greater than in those exposed to less UVB. The Chi-square test results have a *p*-value = 0.014, indicating a significant relationship between ultraviolet-B radiation and complaints of eye fatigue.

Additionally, there is a relationship between the use of PPE and eye fatigue complaints. The analysis results using the Chi-square test have a *p*-value = 0.0001, indicating a significant relationship between PPE usage and eye fatigue complaints, as seen in **Table 1** below.

The results of the multivariate analysis of 5 independent variables indicate no significant relationship among the dependent variables. However, the age of workers has the highest OR value of 0,821, meaning that almost half of the respondents with age ≥ 30 years old experienced eye fatigue complaints, as seen in **Table 2** below.

## DISCUSSION

The results indicate that age affects the eye fatigue of workers since the two

variables are directly proportional. Based on the questionnaire, worker age affects eye fatigue complaints with a *p*-value < 0.05; workers aged ≥ 30 years experienced complaints in 32 people at 48.5%, while those aged < 30 years were 27 at 40.9%. The increase in age can trigger a decrease in sensitivity and fragility of the cornea obtained from mechanical stimulation.<sup>5</sup> Furthermore, the working period affected the eye fatigue of workers, with a *p*-value < 0,05 since the two variables are directly related. The working period is defined as the length of time a worker works in a place and is directly proportional to the level of fatigue.<sup>5</sup>

The length of exposure to the welding tools affected workers' eye fatigue with a *p*-value < 0.05, with the duration of exposure ≥ 4 hours among 34 people at 51.5%, while the duration < 4 hours affected 25 at 37.9%. The longer the exposure to ultraviolet-B radiation, the greater the risk of experiencing eye fatigue. According to radiologists, the longer they were exposed

to radiation in one day, the higher the number of complaints of fatigue.<sup>6</sup> The results of other studies also explain that more than 2 hours of continuous welding is risky and impacts eye health.<sup>7</sup> Lastly, using eye PPE affects workers' eye fatigue, *p*-value < 0.05 with the use of poor eye PPE in 49 people at 74.2%, while proper users in 10 people at 15.2%. A study in Central Cilacap showed a relationship between using PPE and complaints of eye fatigue in workers.<sup>8</sup>

## CONCLUSION

In conclusion, there is a relationship between age, years of service, length of work, ultraviolet-B radiation, and the use of eye PPE on complaints of eye fatigue. The data analysis shows the risk factors for each variable as follows, age value (*p*=0.021), years of service (*p*=0.031), length of exposure (*p*=0.013), Ultraviolet-B radiation (*p*=0.024), use of eye PPE (*p* = 0.0001). However, there are limitations in this research, which are: a potential bias in getting the exact measurement for the intensity of UVB radiation to workers, and the MCU data does not address the impact of UVB radiation on workers. Therefore, K3 officers are expected to explain the workplace hazards, especially the dangers of ultraviolet-B radiation, considering the impact of eye fatigue on the health of welders.

## DISCLOSURE

The author reports no conflicts of interest in this work.

## ETHICS APPROVAL

The Ethics Committee of Public Health Faculty, Hasanuddin University, has established approval for this research with number: 9083/UN4.14.1/TP.01.02/2022, 8 August 2022

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## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article

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## ABSTRACT

This study aims to determine maternal health behavior during pregnancy that affects the incidence of Low Birth Weight (LBW) in Bontang City. This study uses a qualitative research method with a case study approach. This study also uses source triangulation techniques to explore the truth of certain information. Data collection in this study was carried out in the working area of the Bontang Utara 1 Health Center, Bontang City, involving 7 informants consisting of 3 main informants, 3 key informants, and 1 supporting informant. The study found that changes in maternal behavior during pregnancy were related to health behavior and dietary restrictions that mothers consumed.

**Keywords:** Behavior; dietary restrictions; pregnant women; Health; baby; Nutrition.

## INTRODUCTION

One of the health problems in infants that is a concern in many countries is LBW (Low Birth Weight). Babies born less than 2500 grams, including LBW.<sup>1</sup> LBW is still a health problem that often occurs in developing countries; LBW will have short-term and long-term effects on public health. LBW also contributes to a high mortality rate because LBW is very risky for babies who are susceptible to disease, prone to malfunction of vital organs and even the risk of death, so very intensive medical care is needed in various health care centers.<sup>1</sup> (Hadi et al., 2019) According to data from the World Health Organization, 2.7 million newborns out of 20 million live births worldwide each year are estimated to die, of which 15-20% are estimated to be low birth weight (LBW) infants. LBW newborns are 6.5 times more likely to die than babies with normal weight.<sup>2</sup> (Carolin Bunga Tiara, 2019), which means at least 3 million low birth weight (LBW) babies are born yearly. The prevalence of low birth weight (LBW) infant prevalence varies greatly between regions and countries. However, most LBW cases occur in low- to middle-income countries, which are the most vulnerable population to health problems. Regional estimates of low birth weight (LBW) in 2015 were highest in South Asia (28%), followed by sub-Saharan Africa at

13% and Latin America at 9%. The Asia Pacific region (6%) had the lowest number of infants with low birth weight (LBW). (World Health Organization<sup>3</sup> (WHO), 2018).

Based on the results of the 2018 Basic Health Research (RISKESDAS), the proportion of babies with birth weight <2500 grams (LBW) in all provinces in Indonesia is 6.2%.<sup>4</sup> This percentage is the average result of all LBW cases that occur in Indonesia. So far, the number of LBW has decreased by 2.9% compared to the previous year. Data shows that from 2012 to 2019, there was a decline of between 20 million and 14 million LBW babies.<sup>5</sup> (Aceh Health Office, 2019). Reducing the number of LBW has become a global priority, as stated in the Sustainable Development Goals (SDGs). In 2025, efforts aim to reduce the number of LBW by 30%.<sup>6</sup> (WHO, 2014).

Based on data from the Province of East Kalimantan, there were 60,439 babies born and 3,144 experienced LBW. (Central Bureau of Statistics, nd) In 2020. And according to the Bontang City Health Office, the data recorded until December 2021 was 319 babies with low birth weight. Bontang City is one of the cities with the highest per capita income in East Kalimantan. Although it only has three sub-districts, a city with a population of more than 170,000 and is considered a small town, it still has

high health problems, one of which is LBW, and why is Bontang City, which researchers will take into consideration here from other cities because Bontang City has become a city. Child-friendly that complements the child rights-based development system by integrating the commitment of all stakeholders. Based on data from the Province of East Kalimantan in 2019, Bontang was in the 3rd position with 8.9% of LBW cases, the highest in East Kalimantan. The first position is West Kutai, with 10.3% of LBW cases; the second is Mahakam Ulu, with 9.7% of LBW cases in 2019.<sup>7</sup> (Kaltim, 2020)

The state of the living environment is very influential on children's health, especially in the family environment. Mothers in the family must play a very important and quite important role in influencing the health of children from the womb from birth to adulthood. Several economic and demographic studies show that the determinants of child health are positively correlated with the status of parents, especially mothers. Indeed, mothers are the primary regulators of family health, nutrition and well-being. Many factors can increase the risk of a baby being born with low birth weight. This risk is closely related to the mother's condition during pregnancy, one of which is related to the mother's nutritional status. The nutritional status of pregnant women before and after pregnancy can describe

the availability of nutrients in the mother's body to support fetal development. Maternal nutrition is a factor that greatly determines the sustainability of the nutritional status of the fetus in the womb and determines the growth and development of children from birth to adulthood. Determine the continuity of the nutritional status of the fetus in the womb and determine the growth and development of the baby from birth to adulthood. Based on the results of previous research is the presence of food consumed by pregnant women, especially to get energy from carbohydrates and protein. And from the results of interviews with informants, it was found that knowledge about eating habits is one of the reasons why all food-related informants provide energy and protein that is quite good.

The research results at the Public Health Center of the Public Health Service were the frequency of feeding and portion size of pregnant women to examine aspects of remodeling behavior. Perceived aspects are knowledge of appropriate food frequency, portion sizes, attitudes, and beliefs in food frequency and portion sizes. Knowledge of a good frequency and ratio for pregnant women is needed for the main role so that the data obtained from key informants can be compared with data obtained from additional informants.<sup>8</sup>

## METHOD

This study uses a qualitative research method with a case study approach. Qualitative research is an approach to finding and understanding events/phenomena. To understand these symptoms, researchers interviewed informants by asking general and more general questions. The information submitted by the complainant is collected. Information is usually in the form of words or text. The data in the form of words or text are then analyzed. The analysis results can be in descriptions or descriptions/topics. The final results of qualitative research are stated as a written report.

## RESULTS

This research was conducted in Bontang City, East Kalimantan and carried out from the beginning of June to the end of June

2022. The location of this research is in the working area of the Puskesmas Bontang Utara 1. Data was collected through in-depth interviews with key informants, key informants and supporting informants included in the research criteria. There were 7 informants in this study, namely 3 main informants consisting of mothers who have LBW children in the Bontang Utara health center area, 3 key informants consisting of parents or in-laws of the main informant, and 1 supporting informant consisting of posyandu cadres which are in the North Bontang area.

Based on the information that has been obtained from the main informant, it is found that the health behavior of the mother during pregnancy that affects the attitude towards health pays attention to the health needs in the body, so the health behavior here is that the informant feels that his appetite is lacking so he has problems with his daily eating patterns. As information obtained from informants is as follows: *"...when I was pregnant.... I didn't eat too much, so maybe I just wanted to eat what I wanted... what I liked..." (smile) (JP June 23, 2022).*

The informants in this study were on the mother's behavior during pregnancy. Based on the information obtained from the results of in-depth interviews with key informants, it was found that the information obtained from key informants stated that key informants were monitors for key informants in maintaining eating behavior during pregnancy. As the information obtained is as follows: *"...I don't want to,...because I always feel nauseous during pregnancy, so her diet is also lacking. She also sometimes wants elementary school snacks because it's close to home, so she likes the food that children eat, so her eating pattern is not regular.." (MU 15 July 2022).*

Maternal dietary restrictions during pregnancy in this study. Based on the information that has been obtained from the main informants in the results of in-depth interviews that the taboos they get are regarding various kinds of foods such as fruits (jackfruit, pineapple, durian) in vegetables (moringa leaf vegetables, banana heart), foods that are consumed fermented (tape) and seafood of choice. As information obtained from informants

is as follows: *"...ehh.. as far as I know, it is a fermented food, ehh.. durian is a kind of sharp food that tastes the same as seafood because Bontang's seafood contains a lot of mercury..."(thinking and smiling) ( PL 15 July 2022).*

## DISCUSSION

Based on the interview draft that the researcher has made based on in-depth interviews with the main, key and supporting informants, the authors can analyze the eating behavior as well as the attitudes and taboos that the mother received during pregnancy. Covering several themes, namely:

The first theme is the mother's knowledge about low birth weight; from the three informants obtained health behavior about mother's knowledge about low birth weight from three informants, there are two informants, namely PL and JP, who know and understand directly. In contrast, NS informants have only heard about weight. Babies are born low so that the informant knows the information after the child is born. After the researchers analyzed, it was found that the informants in the North Bontang Puskesmas area still did not understand about low birth weight due to the low level of education of the informants and the age factor. Hence, the informants only found out after the informant had a baby with a low birth weight.

The second theme of dietary restrictions that are prohibited for consumption by mothers during pregnancy; the seven informants obtained dietary restrictions that mothers get from the interviews are foods that are prohibited from consumed by the main informants, such as pineapple, jackfruit, durian, moringa leaf vegetables, banana heart, tape, seafood, junk food, fermented food, sweet food and undercooked food. This was confirmed by a key informant regarding taboos in the mother's pregnancy process. After the researchers analyzed that in the community in the North Bontang Health Center area, they still believed in taboos/myths about the content of foods that were considered unsafe for consumption by pregnant women, and from these foods, there were still fears that there were some symptoms that would cause problems for

the health of the mother and the baby. These foods should be avoided during pregnancy, and these taboos have also become a top priority for the mother, so they should be avoided during pregnancy. But the food also does not mean it should not be eaten/prohibited and must be in accordance with the required capacity.

The third theme is the change in diet and food portions of pregnant women during pregnancy from the third informants, namely PL, JP, and NS informants who felt changes in eating patterns and food portions; two informants felt their eating patterns and food portions changed because PL and JP informants felt nausea/cravings so that their eating patterns and the portion of the informant's meal was disturbed. After the researchers analyzed, it was found that eating patterns and eating portions could increase or decrease when a mother experiences a period of cravings, so it is necessary to maintain conditions during pregnancy that will cause various factors that can change the behavior of a prospective mother who has a period of change in their attitude that arises here. There is a role in importance of nutritional intake that goes to the mother to help the baby's growth and development; with the role of the family and the environment, the mother can change behavior that can be a risk in providing nutrition to their prospective baby.

The fourth theme is that nutrition that enters the body of pregnant women can affect the weight of the fetus; from the three informants that the intake of nutrients that enter the body must be fulfilled because it can affect the condition of the baby's weight if the nutritional intake is not met, the child's weight will be less. After the researchers analyzed, it was found that the informants felt that nutritional intake in early pregnancy should be an important benchmark for their pregnancy because they choose foods with nutritional values that can meet the development of balanced nutrition and are good for the mother's body and the fetus. Then the nutritional intake is fulfilled can also improve the conditions that cause the baby to experience low body weight.

The fifth theme, namely paying attention to weight gain during pregnancy, the three informants argued that paying

attention to weight gain was because the informant wanted to know the development of the fetus, so the informant always paid attention. Still, the NS informant felt his pregnancy weight did not increase as usual. Therefore it might be a lack of weight conditions in the fetus in the womb. After the researchers analyzed, it was found that the informants felt that their weight had not increased like the first pregnancy, so the researchers felt that there was a problem with the condition that the mother got so that from this condition it was certain that their fetus had less development in terms of weight, maybe in this condition because the mother had problems. Health and prioritize protein over carbohydrates so babies can lack nutritional intake from the staple foods that the mother consumes and factors in the mother's diet.

According to the informant, the sixth theme that causes babies to be born with low weight is the main cause of babies being born with low weight because it comes from the mother's health condition and the mother's diet, which is the body's criteria. And fetal intake and this can lead to the birth of their babies with low birth weight. And according to the informant, the OT felt nausea/vomiting for up to 6 months and became a risk several times being hospitalized because of this condition. After the researchers analyzed, it was found that the informant felt that the cause of the baby being conceived had low weight due to factors from the health of the mother, who had health problems such as high blood sugar, other health problems and the lack of nutritional intake and the attitude that the mother did to maintain health so that their babies do not have low body weight and from that health problem the informants feel that their behavior changes according to the condition of the body they feel.

Based on the overall theme, all of the informants got the results of in-depth interviews regarding eating behavior and dietary restrictions during pregnancy which became the benchmark for the behavior of the informants, and the behavior here can lead to the occurrence of factors that cause their babies to experience underweight during pregnancy is not complying with the pattern. Eat

well, pay less attention to meal portions and taboos in fulfilling healthy nutrition from nutritious food. And as a researcher, he provides information to the people of the city of Bontang to always pay attention to the health conditions and behavior of prospective, pregnant women to always be faithful in preventing the occurrence of LBW. And for parents and prospective grandmothers in the community to always maintain healthy living behaviors and take care of every behavior of their children to become a source of reducing the LBW rate in the Bontang City area.

## CONCLUSIONS

Overall, it appears that the mother's educational level affects the occurrence of low birth weight through their health behavior, like consuming unhealthy or inappropriate foods during pregnancy. Therefore, socializing healthy foods for pregnant women and improving their knowledge about pregnancy is mandatory to prevent low birth weight among high-risk communities.

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## DISCLOSURE

The author reports no conflicts of interest in this work.

## ETHICS APPROVAL

This study has been ethically approved by the Ethics Commission of Muhammadiyah University of East Kalimantan.

## FUNDING

The researcher bore all costs required in this study.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article

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## ABSTRACT

**Introduction:** The National Health System is the form and method of administering health development which is an effort to increase awareness, willingness and ability of each person to behave in a healthy life in order to achieve the highest level of health. In order to make it happen public awareness to improve health status, provider Health services are required to always provide services that best for patients.

**Methods:** This research was classified as a type of quantitative research with a Cross Sectional design. The data were obtained using questionnaires. The population in this study was 1,428 patients with a sample of 312 respondents who were collected using the Accidental Sampling technique. The test in this study used the Chi Square test.

**Results:** The result of the Chi Square statistical test in the form of a p-value = 0.047 with a significant level (< 0.05) could infer that there was a relationship between the quality of health services and the interest in revisits of patients at the Lempake Public Health Center, Samarinda.

**Conclusion:** Based on the frequency distribution of the quality of health services at the Puskesmas Lempake as many as 312 respondents studied, namely there are 208 respondents with the good category the percentage is higher, namely 66.7% and 104 respondents in the unfavorable category with a percentage of 33.4%.

**Keywords:** Quality of Health Service, Revisit Interest, Public Health Center.

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## INTRODUCTION

The National Health System is a form and technique of implementing health development which is an effort to increase a person's willingness, awareness, and ability to live a healthy life to achieve maximum health status<sup>1</sup>. Health services are one of the most important public services and must be established excellently. To provide excellent health services, it is necessary to comply with five quality aspects: responsiveness, reliability, physical evidence, assurance, and empathy<sup>2</sup>.

Puskesmas is one of the health service providers which plays an important role in providing health services to the community. Puskesmas is a health service organization that prioritizes public and individual health efforts, focusing on prevention and promotion to achieve the maximum degree of public health in its service area<sup>3</sup>. From data on patient visits at the Lempake Samarinda Health Center in 2019, there were 40,224 patient visits at the Lempake Health Center, while in 2020, there were 17,510 patient visits, and in 2021 there were only 17,137 patient visits.

These data indicate decreased patient visits to the Lempake Health Center during the last three years.

According to the description above, the conclusion is that this study is to find out the interest in patient repeat visits to the Puskesmas because, at this time, the patient's return visits to the Puskesmas have decreased due to the emergence of the Covid-19 virus which makes people afraid to use health facilities. Thus, researchers are interested in raising the title of Relationship of Health Service Quality to Patient Revisit Interests at the Lempake Samarinda Health Center.

## METHODS

Quantitative methods are used in this study with a research design *cross sectional*. The population of this study is all patients who visit the Lempake Samarinda Health Center per month in January-December 2021; then the average value is taken to 1,428 patients with a total of 312 samples. The sampling method of this study is *Accidental Sampling*. The instrument in this study is a questionnaire. *Chi-Square*

*Test* used in this research.

## RESULT AND DISCUSSION

### Univariate Analysis

#### Age and Gender

Based on **Table 1** states that the highest age category of respondents is 26-45 years, which is 169 (54.2%) respondents. Most showed that out of a total of 312 respondents, 237 (76%) female patients were more than 75 male (24%).

#### Work

**Table 2** shows that the number of respondents with the highest patient occupation is housewife at 131 (42.0%).

#### Quality of health services, and interest in repeat visits

**Table 3** shows that the percentage of respondents in the good category is 208 (66.7%), compared to 104 (33.4%). The percentage of respondents who chose the category of interest was 260 (83.3%), while the percentage of respondents who chose the category of not interested was 52 (16.7%).

**Table 1. Frequency Distribution of Respondents by Age**

Characteristics	Frequency	Percentage (%)
Age		
18-25	42	13.5%
26-45	169	54.2%
46-60	101	32.4%
Gender		
Man	237	76%
Woman	75	24%
Total	312	100

Source: Primary Data

**Table 2. Frequency Distribution of Respondents by Profession**

No.	Work	Frequency	Percentage (%)
1.	Housewife	131	42.0%
2.	Private sector employee	68	21.8%
3.	Self-employed	28	9.0%
4.	civil servant	38	12.2%
5.	Trader	15	4.8%
6.	Farmer	3	1.0%
7.	Student	17	5.4%
8.	Teacher	12	3.8%
	<b>Total</b>	<b>312</b>	<b>100</b>

Source: Primary Data

**Table 3. Frequency Distribution of Respondents Based on Measured Variables**

Variable	Frequency	Percentage (%)
Quality of Health Services		
Well	208	66.7
Not good	104	33.3
Revisit Interest		
Interested	260	83.3
Not interested	52	16.7
Total	312	100

Source: Primary Data

**Table 4. The Relationship between Health Service Quality and Interest in Visits Patient Repeat**

Quality of Health Services	Revisit Interest			P-value
	Interested	Not Interested	Total	
Well	180 86.5 %	28 13.5 %	208 100%	0.047
Not good	80 7 6.9 %	24 2 3.1 %	104 100%	
<b>Total</b>	<b>260</b> <b>83.3 %</b>	<b>5 2</b> <b>16.7 %</b>	<b>312</b> <b>100%</b>	

Source: Primary Data

## Bivariate Analysis

Table 4 shows that obtained from the results of the association between the quality of health services (*responsiveness*) to the interest in patient repeat visits. It shows that the number of respondents as many as 208 respondents chose the good category, as many as 180 (86.5%) were said to be interested and 28 patients chose the 'good but not interested' category. In contrast, 80 (76.9%) of the 104 patients who chose the response in the 'not good enough' category were considered interested; and 24 (23.1%) chose the 'not good and disinterested' category. The statistical test of the *Chi-Square test* resulted in a p-value of 0.047. These results show that the p-value (<0.05), thus rejecting H<sub>0</sub>, shows no correlation between the quality of health services and the patient's interest in returning to the Lempake Health Center, Samarinda.

Where the quality of service quality is a combination of various different properties and characteristics of a product or service that may suit individual needs<sup>4</sup>. In the results of the study, some patients chose the good category but were not interested (13.5%), based on the results of interviews with several respondents stated that the reason for assessing the quality of Puskesmas services was good but not interested in revisiting is because the distance between the house and the Lempake Health Center was far so they prefer alternative treatment in independent practice in the area closest to the respondent's residence.

This is in line with another study which revealed that service quality regarding responsiveness (77.8%) of those who rated the level of service and responsiveness as very good were more likely to return than those who did not (46.7%)<sup>5</sup>. If the responsiveness service is provided with an in-depth, detailed, directive, and convincing explanations, and if the service understands the information, then the service is considered successful and the individual receiving the service is satisfied. Each individual has a varied background, so the assessment of the level of satisfaction is different for each individual<sup>6</sup>.

This is in line with the research of Haeruddin and Alwi Khidri (2021), who said that the greater the quality of

service, the greater the satisfaction and patient's decision to use and return to the health facility<sup>7</sup>. Based on the results of the processed data, the quality of service (*responsiveness*) significantly positively affects the return of inpatients through patient satisfaction.

## CONCLUSIONS

Based on the results of the frequency distribution of the quality of health services at the Lempake Health Center at a p-value of 0.047 (<0.05) from the Chi-Square test to see the correlation between the quality of health services and the interest in repeat visits of patients at the Lempake Samarinda Health Center, it is known that there is a relationship between the two.

## DISCLOSURE

The author reports no conflicts of interest regarding this article.

## ETHICS APPROVAL

This study had been ethically approved by the ethics committee of Universitas Muhammadiyah Kalimantan Timur.

## FUNDING

The researcher bore all costs required in this study.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article

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## ABSTRACT

**Introduction:** Knowledge of COVID-19 health protocols has an important role in COVID-19 prevention behaviors. This study aimed to determine the effect of health promotion in improving knowledge of COVID-19 health protocols.

**Methods:** This study was a quasi-experimental design with one group pre-posttest. The respondents in this study were 120 people in Pasanggrahan village, West Java who participated in health promotion. The dependent variable was knowledge of COVID-19 health protocols and the independent variable was health promotion. The data were collected by questionnaire. Paired t-test was used to analyze the data.

**Results:** The average age of respondents was 45 years old, most of the respondents was woman (90%), had a high level of education (59,2%), not working (61,7%), multipara (85,8%). Majority of the respondents has no history of COVID-19 (76%) and respondents who had second COVID-19 vaccination was 96,3%. The mean score of COVID-19 health protocols knowledge was higher after health promotion (Mean=8,1; SD=0,89) than before health promotion (Mean=4,1; SD=1,76) and it was statistically significant ( $p < 0,05$ ).

**Conclusion:** COVID-19 health protocols promotion has improved knowledge of COVID-19 health protocols among people in Pasanggrahan village, West Java. Continuous health promotion is needed to improve knowledge, attitude, and compliance with COVID-19 health protocols.

**Keywords:** effectiveness, health promotion, COVID-19, health protocols, knowledge.

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## INTRODUCTION

Recently, there has been a significant threat to public health due to the emergence of the COVID-19 pandemic. Based on a survey by National Disaster Management Agency, nationally, the level of respondents' compliance with health protocols is generally quite good.<sup>1</sup> However, there are still people whose compliance level is still low in implementing health protocols, such as wearing masks (58.7%), washing hands (56.7%), maintaining distance, and avoiding crowds (54.4%), and reducing mobility (54.1%). There are several reasons why people violate health protocols, such as being saturated with the pandemic, feeling uncomfortable, thinking the situation is safe, and feeling confident that they are not infected.<sup>2</sup>

Protective measures are important to overcome and control the spread of the COVID-19 pandemic. Adherence to preventive and control measures are affected by the HWS' knowledge, awareness.<sup>3</sup> As such, the increased knowledge will influence the attitude

and practice toward COVID-19.<sup>4</sup> A global public health campaign strategy to increase knowledge should be conducted to help in controlling the spread of the disease.<sup>5</sup> One of the efforts to improve community compliance, based on the Ministry of Health of the Republic of Indonesia, is by building communication through a campaign on the importance of implementing the 5M health protocols.<sup>6,7</sup> Health promotion can contribute to addressing the CoV-2 virus through behaviour change and disease management, interventions affecting organizations and communities and informing policies affecting the population.<sup>8</sup>

Pasanggrahan Village is in the Solear District, West Java, Indonesia. The residential conditions in Pasanggrahan Village are quite dense, with unhealthy environmental conditions. Based on observations at Pasanggrahan Village, it was found that there are still many people who have not complied with health protocols such as washing

hands, wearing masks, and maintaining distance. This is due to the lack of public knowledge and awareness regarding the importance of implementing the 5M health protocol during the COVID-19 pandemic. Therefore, efforts are needed to provide communication, information, and education about the benefits of implementing COVID-19 health protocols. This study was to determine the effect of health promotion in improving knowledge of COVID-19 health protocols.

## RESEARCH QUESTION

Can health promotion improve knowledge of COVID-19 health protocols in Pasanggrahan village, West Java?

## METHOD

This study was a quasi-experimental design with one group pre-posttest in 2022. The population in this study were people in Pasanggrahan village, West Java. The sample were 120 persons who participated in health promotion and it selected by

consecutive sampling. The dependent variable was knowledge of COVID-19 health protocols and the independent variable was health promotion. Data were collected by questionnaire and analyzed using the paired-t test.

## RESULTS

The average age of respondents was 45 years old; most of the respondents were women (90%), had a high level of education (59,2%), were not working (61,7%), and multipara (85,8%). Majority of the respondents has no history of COVID-19 (76%) and respondents who had second COVID-19 vaccination was 96,3%.

Knowledge of COVID-19 health protocols in this study includes questions about the definition of COVID-19 health protocols 5M, indicators of COVID-19 health protocols 5M, benefits of practicing COVID-19 health protocols, type of masks, how to use masks properly, how to wash hand using soap, and benefits of COVID-19 vaccination.

Overall, there was an improvement of respondent's average total score of COVID-19 health protocols knowledge after health promotion. The average total score of COVID-19 health protocols knowledge before health promotion was 4,1 (SD= 1.76) and the average total score after health promotion was 8,1 (SD= 0.89). It showed in [Table 1](#). Based on paired t-test, there was a difference in the respondent's average total score of COVID-19 health promotion knowledge before and after health promotion and it was statistically significant ( $p < 0,05$ ).

## DISCUSSION

One of the efforts that can be done to improve health knowledge, attitudes, and behaviors is communication, information, and education about health.<sup>9</sup> Health education is an effort or activity to create community behavior conducive to health.<sup>10</sup> Respondents in this study had an improvement in COVID-19 health protocol knowledge after health promotion. It can be explained that information provided in the health promotion received well by respondents and it was effective.

Study by Kanligi et al., (2022) found that

**Table 1. COVID-19 health protocols knowledge before and after health promotion.**

COVID-19 health protocols knowledge	Mean	SD	Z	p
Before health promotion	4,1	1,76	-4,48	0,00
After health promotion	8,1	0,89		

knowledge of COVID-19 health protocols was predicted by source of information.<sup>11</sup>

The more information people get about COVID-19 health protocols, the higher their knowledge about COVID-19 health protocols. Study by Setyaningrum et al., (2022) showed that there was an increase in respondents' knowledge about COVID-19 health protocols after health promotion.<sup>12</sup> Meanwhile, another study showed an increase in respondents' knowledge about COVID-19 health protocol after health education is carried out.<sup>13</sup> Study by Sambo et al., (2021) also showed an increase in respondents' knowledge about the benefits of COVID-19 health protocol after health promotion.<sup>14</sup>

## CONCLUSIONS

COVID-19 health protocols promotion has improved knowledge of COVID-19 health protocols among people in Pasanggrahan village, West Java. Continuous health promotion is needed to improve knowledge, attitude, and compliance with COVID-19 health protocols.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

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## ETHICS

This research has passed the ethics review from the University of Esa Unggul

## AUTHOR CONTRIBUTIONS

ISM: responsible for data analysis and manuscripts; Z: responsible for data analysis; PH: responsible for data analysis; EP: responsible for data collection

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# Analysis of Factors Related to Husband's Participation to Become a KB Acceptor in Unaaha District, Konawe Regency in 2022: Literature Review

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## ABSTRACT

**Introduction:** Globally, the prevalence of male participation as family planning acceptors varies in different countries. Indonesia's prevalence of active family planning participants is 23,606,218 acceptors with various contraceptive methods. Implant Acceptors were Male Surgical Methods (MOP) were 124,262 (0.53%), Injections amounted to 14,817,663 (62.77%), Condoms amounted to 288,388 (1.22%) and Pills 4,069,844 (17.24%) of the total acceptors of family planning users. Men's participation in using family planning is low at 1.75%. There are many factors that men will choose or not to use male contraception. For example, knowledge, social, cultural, and socio-economic factors influence attitudes of other things.

**Methods:** This literature review was based on issues, methodologies, similarities and further research proposals. Of the 15 studies used, 10 of them used quantitative research methods.

**Results:** Based on 15 studies, men with good knowledge are willing to become family planning acceptors. Attitude factors affect the participation of men in using contraception. Good communication strategies and correct information will help the participation of fertile-age couples in using contraception.

**Conclusion:** The conclusion of this literature review was family planning acceptors can be influenced by knowledge, attitudes, wife's support, and sources of information.

**Keywords:** *Husband's Participation, Male contraception, Family Planning.*

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## INTRODUCTION

Indonesia is a developing country with high population growth. The number of people who increase every year can affect the welfare of the people. This condition makes the government make more efforts to suppress the population growth rate through the National Family Planning Population Agency (BKKBN) so that there will not be a large population explosion in the future, which will affect the threat of poverty and hunger.<sup>1</sup> The BKKBN aims to create quality families through promotion, protection, and assistance in realizing reproductive rights through contraceptives.<sup>2</sup> KB (Family Planning) information, education about contraceptives, planning a healthy pregnancy, and the right time to stop having children with risks that can endanger the mother's and child's health.<sup>2</sup>

In Indonesia, the prevalence of active family planning participants is 23,606,218, with the use of contraceptives still low in

men, even less than 3%, with the Male Operation Method (MOP) amounting to 124,262 (0.53%), Condoms amounting to 288,388 (1.22%).<sup>3</sup> Many factors cause men not to use contraceptives, including the influence of knowledge, attitudes, social, culture, socioeconomic, distance to health facilities, family support, limited information and availability of family planning services for men.<sup>4</sup>

Men's participation in using family planning can play a role in reducing the risk of morbidity in women because of the side effects of using family planning. It also reduces the risk of breast cancer, hypertension and type 2 diabetes mellitus due to prolonged use of contraceptives.<sup>5</sup> The government's efforts to overcome the population growth and development rate have been carried out through long-term contraceptive methods (MKJP). Because the side effects of MKJP are rated for less and higher effectiveness than non-MKJP, this method still provides a gap in the

use of contraceptives between men and women.<sup>6</sup>

This literature review aims to analyze the factors related to the husband's participation as a family planning acceptor and to assess what factors are the most dominant in influencing the husband's participation in contraceptives.

## METHOD

This study uses a literature review method in the form of a narrative review which examines factors related to the husband's participation as a family planning acceptor. Reference data in this literature review was obtained through PubMed and Google Scholar searches with the keywords "Man participation as a family planning acceptor, male contraceptives, knowledge on the use of male contraceptives, Factors influencing husband participation in contraception, male contraceptives, use of male contraceptives, number of contraceptive use in men."

## RESULTS AND DISCUSSION

### The Relationship of Knowledge to Men's Participation in Using Contraceptive Devices

Knowledge can make someone aware so that someone will behave according to their knowledge, before someone behaves in a new way. In the person, there will be a sequential process starting from the awareness that makes him interested so that he can weigh well and start trying behavior or actions that are in accordance with his knowledge.<sup>7</sup>

The higher one's knowledge level about contraceptives, the greater the role in making decisions. This is in line with Irham & Haifa's research, where a good level of knowledge affects the use of contraceptives in men, and someone with a low level of education cannot participate in the use of contraceptives.<sup>4</sup>

### Relationship Attitude towards Men's Participation in Using Contraceptive Devices

Knowledge is the first step towards behavior/attitude change, with knowledge about contraception ultimately bringing about positive behavior change. A good attitude obtained from knowledge can affect men's participation in the use of contraception.

Based on the results of a study in India, men are not good at using contraceptives because they do not know about family planning or other things. After all, the use of contraceptives in men can interfere with pleasure in sexual intercourse. However, one-third of men in India favor contraceptive use and think contraception is not just a woman's business.<sup>8</sup>

Research by Aida shows there is a relationship between attitudes and husbands' participation in family planning programs. Attitude is one of the important factors shaping behavior. Husbands with positive perceptions of contraception will participate more in using contraceptives than husbands with negative perceptions. Attitude clearly shows the connotation of a suitable reaction to the stimulus; with a positive attitude, there will be positive actions toward the benefits of family planning, and the attitude to family planning will increase.<sup>9</sup>

### Relationship source of information to Men's Participation in Using Contraceptives

In improving the quality of the family. Husbands are expected to participate in using contraceptives. In this condition, a communication strategy is needed as a source of information to increase the husband's participation in using male contraceptives. This strategy is carried out for systematic planning in order to change the knowledge, attitudes and behavior of a person or audience who is the target of communication. Socialization / providing education can provide knowledge and understanding of the importance of contraceptives, especially in men's contraceptive use.<sup>10</sup>

Based on the results of a study in Pakistan, husbands who get information from healthcare workers have a higher tendency to use contraceptive methods.<sup>11</sup>

### Relationship of family support to Men's Participation in Using Contraceptives

A wife's support is a form of help or support from the family in the form of attention, appreciation, and love that can strengthen the husband. The wife's support for her husband is expected to provide input that the perception of family planning problems is not only a matter of women's affairs but is a shared responsibility.<sup>12</sup>

Based on the research results that analyze the factors that influence men in using family planning, wife/family support is one of the factors forming the reinforcing variable, with the description of wife's support being one of the determining factors for men's participation as family planning acceptors.<sup>13</sup>

## CONCLUSION

The results of the 15 journals contained in this literature review, there are 11 national journals and 4 international journals that show factors related to the husband's participation as family planning acceptors, including knowledge, attitudes, sources of information and family support, but the dominant factors that most influence the husband's participation in family planning. Contraception usage is also affected by the knowledge and attitude of the related population.

## CONFLICT OF INTEREST

No conflict of interest.

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## ETHICS

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## ABSTRACT

**Background:** Mother safety and security during the pregnancy and labor are very important. For some regions that may be far from expert helpers, finding accurate labor helpers may encounter many challenges.

**Objective:** This analytical literature research formulated better strategies to find labor service recommendations for coastal community people.

**Research Methods:** The researcher applied an analytical literature review research to formulate better strategies to find labor service recommendations for coastal community people.

**Results:** the researcher formulated a maternal care framework to provide intervention for coastal community people to seek accurate and appropriate labor services.

**Conclusion:** The proposed strategy in this research is better promoted by the husbands because they are responsible for their wives.

**Keywords:** labor service, coastal area.

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## INTRODUCTION

Mother safety and security during the pregnancy and labor periods are very important. The latest census promoted by the Central Bureau of Statistics found a high rate of labor mortality rate in 2015, 305 for each 100.000 live birth.<sup>1</sup> The Ministry of Woman Empowerment and Child Protection explains that the predictors of the high-labor mortality rate include younger-aged marriage, health access, health facility, culture, and knowledge.<sup>1</sup> The other influential factors in the high-labor mortality rate are the capability and skill of the labor helpers.<sup>2</sup>

For some regions that may be far from expert helpers, finding accurate labor helpers may encounter many challenges. Coastal community prefer to visit midwives, *dukun beranak*, instead of obstetricians or healthcare facilities.<sup>3,4</sup> This research reviewed the study by Sukirno et al. (2017).<sup>3</sup> The reviewing results of the study were useful as the scaffolding to formulate better strategies to find labor service recommendations for coastal community people.

## METHOD

The researcher applied an analytical literature review research to formulate

better strategies to find labor service recommendations for coastal community people. Sangar et al. (2014) recommend the implementation of an analytical literature review to determine related elements of the investigated research variables and elements.<sup>5</sup> In this research, the researchers applied Indonesian language keywords because the researchers took the topic of coastal people in Indonesia.

## RESULTS

### **A Study by Sukirno et al (2017)**

Sukirno promoted qualitative-phenomenological research to find out the childbirth-searching pattern of coastal community people.<sup>3</sup> The respondents' characteristics showed that – four mothers: NP, RS, EN, and SN lived in the coastal areas. They were 40 years old, 37 years old, 30 years old, and 31 years old consecutively. These mothers visited the surrounding midwives when they were giving birth. Based on the educational background, all respondents had a primary school educational background. The obtained demographic data of the respondents were strengthened by the interview results with the surrounding community. Based on the interview, the researchers found that the tradition and the culture in the coastal area were – to visit midwives when mothers

were going to give birth. The results based on the first aspect, knowledge, showed that the mothers entrusted the labor process to the surrounding midwives. The second result, dealing with the cultural aspect, showed that the mothers practiced and implemented the local culture and customs. The third result, dealing with earnings, showed that earnings influenced the health status of the mothers, including the nutrition and affordance to obtain labor care services. In their research, the researchers found that most respondents' husbands did not have exact monthly earnings. Thus, the mothers and their husbands tended to visit midwives because they were cheaper. The fourth result, dealing with family support, found that the husband's support was not based on scientific reasons. The husbands had not performed comprehensive support for their wives.<sup>6</sup> The result of the fifth aspect, the healthcare access, showed that the mothers preferred to visit local midwives due to the distance.

### **Midwives**

A midwife, *dukun beranak*, does not have scientific knowledge about obstetrics and maternity. A midwife may promote his or her job, dealing with maternal care, by informing the local obstetricians. This

procedure is regulated in *Undang-Undang Republik Indonesia Tentang Tenaga Kesehatan (1963)*, the Law of Indonesia about Health Staff, Article 1, Article 10, Article 21 Clause (2), and Article 23 Clause (1).<sup>7</sup>

### Culture

The culture of the coastal people made them entrust the local midwives. Ashriady et al. also found that cultures influenced the strategies of mothers and the surrounding family to seek maternal assistance.<sup>8</sup>

### Earning

Low-income or earning families would prefer visiting midwives to visiting obstetricians. Although the respondents admitted that the service given by the midwife was cheaper, statistically, there was no correlation between the earnings and the healthcare service decision.<sup>9</sup> Bartini & Isabella found no correlation between low family earnings and their decision to seek maternal care.<sup>10</sup> This result contradicts Sukirno et al. For Bartini & Isabella, husband support became important even though his financial status was not excellent.

### Family and Husband Support

Pregnant women should receive support from both families and husbands both suggestions, actions, and solutions for better care.

### Healthcare Access

Currently, the efforts to provide healthcare access for the members and the Indonesian people use some working zones for the healthcare service. Thus, the healthcare service in Indonesia has the labels D, C, B, and A. The labels indicate the areas to cover. The criteria of the hospital or health facility categorizations are based on the recruit division number, the investment source, the operational permission, the permission provider, and the quality assurance committee.<sup>11,12</sup> In some regions in Indonesia, the labeled healthcare services are far from their settlement. This condition makes them reluctant to visit these healthcare facilities. Some people even prefer local drugstores to get medicine because they find the labeled hospitals are far.

## DISCUSSION

Mothers and husbands must be literate that a midwife refers to an individual with a certain specific skill to provide maternal care support and to nurture the born babies, while an obstetrician is an individual with skills and knowledge about maternal care. Understanding obstetricians' roles is important for mothers and husbands in the coastal areas. The reason is – based on Sukirno, the respondents thought that the care given by the integrated healthcare service and the obstetricians were the same. The healthcare service provided by the integrated healthcare service, *posyandu*, dealt with prenatal care. This notion is supported by Herdiani et al.<sup>13</sup> The researchers found that an integrated healthcare service mostly managed the provision of prenatal care, starting from exercise, maternal education, and routine health check-up.<sup>14</sup> However, suppose the mothers are indicated to give birth soon. In that case, the roles of integrated healthcare service are not to provide labor care but to provide healthcare access to obstetricians or hospitals.

After explaining the roles of midwives and the obstetricians, and the integrated healthcare service and the obstetricians, husbands of pregnant mothers must be literate to provide active support. The responsibility of being an active supporter for the mothers requires a husband to willingly learn and get proper education about maternal health. With proper maternal health education, a husband can plan his budget to prepare for the labor process of a mother. With an excellent education, a husband can be more aware that providing support does not only entail providing a suggestion for the mothers. Providing support also deals with the capability of a husband to seek maternal healthcare access.

## CONCLUSION

From the review and discussion, the researcher found limited studies about labor service-seeking patterns in coastal areas. Studies related to this topic are important because Indonesia is an archipelago. Thus, excellent strategy formulation to find and receive help for pregnant mothers is important. The

husbands better promote the proposed strategy in this research because they are responsible for their wives.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

This research has passed the ethics review from the University of Halu Oleo.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

**Introduction:** Household waste is one of the garbage sources through the landfill. Muara Bengkal Ilir is quite far from the city and the people must go to the city center to get their needs. The communities meet their food and household consumption needs through online shopping caused by the Covid-19 pandemic and must avoid transmission. This research aims to find out the source and household waste management in Muara Bengkal Ilir.

**Method:** The research method used in this research is observation with data collection by interview. Data analysis uses percentages and descriptive presentation. The research was carried out from December 2021 to June 2022.

**Result:** Research results showed 70% of household waste sources in Muara Bengkal Ilir Village come from online shopping waste and 70% from plastic waste. The waste management that the community has carried out was reuse 10%, reduce 36.6% and recycle 0%.

**Conclusion:** Knowledge and education in the community to reduce and utilize waste is important. Waste management applications and regulations for reducing plastic waste or use of recycled plastic, especially in online delivery services.

**Keywords:** household waste; management; online shop.

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## INTRODUCTION

Garbage pollution causes environmental quality to decline and can impact public health. Garbage pollutes not only the terrestrial environment but also the aquatic environment, such as lakes, rivers and oceans. Garbage is one of the problems faced by cities in all countries, including Indonesia. It is even reported that Indonesia is one of the 20 largest contributors of plastic waste in the world that pollutes the oceans.<sup>1</sup> Plastic waste is mixed with other waste and needs to control because plastic is nondegradable. Some areas in Indonesia develop reduced plastic in the communities by waste management centers called waste banks.<sup>2</sup> Sources of waste come from daily household activities. Community behavior and knowledge have an important role in waste management. Many factors influence waste management from the community, the environment, and government regulations. Some factors that influence the community in implementing household waste management are education, job, knowledge, attitude,<sup>3</sup> government role and sanitation facility. Lack of public awareness in managing

waste has the potential to cause waste pollution in residential environments and rivers. Providing a garbage storage unit is one of the sanitation facilities, community participation, industry and government that to be a priority in river water pollution control.<sup>4</sup> Waste management strategy as recycling and waste minimization are influenced by integrating cultural considerations in a country.<sup>5</sup>

Muara Bengkal Ilir is one of the villages in the Muara Bengkal sub-district, East Kutai Regency, East Kalimantan Province. The total population in the Muara Bengkal Ilir sub-district is 4,101 people with a land area of 157.57 km<sup>2</sup>.<sup>6</sup> This area is rural, and every community still has a large land area around their house. Household waste is usually collected and disposed to the temporary shelters and then burned. But some plastic waste, bottles, will be thrown into the river. This can cause flooding and pollution in rivers. The level of public knowledge about waste management is still lacking. The availability of garbage shelters does not exist and no officers will collect waste to be taken to landfill. Because this location is far from the landfill. Many people do online shopping to fulfill their daily needs. This is very

practical, especially during the COVID-19 pandemic, which urges the public to avoid direct contact. This causes various types of waste, both paper and plastic. Based on these problems, a study was appointed on the source and household management waste in Muara Bengkal Ilir, East Kalimantan. This study was conducted in the neighborhood Association (RT 1), Muara Bengkal Ilir.

## METHOD

The method used in this study is observation with data collection by interview. Data analysis uses percentages and descriptive presentation. The research was carried out from December 2021 to June 2022. The sampling technique used purposive sampling, considering people of productive age, namely 15-64 years.

## RESULTS

The highest respondent aged 16-23 was 13 people, and the second, 40-47 years, were 8. These ages usually have high knowledge of updating social media. The majority of respondents are female 21 people that women usually like to shop and cook for the family daily. Community

shopping activities influenced the amount of waste to meet needs. Many people did online shopping during the COVID-19 pandemic and the lockdown was enforced. This has become a new habit trend for the community because it is more practical, especially for young people who follow technological developments and think practically. The majority of the occupational respondent is student and housewife.

The study found that 70% of respondents usually shop online to meet their daily needs. It has often been done since the covid 19 pandemic and has become a habit. Almost every day, they do shopping online. They always shop at the market to meet all their daily needs before the pandemic. The majority of the waste produced in this study was in the form of plastic waste 70%, in the form of bottles, mica, and plastic cups. The components of household waste management are Reuse, Reduce and Recycle, usually called 3R. The study found that respondents 10% of ever reused waste, 36,6% ever reduced waste and 0% or nothing respondents recycle waste.

## DISCUSSION

Covid 19 pandemic has changed the community's behavior in consumption, use of online shopping become a habit. This phenomenon occurs not only in Indonesia but almost all over the world. Covid 19 pandemic changed lifestyle in consumption habits in the communities, especially as lockdowns increased online shopping and delivery services.<sup>7,8</sup> Plastic waste found 70% in the form of bottles, mica, and plastic cups is this research result. Knowledge and responsibility respondents in household waste still less but desire to shop, especially online. Online shopping and habits during the pandemic will affect the type and amount of waste. Kind of plastic waste from online food delivery services affects increasing plastic bags, hot and cold food bags, plastic food containers and food waste.<sup>8</sup> The types of groceries that are often given are food and beverage products, almost all of which use plastic wrappers. Reusable packaging materials and reserve logistics on online shopping logistics will minimize waste in the environment.<sup>9</sup> Households have a lot

of activity and produce the kind of waste every day. Household waste per capita decreased and plastic composition slightly increased during the pandemic.<sup>10</sup>

The study finds that respondents 10% of ever reused waste, 36,6% ever reduced waste and 0% or nothing respondents recycle waste. The community collects household waste and then burns it; some of it is directly dumped into the river. The level of community knowledge is still lacking in household waste management. Laws and regulations on waste management and sanctions are crucial to realize good waste management. Education to separate food waste collection can increase recycling and indirectly signals households that recycling is important and desirable.<sup>11</sup> Community intervention regarding practice and household waste management effectively improves knowledge.<sup>12</sup> The COVID-19 pandemic impacts people's behavior in terms of online shopping and personal health and hygiene. There was a significant relationship between in satisfaction level of household waste management during covid 19 pandemic between gender, waste volume change in lockdown, PPE for waste collectors, and education on waste handling techniques provided by the government;<sup>13</sup> It also impacted the change of garbage, recycling, organics flows; new health and safety concerns; reused and reduction practices; deposit-return bottle collections; waste diversion and reduction education.<sup>14</sup>

## CONCLUSION

The habit of online shopping and online delivery has become a lifestyle in society in line with the development of technology. It has led to plastic waste and undegradable packaging materials waste increase. Government regulations and the industry's role in providing degradable materials for their products are very important to save the environment in line with economic-circular.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## FUNDING

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## ETHICS

Not applicable.

## AUTHOR CONTRIBUTION

Concept, method and writing by VP; data analysis by AA; literature review by RY and DK; Correction by MW; Proof read by MH. All authors have read and agreed to published version of the manuscript.

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## ABSTRACT

**Introduction:** This systematic literature review determined the implementation of the hospital safety index, the implication of the hospital safety index implementation, and the kind of hospital safety index with meaningful information provisions.

**Method:** the applied process in this research was the modified PRISMA procedure.

**Results:** The results found four relevant articles. In this research, the researcher concluded that the most relevant and worthy to be followed up by future researchers was the study with the implementation of the Leapfrog Hospital Survey as the comparison or substitution of the current Hospital Safety Index by WHO. The reason for the worthiness Leapfrog Hospital Survey dealt with the instrument's objective to evaluate and improve the safety aspects of patients, medical workers, and doctors. These aspects were not available in Hospital Safety Index, which generally tended to be used by evaluators to assess hospital readiness.

**Conclusion:** Therefore, researchers and hospital parties should attempt to apply Leapfrog Hospital Survey.

**Keywords:** Hospital Safety Index, Indonesia, Leapfrog Survey.

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## INTRODUCTION

The safety of patients, medical workers, and doctors becomes the responsibility of hospital management as the health service providers. Therefore, hospitals must ensure the hospital safety aspects carefully.<sup>1</sup> The hospital safety aspects come from various perspectives, starting from the well-being of the medical workers and doctors, the cleanliness and completeness of the equipment, the building structure, the electrical installation, the water system, the sanitation, the treatment procedure, and many more. In this research, the researcher promoted a systematic literature review of the "Hospital Safety Index." This review determined the implementation of the safety index and the implication of the index implementation for hospitals and related parties. Besides that, this research aimed to find recommended hospital safety indexes that provided meaningful information related to hospital safety aspects and the negative events at hospitals so that the hospitals could manage the negative events.

## METHOD

In this research, the researcher applied for a systematic literature review with the PRISMA procedure, *Preferred Reporting*

*Items for Systematic Review, and Meta-Analyses.*<sup>1</sup> The researcher modified the applied PRISMA into some stages. The four primary steps of the PRISMA procedure. They are 1) finding the articles, 2) checking duplications, 3) screening the duplicated articles, and 4) screening the articles by checking their completeness. The researcher applied more specific steps at each stage to create meaningful review results. The specific steps are called the sub-steps.<sup>2</sup>

The first sub-step of the primary PRISMA procedure was finding the articles. The researcher searched the articles by a) determining the keywords, b) using the pre-determined keywords of hospital safety index or *indeks keselamatan rumah sakit*, c) taking the accessible articles, d) taking the articles published from 2021 until 2022, and e) taking only articles with DOI or E-ISSN. In the second step, the researcher checked the duplicated articles and found all four articles were not duplicated or published multiple in other journal outlets. Therefore, the researchers used all articles in the next step by reading each article's abstract. Then, the researchers screened the articles by reading their abstracts. The applied sub-steps were a) taking non-literature review articles and b) taking articles written in

English and Indonesian. After reading the abstracts, the researcher screened the articles by reading all components of the articles, starting from a) background, b) the previous research review, c) theoretical framework, d) method, e) findings, f) evidence, and g) limitation. Then, the researcher synthesized the results based on the applied article methods: quantitative and qualitative.

## RESULTS AND DISCUSSION

In the primary steps, the researcher searched the articles from Google Scholar. The research used pre-determined keywords. The search results found 74.300 articles with the "Hospital Safety Index" keyword and 3.670 articles with the "*Indeks Keselamatan Rumah Sakit*." In this research, the researcher read the articles' titles and keywords that took the topic of hospital safety index or *indeks keselamatan rumah sakit*. This process found 5 relevant articles: Lestari, Paramitasari, Fatmah, et al. (2022), Lestari, Paramitasari, Kadir, et al. (2022), Pakyz et al. (2021), Santosa & Rianita (2012), dan Yenni et al., (2020). However, the researcher excluded one of the articles, Santosa & Rianita (2012), since the publication year was not between 2021 and 2022.

### **Research by Pakyz et al. (2021)<sup>3</sup>**

The research background of Pakyz et al. (2021) dealt with the prevalence of health-associated infection during hospital medical treatment. They found one out of 25 inpatient patients in the United States of America would suffer from HAI. The impacts of the health infection during the treatment were poor clinical and financial outcomes. The causes of the health-associated infection problems were resistant organisms against various drugs. This situation hindered medical treatment at hospitals. Hospitals should have responded to this situation by investing in equipment and instrument to control the infection, providing relevant priorities for the infection needs, and supporting the inpatient patient's safety. Therefore, Pakyz et al. (2021) implemented the *Leapfrog Group Hospital Survey* published by *Leapfrog Hospital Survey* (2021) and CMS to determine the improvement of hospital safety levels so that the hospitals could endure the patients' safety from various hazardous matters. The results showed that hospitals with extremely excellent categories had lower CDI prevalence or *Clostridium Difficile Infection* than those with "excellent" and "average" categories. The researchers also did not find a significant difference in hospitals with MRSA blood infection prevalence. They also found that magnet position was correlated with the MRSA infection prevalence. However, magnet position was not correlated significantly with CDI prevalence.

### **Research by Yenni et al. (2020)<sup>4</sup>**

The research background of Yenni et al. (2020) was the necessity for Indonesian Citizens to go to the hospitals during disasters. The results found that the investigated hospitals had a high hospital safety index average for each index group, starting from the architecture element, infrastructure protection, physical access readiness, critical system, and hospital equipment and supply. The researchers concluded that the investigated hospitals had opportunities to improve their functions in preventing patients' health during disasters.

### **Research by Lestari, Paramitasari, Kadir, et al. (2022)<sup>5</sup>**

The research background of Lestari, Paramitasari, Kadir, et al. (2022) was similar to that of Yenni et al. (2022). The research of Lestari et al. (2022) applied Hospital Safety Index to assess hospital safety during disasters. The researchers argued that the hospital safety function with HSI, should be adjusted with the sizes of large, medium, or small-sized hospitals. The research focused on moderate and small-sized hospitals. The applied attributes by the researcher ensured the hospital safety index contents of moderate and small-sized hospitals, starting from the structural condition and non-structural and functional attributes.

The research results obtained the HSI average scores of 0.675 and 0.752 for Jakarta and Northern Sumatra provinces, within the range of 0.66 and 1.00. Therefore, the hospitals were categorized as "extremely excellent" or "A." The categories indicated that the hospitals could remain operating during disasters. However, the Western Java and Yogyakarta provincial hospitals obtained HSI scores of 0.601 and 0.602, categorized as "excellent" or "B." The scores indicated that the hospitals should improve their poor aspects.

The researchers concluded that the HSI assessment allowed the government and related authorized parties to use the results for mitigation measures. One of the real examples was COVID-19 mitigation. The researchers recommended intervention efforts to improve the readiness of the hospitals with HSI.

### **Research by Lestari, Paramitasari, Fatmah, et al. (2022)<sup>6</sup>**

The research background of Lestari, Paramitasari, Fatimah, et al. (2022) had a similar background to the study of Lestari, Paramitasari, Kadir, et al. (2022). The researchers assessed the readiness of hospitals with HSI. The results found that most hospitals had A and B categories, or "extremely excellent" and "excellent." The researchers only found a few hospitals with the C category, "below average," from Yogyakarta province. Hospitals with C-HSI results were considered to have

poor preparedness if they encountered emergencies or disasters, such as volcano eruptions. Therefore, these poor aspects should be improved.

From all four research articles, current researchers argue that patient safety at hospitals is complex. Safety does not only deal with the physical condition to be free from hazardous matters, such as disasters and emergencies. The safety must also consider the safety of diseases that worsen the patient's health. Therefore, the hospital safety index should not only refer to HSI published by WHO. The hospitals and related parties should also consider using HSI published by *Leapfrog Hospital Survey*.<sup>7</sup> This instrument provides additional information about hazardous potency that may threaten patients, including disease infections due to the given treatment during inpatients.

The brief overviews of all four articles provide information that hospitals with high HSI probably cannot manage health-associated infection during inpatients. Qualitatively, the study by Pakyz et al. (2021) proved that hospitals with extremely excellent categories had lower CDI prevalence or *Clostridium Difficile Infection* than those with "excellent" and "average" categories.<sup>3</sup> The researchers also did not find a significant difference in hospitals with MRSA blood infection prevalence. They also found that magnet position was correlated with the MRSA infection prevalence. However, magnet position was not correlated significantly with CDI prevalence.

Pakyz et al. (2021) statistically provided quantitative evidence with the ordered probit regression.<sup>3</sup> This method provided meaningful findings for future researchers to determine the correlation between the assessed aspects of the hospital safety index and the negative hospital events. The evidence by Pakyz et al. (2021) was more reliable than the quantitative-qualitative analyses promoted by the other studies. The studies by Lestari, Paramitasari, Fatmah, et al. (2022), Lestari, Paramitasari, Kadir, et al. (2022), dan Yenni et al. (2020) seemed only to describe hospital safety index outcomes.<sup>4,5,6</sup> The implication of the outcomes could be some efforts to improve

the hospitals to reach a higher index without evidence about the correlation between the assessed aspects of hospital safety and the negative events at hospitals.

## CONCLUSION

Based on the implementation of the current modified PRISMA procedure, reviewing all four articles about the Hospital Safety Index or *Indeks Keselamatan Rumah Sakit* found that the most relevant research to follow up was the research of Pakyz et al. (2021). Thus, scholars could promote studies about patient safety at hospitals with the Leapfrog Hospital Survey as a comparison to the Hospital Safety Index published by WHO. The researchers also recommend that scholars and authorized parties in the medical field design a comprehensive hospital safety index. This recommendation indicates that the hospital safety index must ensure the safety of patients, medical workers, doctors, and management both physically and psychologically from various hazardous matters, including microorganisms,

dangerous substances, natural disasters, physical accidents due to various objects, and many more.

## CONFLICT OF INTEREST

No conflict of interest.

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## ETHICS

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## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

**Background:** Nationally, indicators regarding the coverage of delivery services in health facilities have succeeded in achieving the objectives of the 2017 strategic plan, but in several provinces in Indonesia, there are still significant differences regarding the coverage of delivery services; for example, Jakarta has the highest coverage of 102%, then Bali at 97.73%. While the province of NTT only had an achievement of 56.18%.

**Objective:** This literature review aims to determine the factors associated with the selection of birth attendants by traditional birth attendants in women giving birth.

**Methods:** This research is a literature review involving 10 literature sources from 5 national journals and 5 international journals consisting of various research designs (qualitative and quantitative). For data collection from Google Scholar, Mendeley and also Science Direct.

**Results:** Of the 10 articles reviewed, 7 articles show that mothers have low education and knowledge, the economic status of the mother's family is categorized, the distance from this house to access to health services is not affordable, and the mother does not receive family support (husband).

**Conclusion:** the level of knowledge, social status and family support has a very close relationship with the selection of birth attendants by the mother.

**Keywords:** birth attendant; midwife; maternity mother.

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## INTRODUCTION

The proportion of births supported by trained health workers (health workers) reached 90.88% in 2019. With this figure, the 2017 Ministry of Health Strategic Plan target of 90% has been achieved. The achievement of this indicator over the last nine years has shown an increasing trend, from 73.17% in 2010 to 91.78% in 2019.<sup>1</sup> Indicators regarding the coverage of delivery services in health facilities have succeeded in achieving the objectives of the 2017 strategic plan. However, several provinces in Indonesia still have significant differences in the coverage of delivery services. For example, Jakarta has the highest coverage at 102%, then Bali at 97.73%. Meanwhile, Central Sulawesi Province only had an achievement of 76.18%. This shows that the achievement of delivery assistance by medical personnel in Central Sulawesi is still below the national target of 90%.<sup>2</sup>

As a competent party, midwives play an important role in maintaining the health of mothers and children, especially during the delivery process. However, the fact in

the field is that there are still very many deliveries that are assisted by traditional obstetricians (traditional birth attendants) compared to midwives.<sup>3</sup> The phenomenon of traditional birth attendants (traditional obstetricians) has a very significant impact on efforts to improve the health of mothers and babies; because of the birth process in Indonesia, most (40%) still rely on and are handled by traditional obstetricians, this is exacerbated with the lack of training of traditional birth attendants in carrying out labor actions. Hence, maternal and infant mortality risk during the delivery process is very large.<sup>4</sup>

The low coverage of obstetrics (delivery) by health workers is one of the causes of the high maternal mortality rate because non-health workers assist it. For areas with difficult-to-reach access, effective efforts are needed to increase the enthusiasm of mothers giving birth to give birth to health workers. We might be able to make an effort to make a breakthrough in the form of a cooperation program (partnership) between midwives, obstetricians, and maternity hospitals. Dukuns, in this case, are made partners

by health workers in terms of midwives by continuing to empower shamans in childbirth efforts, of course in this case, they will not be given the task of carrying out the delivery process but other tasks that are considered to be able to assist the mother's delivery process.<sup>1</sup>

## METHODS

The design of this research is library research (literature review). This is done because researchers cannot conduct research directly in the field due to the coronavirus pandemic (covid-19). The type of data used is secondary data. Data sources in this literature review were obtained through trusted journal search sites, namely Mendeley, Science Direct and Google Scholar, from 2017 to 2022. The analytical method used using content analysis of this document journal using online research journals obtained through the website search for trusted journals with the following inclusion criteria:

- Online research journals on childbirth among traditional birth attendants
- The online research journals used are within the last 5 years (2017 to 2021),

- c. National and international class online research journals
  - d. There is an ISSN number (International Standard Serial Number) in both the printed and electronic versions or P and I in research journals
  - e. There is a Digital Object Identifier (DOI) in research journals
  - f. Research journals obtained through trusted journal search sites (Google Scholar)
  - g. Full-text research journal
- The online journal search process through trusted journal search sites:
- a. Google Scholar. To obtain online research journals, researchers used the keywords childbirth and traditional birth attendants, at any time, found as many as 1,176 online research journals.
  - b. Mendeley. To find other online research journals, the researchers changed the keywords to childbirth and traditional birth attendants in 2022 and found 24 online research journals.
  - c. ScienceDirect. To find other online research journals, researchers changed the keywords to childbirth and traditional birth attendants in 2022 and found 56 online research journals.

## RESULTS AND DISCUSSION

Research conducted by Benon et al. (2016) found results that Contrary to the notion that women only use traditional birth attendant services, we found that men actively seek the services of traditional birth attendants and use them for their wife's health care in the community. TBAs sensitize men to use cultural and biomedical health knowledge and become women's allies in influencing men to provide the resources needed for maternity care.<sup>5</sup> Research conducted by Garces et al. (2019) found that the role of traditional birth attendants in providing health care for women decreased overall. While there is a need to increase women's access to skilled health providers in health facilities, especially in rural areas, the availability of trained providers is lacking. In addition to financial and structural constraints, cultural considerations also play a role in the preference of some women to receive care from women living in their communities.<sup>6</sup>

Research conducted by Marsilia

(2018), found that four sub-variables of predisposing factors had a relationship ( $p < 0.05$ ) with the selection of traditional birth attendants as birth attendants, namely the sub-variables of knowledge, attitude, education, and socio-culture. This family income enabling factor has a relationship of  $p = 0.000$  with the selection of traditional birth attendants as birth attendants.<sup>7</sup>

Research conducted by Purnawati and Ariasih (2021) showed that as many as 27.2% of deliveries were assisted by traditional birth attendants. The pandemic is not why people choose to give birth with a traditional birth attendant. People prefer traditional birth attendants because of cultural perceptions, beliefs, proximity and reach, as well as geographical conditions. This choice does not seem to occur during the delivery process but has been the mother's choice since pregnancy, even before pregnancy. It can be concluded that access greatly influences the mother's confidence in choosing a place of delivery.<sup>8</sup>

Kurniawati (2019) shows that the characteristics of most of the respondents are as follows, mothers with the most recent elementary education are 18 respondents (50.0%), and the most occupations are housewives, which are 31 respondents (86.1%). Some of the reasons why mothers use the services of a shaman in the delivery process include: the low knowledge of 30 respondents (83.3%), the place where the shaman practices is closer to their place of residence (69.4%), giving birth in a hospital requires a lot of money (100%), all families gave birth to traditional birth attendants (77.8%), more trust in traditional healers than health workers (77.8%), often used the services of traditional healers (61.1%), many traditional healers in their neighborhood (69.4%), and support from the family to use the services of a traditional healer (88.9%). It can be concluded that a mother's knowledge affects the selection of mothers in choosing a place of delivery.<sup>8</sup>

Research conducted by Widianingsih and Achamad (2021) shows that the factors influencing pregnant women who give birth with traditional birth attendants are hereditary habits, beliefs, social relationships between patients and birth attendants, social and economic

conditions, and long-distance health services with birth attendants. Difficult transportation.<sup>9</sup> Ningrum's research (2018) shows that the characteristic factors that influence the selection of birth attendants are junior high school education level and socioeconomic below the minimum wage. Other influencing factors are trust in the paraji shaman, the long distance to health services, family support and information obtained by respondents. There are still respondents who choose paraji shamans as birth attendants.<sup>10</sup>

Cheptum et al. (2018) show that the selection of traditional birth attendants as a place of delivery is due to financial reasons.<sup>11</sup> The community is well aware of the risks of giving birth with a traditional birth attendant. However, they still choose their services for their availability, accessibility and friendly attitude. The research of Gurara et al. (2018) found that many women still prefer to give birth traditionally as a birth attendant. Reasons for choosing homebirth included lack of transportation to health care facilities, distance to health care facilities, lack of care at health care facilities, and the friendliness of traditional birth attendants. A lack of formal partnerships between traditional birth attendants and the health system was also observed. It can be concluded that access to health services affects the selection of birthing mothers to traditional birth attendants by mothers who give birth.<sup>12</sup>

From the 9 journals reviewed above, it was found that similar results were found, namely the factors that influence childbirth mothers to give birth to traditional birth attendants are low maternal knowledge, access (distance) to distant health services and low income.

This shows that the level of knowledge greatly influences the mother's choice in giving birth. This study illustrates that apart from the mother, a husband who has low knowledge also influences the choice of place of delivery. The husband's support for giving birth to the traditional birth attendant also contributes to the mother in giving birth to the traditional birth attendant. Low knowledge is also formed due to the habit of the people in the past who gave birth to a traditional birth attendant without complications; this phenomenon

made mothers perceive that giving birth to a traditional birth attendant was safe for them. According to Green, knowledge is the initial factor of expected behavior and is generally positively correlated with behavior; behavior of mothers with good knowledge tends to use health workers as birth attendants and vice versa.

Mothers with low economic status or income are afraid to give birth to an obstetrician (midwife) because they do not have enough money to give birth, thus causing them to prefer a traditional birth attendant as a place of delivery compared to a midwife. Likewise, Greenen's theory explains that a person will take positive or negative action because of economic incentives.<sup>13</sup>

The distance of health services that are difficult to reach by mothers causes people to choose to seek closer delivery assistance due to the distance and long travel time, choosing births with traditional birth attendants, and giving birth at home due to the lack of transportation facilities and in the area there are no health facilities. The close distance from the mother's house to the obstetrician (Paraji) makes mothers who are about to give birth prefer to come to give birth to a traditional birth attendant rather than coming to health workers. Therefore, this distance is used by mothers to choose an obstetrician (Paraji) as an obstetrician.

## CONCLUSION

From the 9 reviewed journals, it was concluded that the reasons why mothers

gave birth to traditional birth attendants were low maternal knowledge, low income and access (distance) to health services that were far away.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Not applicable.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

**Introduction:** According to WHO, it is estimated that by 2030 the prevalence of diabetes Mellitus in Indonesia will reach 21.3 million people. Only two-thirds of diagnosed patients received pharmacological, non-pharmacological and alternative therapies properly. The purpose of this study was to review the literature on using sea cucumber bioactive components as an alternative treatment for diabetes mellitus.

**Methods:** This study used the literature review method by collecting and analyzing research articles on diabetes mellitus treatment and the use of sea cucumber bioactive ingredients. Articles were collected from online databases sourced from Google scholar, Science Direct and PubMed, which were selected based on predetermined criteria.

**Results:** Sea cucumbers have bioactive compounds that can help cure diabetes, expedite wound healing, both external and internal wounds, and lower blood glucose levels.

**Conclusions:** Sea cucumbers can be used as an alternative therapy for the prevention and treatment of diabetes mellitus to reduce its prevalence of diabetes mellitus. It is intended that this literature review research will serve as a reference for developing and utilizing sea cucumbers for the wider world of health.

**Keywords:** Diabetes Mellitus; Sea Cucumber; Bioactive Compound; Wound Care; Alternative Treatment.

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## INTRODUCTION

Diabetes mellitus is known as the silent killer because many people with diabetes mellitus do not realize the onset of the disease. Diabetes mellitus can attack almost all systems of the human body, from the skin to the heart and can cause many complications. Still, only 2/3 of patients diagnosed with diabetes mellitus received treatment properly.<sup>1</sup> Diabetes Mellitus is the sixth leading cause of death in the world.

Various epidemiological studies show a tendency to increase the incidence and prevalence of diabetes mellitus in various parts of the world. The World Health Organization (WHO) predicts a large increase in the number of people with diabetes in the coming years. WHO predicts an increase in the number of people with DM in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030. This is revealed by the World Health Organization.<sup>2</sup>

Indonesia is one of the archipelagic

countries that has many very abundant resources. The use of natural animal materials has been widely practiced by the community since ancient times, especially for medicinal purposes, one of which is the use of active ingredients contained in sea cucumbers, namely alkaloids, saponins, glycosides, the amino acid content of arginine, glutamic acid, and glycine which are known to affect the treatment of diabetes mellitus. The content of sea cucumbers can also be useful as an anti-viral, anti-microbial, anti-inflammatory, beauty, increase immunity, help new cell growth, and as an anti-cancer drug. Sea cucumbers have been proven to lower blood pressure with no side effects.<sup>3</sup> Sea cucumbers have the content contained in sea cucumbers that modern researchers have proven to heal wounds in patients with diabetes mellitus. The purpose of this study was to review the literature on the use of the bioactive components of sea cucumbers as an alternative treatment for people with diabetes mellitus.

## METHODS

This study used the Systematic Literature Review (SLR) method. A comprehensive literature search was conducted using Harzing's Publish or Perish application on several databases, namely Google Scholar, PubMed, Scopus, and Crossref, using the keywords "diabetes, wound care, sea cucumber, bioactive metabolism, and bioactive compounds". The first step of this literature review is to find articles. Researchers searched for articles by determining keywords, using predetermined keywords, taking accessible articles, taking articles published from 2012 to 2022, and only taking articles with DOI or E-ISSN. In the second step, the researcher checked for duplicated articles and found that the four articles were not duplicated or double-published in other journal outlets. Therefore, we used all articles in the next step by reading the abstract of each article. Then, the researcher screened the articles by reading the abstracts. The step applied

afterward was to take articles that were not literature reviews and take articles written in English and Indonesian. After reading the abstract, the researcher screened the article by reading all components of the article, starting from the background, review of previous research, theoretical framework, methods, findings, evidence, and limitations. Then, we synthesized the results based on the article methods: quantitative and qualitative.

## RESULT

### *The Impact of Diabetes Mellitus*

The impact of diabetes is psychological, social and spiritual problems, as well as unproductive sufferers and families, so, of course, it increases the economic burden on sufferers and families and other psychological impacts on people with this disease are low self-confidence, low sexual ability, or sexual dysfunction sufferers.

Various strategies have been undertaken to prevent risks that arise from diabetes mellitus, but so far have not shown maximum results, so many experts are interested in conducting various kinds of research using herbal and non-herbal basic ingredients, which, as we know, Indonesia is very rich. Various kinds of plants have natural bioactive ingredients that have been used to prevent and treat various diseases. Research on natural bioactive ingredients originating from the sea has been widely studied, especially in the health sector; this aims to improve the standard of living and health of the Indonesian people who are rich in natural resources.

## DISCUSSION

### *Utilization of Sea Cucumber Bioactive Ingredients in Diabetes Mellitus*

Sea cucumber is marine animals that include thorn-skinned animals (Echinoderms) whose body is round and long, resembling a cucumber, which is known as sea cucumber and is also a food that contains sufficient nutrients.

Sea cucumbers have an excellent source of protein. The protein content in dried sea cucumbers is 82 g per 100 g, with a high digestibility value. Of that amount, about 80% is in the form of collagen. Collagen serves as a connective tissue in the growth

of bones and skin. In bone growth, calcium supplements alone are insufficient because bones consist of calcium phosphate and collagen. Without the presence of collagen, bones will become brittle and break easily.<sup>4</sup> The benefits of collagen increase the regeneration of dead cells due to wounds, thereby accelerating the healing of diabetic foot ulcers.

DM can significantly impact health and require serious countermeasures.<sup>5</sup> People with diabetes basically can not be cured, but blood sugar levels can only be controlled. It was only in diabetics without insulin dependency. Nutrition in the sea cucumber is able to stimulate the pancreas to produce insulin. In addition, members of the Holothuriidae family improve the performance of the kidneys and spleen so that sugar can be digested properly. The active compound is also useful for treating gastric ulcers in acute gastritis and indigestion patients.

Several other studies related to collagen or sea cucumber collagen peptides, including hydrolyzate of sea cucumber collagen *Stichopus hermannii* and used as a skin moisturizer.<sup>6</sup> Sea cucumber collagen peptides *Apostichopus japonicus* and *Cucumaria japonica* are also proven to have antitumor, anticoagulant, anti-inflammatory and healing wounds effects.<sup>7</sup>

Besides, sea cucumbers have very good properties for health, which can improve blood circulation in the body, prevent blockage of cholesterol in blood vessels, launch kidney function, increase metabolic rates, help cure arthritis, diabetes mellitus and hypertension and accelerate wound healing, both wounds external and internal injuries, this is because sea cucumbers themselves contain many bioactive components that are very beneficial for human health such as mucopolysaccharides, glucosamine and chondroitin sulfate, minerals and trace minerals, steroids, collagen, Omega3 – DHA and EPA, and holoturin. Similar research conducted by Farouk et al. (2012) stated that sea cucumbers (phylum Echinoderms) had been shown to heal wounds, are used as anticoagulants and antithrombotics, reduce cholesterol and blood lipid levels, are anticancer and antitumor, antibacterial, immunostimulant, antifungal, antiviral,

antimalarial, antirheumatic and antioxidant.<sup>8</sup>

One of the bioactive ingredients of sea cucumbers is copper antioxidant, zinc-superoxide dismutase (Cu, Zn-SOD). It has been reported that oxidative stress conditions in diabetic rats show excessive production of free radicals so that the antioxidant content of copper, zinc-superoxide dismutase (Cu, Zn-SOD) decreases in pancreatic tissue of DM rats (Wresdiyati et al., 2008), as well as in liver tissue and kidney of diabetic mellitus rats. The administration of hydrolysates, concentrates, and protein isolates of sea cucumbers can increase the antioxidant content of Cu, Zn-SOD in the pancreas tissue of diabetic mellitus rats. Sand sea cucumber protein hydrolyzate has the best effect in increasing the content of antioxidant enzymes Cu, and Zn-SOD in the pancreas tissue of diabetic mellitus rats.<sup>9</sup>

The use of sea cucumbers in the world of health is used as an ingredient in medicines and healthy foods that have many properties in curing various diseases. Here are some studies on sea cucumbers that have high medicinal value and have tissue repair capabilities and are very effective in helping the healing process of diabetes mellitus and diabetic foot ulcers, as well as research using sea cucumbers as a treatment for several other diseases.

The use of sea cucumbers in the prevention and cure of diabetes has also been studied by Fitriah et al. (2013) using gold sea cucumber powder at a dose of 40.5 mg/kgBW and a dose of 81 mg/kgBW and 162 mg/kgBW can reduce blood sugar levels significantly in hyperglycemic model rats. Still, administration of gold sea cucumber powder at a dose of 40.5 mg/kgBW in the long term is more effective in reducing blood sugar levels in white male rats with the hyperglycemic model.<sup>10</sup>

The content of glycosaminoglycans in sea cucumbers has been shown to prevent the occurrence of thrombosis, as research conducted Zhang (2012) revealed that sea cucumbers are anti-thrombotic due to the presence of glycosaminoglycans compounds (GAGs). At a 5 micrograms/ml concentration, glycosaminoglycans (GAGs) can cure ischemic brain stroke

and ischemic heart disease. It performs by inhibiting blood clotting activity through inhibiting fibrin monomers and increasing plasmin activity. Plasmin is an enzyme that breaks down blood plasma proteins and lowers blood viscosity. It occurs when the wound so that the blood clots.<sup>11</sup>

Hsi-Hsien Lu (2012) investigated the fat-lowering effect (hypolipidemic) due to glycosaminoglycan compounds. The compound is contained in sea cucumbers. Glycosaminoglycans or GAGs of sea cucumbers, contain hexosamine and hexuronic acid. Subsequent experiments were carried out on Wistar rats weighing 5 g, 10 g, 15 g, and 20 g. The rats were given 1% cholesterol for 6 weeks to increase total cholesterol, LDL, and liver weight. GAG significantly prevented increases ( $p < 0.05$ ) in the liver contents of triglycerides, cholesterol, and phospholipids. Thus, this study shows that sea cucumber GAG has the potential to be used to reduce the risk of atherosclerosis and hyperlipoproteinemia.<sup>12</sup>

## CONCLUSIONS

Various types of sea cucumbers and seaweed are widely available throughout the coast of Indonesia and the community has widely used those as food and medicine. Bioactive ingredients such as mucopolysaccharide, glucosamine and chondroitin sulfate, minerals and trace minerals, steroids, collagen, Omega3 – DHA and EPA, and holoturin in sea cucumbers can help lower glucose levels in people with diabetes mellitus and help heal diabetic foot ulcers. Collagen in sea cucumbers serves as a connective tissue in the growth of bones and skin. EPA and

DHA are eicosanoids that can mediate every inflammation stage by forming groups of prostaglandins, thromboxanes, lipoxins and leukotrienes; its synthesis is increased at the site of the inflammatory response, and agents that inhibit its synthesis also reduce inflammation. The content of glycosaminoglycans in sea cucumbers has also been shown to prevent thrombosis. GAG in sea cucumbers has the potential to be used to reduce the risk of atherosclerosis and hyperlipoproteinemia.

Marine biological resources, especially sea cucumbers, can be used as adjuvant therapy or as an alternative therapy for the prevention and treatment of diabetes mellitus, and can also be used in the treatment of acute or chronic wounds due to the superior use of bioactive ingredients. In addition, this literature review can be used as material for the development and utilization of better and wider sea cucumbers for further researchers in the future.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

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## ETHICS

Not applicable.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

**Introduction:** There are two types of Hepatitis B, acute and chronic hepatitis B, with recognized progressiveness from the SGOT and SGPT. Acute hepatitis B is indicated by de ritis  $< 1$ , while a ratio of deritis higher than 1 indicates chronic hepatitis. The increased SGOT and SGPT of chronic hepatitis also decrease the albumin. This matter indicates liver damage. This research determines the differences between albumin and the ratio of de ritis in both acute and chronic hepatitis B.

**Methods:** This comparative test research used total sampling. The applied analysis method was the Mann-Whitney analysis. The researchers obtained secondary data from 91 patients suffering from hepatitis B in 2021.

**Results:** The Mann-Whitney test results indicated the albumin differences toward the ratio de ritis of chronic and acute hepatitis B at Local Hospital Kendari with Asymp. Sig (2-tailed) 0.000, lower than 0.05.

**Conclusions:** The Mann-Whitney test obtained Asymp. Sig (2-tailed) 0.000, lower than 0.05. Therefore, the result accepted  $H_a$  and denied  $H_o$ . Thus, the result indicated the albumin level differences based on the ratio de ritis of patients with acute and chronic hepatitis B at Local Hospital Kendari.

**Keywords:** Hepatitis B; Albumin; SGOT; SGPT; De Ritis Ratio.

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## INTRODUCTION

Hepatitis B refers to the world's health problem. The disease is also endemic to most countries in the world, both advanced and developing countries. Hepatitis B is caused by the hepatitis B virus. The disease is ranked first in terms of the spread and the incidents. Hepatitis B is an infectious disease that destroys the liver cells. The virus is also the main cause of acute hepatitis, chronic hepatitis, fulminant hepatitis, liver cirrhosis, and liver cancer.<sup>1</sup>

The objectives of SGOT and SGPT enzyme examination are to determine liver function. High liver enzyme indicates that the liver does not work properly and indicates permanent damage to the liver.<sup>2</sup> SGOT enzyme can be found in hepatocyte cytosol and mitochondria, while SGPT can only be found in hepatocyte cytosol. Thus, once the hepatocyte is severely damaged, the content of SGOT plasma will be higher than the content of SGPT. This matter indicates the ratio of SGOT: SGPT  $\geq 1$ . On the other hand, the minimum damage on hepatocytes leads to the ratio of SGOT: to SGPT and decreases the albumin

content level to determine the cytosol enzyme leakage period into the blood. The minimum damage of hepatocytes can be used to check the ratio of SGOT: SGPT  $\leq 1$  with decreased albumin level.

Some clinical procedures using the ratio deritis value and decreased albumin level are useful to determine the disease and the progressiveness of hepatitis B. The procedure is also useful to determine the phases of the suffered hepatitis B, whether the phase is acute or chronic.<sup>3</sup> Winda et al. found that the decreased albumin level of hepatitis B patients was correlated to the increased SGOT, SGPT, and ratio de Ritis.<sup>4</sup>

This research determined the differences in albumin serum levels toward the ratio de Ritis of acute hepatitis B and chronic hepatitis B at the Local Hospital of Kendari.

## METHODS

This research applied a comparative test technique and total sampling with Mann-Whitney test analysis. The researchers used the secondary data, consisting of 91 subjects suffering from hepatitis B, from January to December 2021 at Local

Hospital Kendari. The research subjects consisted of 34 male and 57 female patients, selected based on the applied criteria with the keywords of hepatitis B, albumin, SGOT, SGPT, and ratio de ritis.

The liver is a central organ for metabolism and has the function of metabolite protein. All plasma protein, except gamma globulin, is synthesized in the liver. The protein includes albumin to defend against the colloid osmotic pressure. The liver synthesizes 14 gr albumin from a catabolized amino acid by protein.

Thus, prolonged hepatocellular dysfunction decreases the plasma protein. One of the hepatocellular dysfunction causes is hepatitis B virus infection. The albumin level in the serum becomes a useful indicator to determine the disease severity. The serum albumin level regularly decreases along with severe hepatocellular disease for 3 weeks. The hepatitis B infection decreases the albumin serum. This matter indicates a massive dysfunction with a poor prognosis.

Hepatitis B is a disease that damages the liver cells. This problem increases the levels of SGOT and SGPT. Thus

the ratio between SGOT and SGPT, or ratio de ritis, is useful to determine the period of suffering from hepatitis B and the progressiveness of the diseases, both acute hepatitis B and chronic hepatitis B. Lower ratio de ritis than 1 indicates acute hepatitis B while higher ratio de ritis than 1 indicates chronic hepatitis B. Besides that de ritis ratio, the parts of the liver test are also useful to indicate the progressiveness of hepatitis B based on the albumin examination. Hepatitis B patients have liver dysfunction in synthesizing albumin. They also suffer from fibrosis in the hepatocyte cells. These problems decrease the albumin serum level.

## RESULT AND DISCUSSION

The descriptions of SGOT and SGPT levels of 91 patients suffering from hepatitis B showed that 34 people had normal SGOT levels while 57 had abnormal SGOT levels, 63%. On the other hand, people with normal SGPT levels were 39 respondents (43%), while people with abnormal SGPT levels comprised 52 respondents, 57%. The results showed that abnormal and normal values were in line with the theory of Walmsley et al. (2013).<sup>3</sup> The theory reveals that increased SGOT and SGPT levels in the blood damage the hepatocyte cells due to the hepatitis B virus infection. In the cases of hepatitis, the liver is inflamed. Then, the releases of SGOT and SGPT in the blood indicate tissue damage on the hepatocyte. Thus, higher SGOT and SGPT levels indicate higher liver cellular damage. In a normal situation, the SGOT and SGPT levels are constantly released in the blood with a certain specific amount. However, in the case of B hepatitis, the amount of the released enzymes, SGOT and SGPT, increase. Generally, SGPT is released immediately from the hepatocyte into the blood within an acute situation, while SGOT is enormously released within chronic problems with progressive damage.

The frequency of de ritis ratio of patients with hepatitis B is lower than 1. In this research, the researchers found 40 individuals (44%) while people with a higher ratio de ritis than 1 were 51, 56%. This matter indicated that most patients with hepatitis B suffered from chronic disease and tended to suffer from cirrhosis,

indicated by a higher ratio deritis than 1. The theory explains that acute hepatitis B is indicated with a lower de ritis ratio than 1, while chronic hepatitis B with the tendency of cirrhosis is indicated with a higher de ritis ratio than 1. Thus, the clinical procedure with ratio de ritis is useful to determine the period and progressiveness of hepatitis B disease. Then, the procedure is useful to determine the administered prognosis for the patients.<sup>3</sup> The ratio de ritis with the ratio of SGOT and SGPT examines the increased SGOT level than the SGPT level. The SGOT enzyme is observable in the hepatocyte cytosol and mitochondria while the SGPT enzyme is found only in hepatocyte cytosol. Thus, once the hepatocyte is severely damaged, the content of SGOT plasma will be higher than SGPT. This matter indicates the ratio of SGOT: SGPT  $\geq$  1.

The descriptions of total albumin levels of hepatitis B patients were 38 individuals with normal levels (3.5 - 5.5 gr/dl) and 53 individuals with abnormal levels, 58%. Thus, hepatitis B patients with abnormal albumin levels were higher than those with normal albumin levels. Generally, the condition of hypo-albumin of the hepatitis B patient occurs due to various factors. Unfortunately, this situation leads to liver cirrhosis. The prolonged hepatocyte cellular damage interrupts the liver's function to synthesize protein. The heart is the central organ of metabolism and is important for protein metabolism. Albumin is a plasma protein synthesized in the liver.<sup>5</sup> Thus, prolonged hepatocellular dysfunction decreases the plasma protein. Ronald et al. (2004) explain that a significantly decreased albumin level is observable in people with increased SGOT and SGPT levels.<sup>6</sup>

Lower albumin in a group with a higher ratio than 1 compared to the group with a ratio lower than 1 occurred due to decreased albumin production in the liver. This matter also occurred due to fibrosis of the hepatocyte cells, increased albumin excretion via the colon due to gastropathy portal enteropathy, and portal hypertension found in patients with hepatitis B with a tendency of liver cirrhosis. The decreased albumin content occurs along the increased ratio de ritis.

A higher ratio de ritis than 1 indicates

chronic hepatitis disease, chronic hepatocellular problems, and liver dysfunction to synthesize albumin. Thus, the albumin amount decreases. Winda et al found that the decreased albumin level of hepatitis B patients was correlated to the increased SGOT, SGPT, and ratio de ritis.<sup>4</sup> The current research found that the lower albumin level of the group with a ratio de ritis was higher than 1. Thus, the research results found the albumin level differences based on the ratio deritis of hepatitis B disease.

## CONCLUSIONS

The Mann-Whitney test obtained Asymp. Sig (2-tailed) 0.000, lower than 0.05. Therefore, the result accepted  $H_a$  and denied  $H_o$ . Thus, the result indicated the albumin level differences based on the ratio de ritis of patients with acute and chronic hepatitis B at Local Hospital Kendari.

The researchers suggest further studies to investigate the albumin levels with ratio de ritis of the patients with hepatitis in a larger sample size. This suggestion is important because albumin is a sensitive indicator to determine the prognosis of the patients. Besides that, albumin is a heap indicator and easy to use for hepatitis B diagnosis. Common people and patients with hepatitis B should regularly check their SGOT, SGPT, and albumin to determine the disease development and apply accurate medical therapy. For hospitals and health institutions, the results are useful as a reference to create preventive interventions for hepatitis B transmission in Kendari.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Not applicable.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

Environmental sanitation is an environment's health status, including housing, sewage, and clean water supply. The sanitation situation in coastal areas is different from other areas. Most rural communities are far from proper sanitation. From the field survey, it has been found that 82% use ring slab toilets (Toilets are built by clay with one slab and two or three concrete rings), 12% hanging and 6% use septic tanks. The results show that there is a statistical relationship. 1) There is a relationship between the availability of clean water with the incidence of diarrhea. 2) There is no relationship between the availability of trash bins with the incidence of diarrhea. 3) There is no relationship between healthy homes and the incidence of diarrhea. Some good behaviors in caring for toddlers influence the incidence of diarrhea, such as the habit of washing hands with soap, wasting baby feces in the toilet, maintaining cleanliness, giving exclusive breastfeeding, maintaining the cleanliness of food and drinks, etc.

**Keywords:** *Environmental Sanitation, Diarrhea, Diarrhea in Coastal Areas.*

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## INTRODUCTION

Diarrhea is a global health problem and one of several infectious diseases with relatively high morbidity and mortality. Diarrhea contributes to child morbidity and mortality in various countries, including Indonesia. Indonesia is a country with a potential outbreak of diarrheal disease.<sup>1</sup> Diarrhea is an endemic in Indonesia and a potential epidemic disease often accompanied by death. In 2015 there were 18 outbreaks of diarrhea in 11 provinces and 18 districts/cities, with 1,213 sufferers and 30 deaths. The estimated number of diarrhea in health facilities in Indonesia reported in 2017 was 7,077,299 people, while the number of diarrhea reported by patients treated in health facilities was 4,274,790 people or 60.4%.<sup>2,3</sup>

Several factors that increase the risk of diarrhea are lack of clean water, waste disposal, and improper food preparation and storage. Diarrhea prevention is by maintaining personal hygiene, breastfeeding and nutrition, and environmental factors that play a major role in diarrheal diseases, such as basic sanitation. The house includes the type of floor house, the availability of healthy latrines, sewage management waste, and clean water sources. Diarrhea

is closely related to the physical condition of a healthy home and environmental sanitation. Previous research conducted in the Nyarugenge District, Rwanda, found an association between house floor conditions and diarrhea. Houses with non-waterproof floors (earth, wood/bamboo floors) allow the floor to become a place where dust accumulates and causes diarrhea.<sup>1,4</sup>

The true implementation of environmental sanitation in households is that they must have a goose-neck latrine or embankment with a lid, have a septic tank or wastewater disposal, and can be used alone or together (Kemenkes RI, 2018). Trash cans with closed conditions are also important because acceleration is said to be a vector of digestive tract diseases such as damp and dirty places such as piles of household garbage.<sup>5</sup>

A prominent risk factor in the early incidence of diarrhea is the family's socioeconomic status. The lower the economic level, the higher the risk of diarrhea because poverty and health are interrelated. Developing countries tend to have people with lower levels of health status than other countries. Oliveira et al. found that family socioeconomic factors, including family income and mother's knowledge, were associated with preventing diarrheal disease in children

under five. Furthermore, Mansur et al. noted that the socioeconomic vulnerability of families living around rivers (deltas and estuaries) could increase exposure to disease risk.<sup>5</sup>

There is a strong temptation to evaluate the health impacts of water supply, sanitation and hygiene interventions, but the challenges are also many. Sometimes it is difficult or impossible to randomize or to blind the intervention. In practice, most studies do not determine a specific etiology and disease with an outcome (diarrhea) caused by various pathogens transmitted by various routes and associations associated with various potential confounding factors. The vulnerability of such studies to confounding is compounded by using an observational study design and the relatively low risk involved. In developing countries, most levels of diarrheal morbidity and even many life-threatening morbidities are not reported to the health system; thus, active surveillance involves home visits to detect people, often with periods of excessive recall.<sup>6</sup>

In coastal areas, most rural communities use the toilet ring slab; this latrine is generally fragile and installed in a low-lying area; they are easy to collapse and also get flooded by flood water and they cannot use it during flood time. It goes people have no other choice but to open

defecation. So the overall environmental situation worsens through water pollution by human waste. Using polluted water and living in unsanitary conditions make people suffer from various types of water-borne diseases. Currently, the number of diarrheal diseases and dysentery is the highest among households. Due to communication breakdowns and long distances from households to healthcare centers, people face serious problems with emergency care during disasters.<sup>7</sup>

The effect of environmental sanitation on the incidence of diarrhea is still a very interesting theoretical concern and the research evidence is very significant. This review aimed to summarize research that describes the effect of environmental sanitation on the incidence of diarrhea in coastal areas.

## METHOD

### Search Strategy

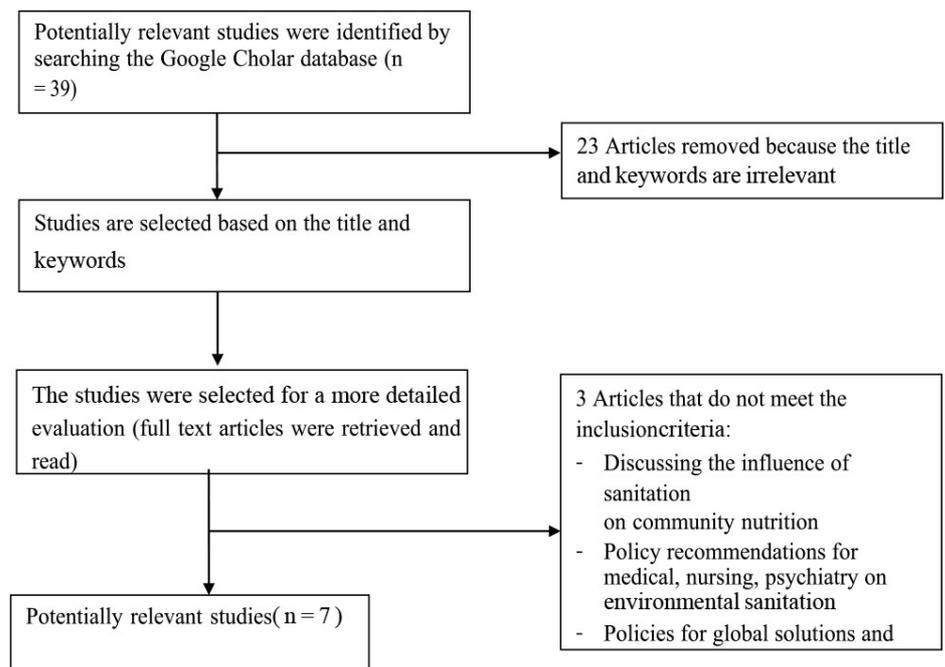
Google Scholar was used as the main source of the database accessed in September 2021 to extract studies published in English that discuss the context of the influence of environmental sanitation on the incidence of diarrhea. A series of keywords combining the effect of sanitation and the incidence of diarrhea was used to search for articles. We looked at articles published during 2010 – 2021. Keyword titles and abstracts were screened for the first step. For relevant articles and full articles that meet our inclusion criteria, we include them in the analysis.

### Inclusion Criteria

1. The article should assess the effect of poor environmental sanitation by discussing the diarrhea variable.
2. The article should use an epidemiological design such as actual analysis, spatiotemporal studies, and descriptive analysis to identify the relationship between climate change impacts and mental health.
3. Articles should discuss environmental sanitation and the incidence of diarrhea published in 2010-2021.

### Literature Search Results

The first step is thirty-four articles collected from Google Scholar. Among these articles, 23 were removed because



**Figure 1.** Article Review Flowchart.

they did not meet the title and keywords, while 16 were included. In the case of complete papers, articles are included, and at the final stage, 9 articles met the inclusion criteria. The methods and main findings of the 7 articles are summarized in [Figure 1](#). The study took place during (n = 1). This research study took place in Indonesia and Bangladesh—a systematic review of several different geographies and a global scoping review.

All articles included studied the effect of environmental sanitation on the incidence of diarrhea. Several methods were used to determine the relationship between diarrhea variables and the effect of environmental sanitation. Three articles use case-control tests.<sup>2,3,6</sup> Two articles of observational analysis.<sup>4,1,7</sup> One article used cross sectional.<sup>5</sup>

## RESULT AND DISCUSSION

In 2014, Canadian Public Health Leader Marc Lalonde explained the factors that cause disease. This theory is known as the Lalonde Framework and presents four factors at various levels that affect health: (1) environment (biotic-socio-cultural), (2) behavior (lifestyle), (3) related to health services, and (4) individual (biopsychosocial). Furthermore, based on the theory of disease occurrence (epidemiological triangle), diarrhea will not occur in children if there is a balanced

interaction between the three components, such as the host, agent, and environment. This condition will occur if there is an imbalance. The state of balance between the three components of diarrhea, namely the host (in this case, children), Chronic diarrhea of people living on the coast, with the provision of clean water, latrines, and household sewers that are not good enough can increase the risk of being contaminated with pathogenic bacteria so that if consumed it will cause diarrhea. This opinion is supported by Widoyono (2010), who explains that the transmission of diarrheal disease in toddlers is usually through the air, which is the main transmission medium. Diarrhea can occur when a person uses contaminated water, either contaminated from the source or contaminated during the trip to the house and during storage.<sup>3</sup>

The sanitation situation in coastal areas is different from other areas. Most rural communities are far from proper sanitation. From the field survey, it has been found that 82% use ring slab toilets (Toilets are constructed using clay with one slab and two or three concrete rings), 12% hanging and 6% use septic tanks. Some people defecate, some use boats, some people use temporary hanging latrines that connect water bodies and some use neighboring latrines together; so far, this vulnerable group (Women, Children and

Parents) is facing serious problems.<sup>7</sup>

The quality of household latrines does not directly affect the risk of diarrhea, but it is important in certain circumstances; the role of parents in children in using latrines at home and household latrine sanitation can reduce the risk of diarrhea.

Based on a level impact assessment, environmental hygiene was found to help reduce diarrhea in households. The effect of environmental hygiene on the community by increasing air coverage suggests that improvements in water and sanitation should go hand in hand for the strongest positive effect in reducing the risk of developing childhood diarrheal diseases.<sup>3</sup>

Some good behaviors in caring for toddlers have an influence on the incidence of diarrhea, such as the habit of washing hands with soap, baby excrement waste in the toilet, maintaining cleanliness, giving exclusive breastfeeding, maintaining the cleanliness of food and drinks, etc. This is in accordance with research that concludes that maternal behavior affects the incidence of diarrhea in infants.<sup>2</sup> The appropriate method of disposal of feces is that feces should not be in soil and surface water because it causes contamination and cleanliness of the soil and water sources, making it a good growth medium for plants. *E. coli*. The latrine must also be closed, free from odors or unsightly conditions, so as not to invite invitees and other animals to transmit diarrhea-causing pathogens. Dirt should not be touched with hands directly; when cleaning, it is also mandatory to wash hands with soap and running water.<sup>8</sup>

## CONCLUSION

From the results of the discussion, it can be concluded that (1) environment (biotic-socio-cultural), (2) behavior (lifestyle), (3) related to health services, and (4) individual (biopsychosocial) affect the health level of the individual. The main transmission of diarrhea in toddlers is through water and the fecal-oral route, exacerbated by the lack of proper toilet design. Also, the mother behavior and knowledge affect the risk of diarrhea in children.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Not applicable.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

In the context of implementing health development, it is necessary to have health financing, which aims to provide sustainable health financing in sufficient, effective and efficient amounts. The purpose of this study was to determine the planning and realization of the Maternal and Child Health (MCH) program budget, to analyze the MCH program financing against achievement indicators according to Minimum Service Standards (MSS). This research was conducted at the Health Office of East Kutai Regency. This research use a descriptive qualitative approach. MSS activities show an average program achievement of 82% with an average budget absorption of 72.5%. The low achievement of the toddler health service program is due to the low number of posyandu visits for toddlers after completing basic immunization.

**Keywords:** Financing, MCH, MSS, Health Office.

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## INTRODUCTION

The implementation of mandatory government affairs in terms of providing public services to meet the needs of citizens, is guided by the Minimum Service Standards (MSS) which regulates the type and quality of basic services starting from the data collection stage, planning the calculation of needs, fulfillment plans and the implementation of these basic services.<sup>1</sup>

In implementing the MSS in the Health Sector, a Technical Standard for the Application of MSS is prepared which explains the operational steps for achieving MSS in the Health Sector, which becomes a reference for local governments by taking into account the potential and capabilities of the region. MSS is a performance appraisal tool for local governments in providing basic services. So that the application of SPM in the regions becomes the material for the Central Government in formulating national policies, providing incentives, disincentives and administrative sanctions for Regional Heads. So that SPM also functions as an instrument to strengthen the implementation of Performance Based Budgeting.<sup>2</sup>

In an effort to measure the success of development, a process of monitoring and supervision is needed in the preparation

and implementation of development policies, as well as assessing the results of the realization of performance and finances, to ensure that the targets that have been prepared run effectively and efficiently. This includes measuring the gap between current and planned development performance. And in terms of management of mandatory affairs based on basic services, including in the health sector, these MSS indicators are things that must be paid attention to.<sup>3</sup>

One of the challenges faced by most districts/cities in Indonesia is the high Maternal Mortality Rate (MMR), as well as in East Kutai Regency where the number of maternal deaths in 2021 is 176 per 100,000 live births with an absolute number of 13 mothers. With the most cases in North Sangatta District with the number of cases 8 mothers.<sup>4</sup>

In facing this challenge, the government of East Kutai Regency has committed to improve the quality of health. This can be seen by the decrease in maternal mortality cases in 2021 compared to conditions in 2020, where in 2020 there were 16 maternal deaths, with an MMR of 198 per 100,000 live births.<sup>5</sup>

However, what is still questionable is the extent to which this commitment is reflected in the health financing budget program in order to achieve health

development goals. The results of previous studies show that the lack of budgeting in the health sector can be seen as a low appreciation of the importance of the health sector as a buffer element, which if neglected can lead to a series of other problems that can actually absorb even greater regional finances.<sup>6</sup>

This study tries to explore the extent to which the utilization of the health financing budget on the achievement of the Maternal and Child Health (MCH) program according to the MSS in the health sector in East Kutai Regency in the 2021 fiscal year. Timur in responding to challenges in an effort to improve health status in East Kutai. In addition, this study is also complemented by a qualitative study through in-depth interviews with policy makers in order to understand the extent of planning and evaluation of budgeting in the MCH program. The focus of this research is on 4 sub-activities in the MCH Program, namely: Maternal Health Service Sub-Activities, Maternal Health Services, Newborn Health Services and Toddler Health Services.

## METHODS

This study uses a qualitative descriptive approach, namely the formulation of the problem and secondary data found in the field. An analysis is carried out by

extracting information from stakeholders, in order to draw conclusions to answer the research objectives. The analysis was carried out on primary and secondary data sourced from the Health Office of East Kutai Regency. Then a problem identification process is carried out which includes the planning process and the realization of the MCH Program budget in the 2021 fiscal year.

## RESULTS

### Budget Planning

The results of in-depth interviews with several informants from the East Kutai District Health Office found that: (1) Health problems did not affect the budgeting because the calculation of the budget was routine with different individual patients each year. However, there were also informants who stated that they were influential because health problems were used as the basis for determining the priority of activities to be financed, especially at the level of puskesmas program managers. (2). The relationship between program performance analysis and budget planning shows that most of the informants stated that program performance is needed in budget planning, because it will be used as the basis for determining activity priorities. (3) Analysis of environmental and behavioral factors with budget planning shows that all informants stated that they were needed and influential because the environment and behavior as well as community access greatly influenced the success of the program.

Based on the results of in-depth interviews on the situation analysis, it shows that the budget planning prepared by the Health Office of East Kutai Regency is based on performance which includes the performance achieved last year and the planned target achievement for the coming year. The budget planning process starts from the Community Health Center's Proposed Activity Plan which is the result of the Puskesmas Level Planning document process, which is adjusted to the Strategic Plan of the Health Office. The compiled budget is part of the Regional Work Plan (RKPD) document for East Kutai Regency. In the process, the priority scale is still being

determined to accommodate all proposed activities, adjusted to the ceiling allocation that will be accepted in the final draft of the RKPD. Then the activities that are not accommodated are strived to continue to be held by combining these activities with other similar activities. Thus, it can be said that the East Kutai District Health Office combines a budget-based targeting and Target-based budgeting approach, namely where in practice the East Kutai District Health Office has received the estimated ceiling amount to be managed in the coming year but must be adjusted to the targets that have been set. determined by the Head of the Department of Health. The process of determining the priority scale is carried out in a transparent manner involving all heads of fields and program managers who are discussed through the internal meeting forum of the health office.

### Budget Realization Analysis

The analysis of the budget realization of the MCH Program includes the process of calculating the budget, the linkage of the budget with the SPM, the realization of budget absorption, the adequacy of the budget, sources of funding, the achievement of targets and the basis for budget allocation. Based on the results obtained from informants, it can be concluded several things as follows: (1) The Health Office of East Kutai Regency conducts the process of calculating the MCH program budget by following the existing Pre-Work Budget Plan format in detail, the budget follows the activities that have been prepared in accordance with the

codetification contained in Permendagri 90 of 2019.<sup>7</sup> (2) The calculation of the budget at the Health Office in principle has been linked to the MSS target, but the object of spending is still on service facilities such as posyandu, treatment centers, hospitals or birth waiting homes. Meanwhile, for individual visits, the budget is only for activities that are sweeping and tracking maternal audits, this is because apart from not allowing the provision of individual health services due to the limited number of personnel, it will also require a large amount of funding in its implementation. (3) In terms of budget adequacy, most of them are relatively fulfilled, this can be seen from the remaining silpa at the end of the fiscal year. However, in terms of realization, there are sub-activities with low realization, namely the Maternal Health Service Sub-Activity where the budget realization is only 42% (4) The sources of funds used to carry out activities at the Health Service in East Kutai Regency consist of various sources, namely the General Allocation Fund (DAU), the Non-Physical Special Allocation Fund (DAK) for the Health Sector and the Cigarette Tax Revenue Sharing Fund (DBH). All of these budget sources are integrated into the body of the East Kutai Regency APBD. (5) There are internal and external factors in supporting the success of the MCH Program. Internal factors are the performance of officers, support for infrastructure, motivation of officers, the suitability of targets with conditions in the field. External factors are the environment and the community, trust, awareness and

**Table 1. Ceiling of Fund Allocation and Realization of Expenditure for FY 2021.**

Sub Activities	Allocation Ceiling	Realization	Percent
Maternal Health Services	910.792.305	780.402.550	86%
Maternity Health Services	2.565.245.000	1.069.916.900	42%
New- Born Health Services	272.890.250	259.382.400	95%
Children Under - five Health Services	603.135.649	432.992.068	72%

**Table 2. Achievements in the Achievement of the MCH Program Performance in 2021.**

Indicator MSS	Target	Realization	Percent
Maternal Health Service	8.305	7.163	86%
Maternity Health Service	7.928	7.042	89%
New Born Health Service	7.550	6.735	89%
Children Under Five Health Service	34.867	22.399	64%

cooperation of the community towards programs and partnerships that are built both across programs and across related sectors

Of the four MCH programs that became the focus of research, the largest budget allocation was for Maternal Health Services Sub-Activities, amounting to Rp 2,565,245,000.00, while the Sub-Activities with the smallest expenditure allocations were for Newborn Health Services Sub-Activities, amounting to Rp 272,890,250,00.<sup>8</sup>

Based on the realization of spending on the four sub-activities that became the focus of the research, the highest percentage of expenditure realization was in the Sub-Activity of Newborn Health Services, amounting to Rp. 259,382,400.00 (95%), while the lowest percentage of expenditure realization was the Maternal Health Service Sub-Activity, amounting to Rp 1,069,916,900.00 (42%). This low absorption is due to the budget for the maternity insurance program for the poor who do not have health insurance. And in practice not all pregnant women use the program. This is inseparable from the status of Universal Health Coverage (UHC) in East Kutai Regency, where the participation coverage of the National Health Insurance Program (JKN) of East Kutai Regency has exceeded 95% of the total population.<sup>9</sup>

### **Analysis of MCH Program Financing on MSS Indicators**

The Strategic Plan (Renstra) of the Health Office 2021 – 2026 which is an elaboration of the Medium Term Development Plan (RPJMD) of East Kutai Regency, has included MSS indicators as outputs from Sub-Activities in each MSS indicator.<sup>10</sup>

From the interviews, it is known that in determining the performance targets of the MCH Program, the Health Office always refers to the referrals from the Ministry of Health using the East Kutai Regency Population and Civil Registry (Disdukcapil) data released in the previous year, which is the latest population data during the planning process.

There are weaknesses obtained in this process, namely: there is a discrepancy between the SPM target and the reality on the ground. One of them is the data is

not up to date. With the KTP rule for life, not all residents renew their KTP. So that there are many palm oil workers who still hold KTPs from their regions, or there are East Kutai residents who are domiciled outside East Kutai but still hold East Kutai KTPs, so they are still listed as targets that must be provided with services. Another thing that is a problem is the migration of residents between villages, this case usually occurs in the families of oil palm workers where they will move from one camp to another according to the location of the plantation they are working on, so this also has an impact on the recording of service history his health.

Based on data on the realization of SPM in the health sector of the East Kutai Regency Health Office in 2021, it shows that none of the SPM activities have been able to achieve the 100% target. The highest achievement was in maternal and newborn health services with a percentage of 89%. While the lowest percentage of achievement is in the health services for children under five, which is 64%. The low level of health services for children under five is due to the low number of visits to posyandu / health service facilities for groups of toddlers who have received complete basic immunizations. So that in providing health services for toddlers, health workers are more likely to pick up balls in toddler play groups and PAUD, so that children under five can still get health services.

### **CONCLUSION**

The conclusion obtained from the results of this study is that the MCH program planning and budgeting process at the Health Office of East Kutai Regency has implemented performance-based planning and budgeting with a description of expenditures that are adjusted to technical standards for meeting the quality of MSS, through a budget-based targeting mechanism. has been determined beforehand, only after that the targets and types of activities are adjusted to the size of the available budget.

The suitability of the MCH program financing to the achievement indicators according to the MSS at the East Kutai District Health Office is realistic, some is not and tends to be unrealistic. The

discrepancy between the target and the reality on the ground is due to the target number for each MSS indicator is calculated by comparing the service achievement with the projected target, while the projected target is not always the same as the conditions in the field.

The suggestions that can be given are optimizing the MCH program across sectors as well as across sectors in an effort to achieve the target by taking into account the availability of manpower, facilities and infrastructure to support services, besides that a special study is needed in calculating target projections so that targets in the field are more realistic, given the geographical conditions. in East Kutai Regency is quite extensive and population mobility is quite high.

### **CONFLICT OF INTEREST**

No conflict of interest.

### **FUNDING**

No third-party funding was involved in this study.

### **ETHICS**

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang.

### **AUTHOR CONTRIBUTIONS**

All authors contributed equally in the writing of this article.

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# Relationship of House Sanitation, Knowledge and Mother's Behavior with Stunting infants in the Work Area of Mangkupalas Health Center Samarinda

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## ABSTRACT

**Background:** Stunting in infants is a lack of adequate nutrient intake which is influenced by several factors including lack of parental knowledge, lack of attention or support for their children, an unclean environment, limited access to food and poverty, and frequent illnesses such as diarrhea.

**Objective:** The purpose of this study was to determine the relationship between house sanitation, knowledge, and Mother's behavior with stunting in infants.

**Research Methods:** Implementation Methods: The research was an observational study with a cross-sectional and study analyzed using univariate tests using chi-square.

**Results:** This study illustrates that 24.1% of toddlers experience stunting where the height measurement results in toddlers are not age-appropriate. Stunting in toddlers is also related to environmental conditions and maternal behavior towards breastfeeding and complementary feeding. Environmental factors such as the use of clean water also affect the growth and development of children under five on this study illustrates that there are still 23% of respondents who do not have access to clean water. Around 48.6% of children under five get stunting also due to poor maternal behavior.

**Conclusion/Lesson Learned:** House sanitation conditions, knowledge, and behavior of mothers have a significant relationship with the incidence of stunting in children under five in the working area of the Mangkupalas public health center, Samarinda.

**Keywords:** House sanitation, knowledge, behavior, stunting, children under five.

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## INTRODUCTION

Nutritional status in toddlers is an important thing that must be known for parents to grow toddlers' development, malnutrition can affect toddlers' brain development.<sup>1</sup> Stunting in children under five is a consequence of several factors that are often associated with poverty including nutrition, health, sanitation and the environment. There are five main factors that cause stunting, namely poverty, social and culture, increased exposure to infectious diseases, food insecurity and people's access to health services.<sup>2</sup>

Parental behavior is very important in fulfilling nutrition because at times like these children really need the attention and support of their parents in facing very rapid growth and development. To get good nutrition, parents need knowledge of good nutrition so they can provide a balanced menu of choices. Exclusive breastfeeding affects development because

breast milk has good ingredients for child development besides breastfeeding can also be a stimulus for child development.<sup>3</sup>

According to Hendrik L. Blum's theory (Health Determinant Factor), environment and behavior are factors that influence human health status.<sup>4</sup> Among these factors, parental behavior is the biggest and most difficult determinant factor to overcome, followed by environmental factors. This is due to behavioral factors that are more dominant than environmental factors, because the human environment is also strongly influenced by parental behavior. The question of this research is whether there is a relationship between Environmental Sanitation and maternal behavior with the incidence of stunting in toddlers. The purpose of this study was to determine the relationship between environmental sanitation conditions and parental behavior with stunting in toddlers.

## METHOD

Conservational research design with a cross-sectional approach, the research subjects were 79 mothers with toddlers. The sampling technique was carried out by proportional random sampling. The collected data were analyzed by univariate test using frequency distribution and bivariate test using chi square. This research is intended to determine the relationship between parental behavior and stunting in toddlers. The sampling technique uses a probability sample with random sampling or simple random sampling. Data analysis used the results of research using Chisquare with the help of the SPSS program.

## RESEARCH RESULT

Univariate analysis was carried out to obtain an overview of the data frequency of each variable, namely environmental

conditions by describing the value of each variable used in the study. In the following, the research results are presented in the form of a percentage frequency distribution table accompanied by a descriptive explanation of the research results

### Environmental conditions

Based on [table 1](#) below, there are two categories of good and bad environmental conditions where 32 respondents with a percentage (40.5%) stated that the environmental conditions were good, while 47 respondents with a percentage (59.5%) stated that the environmental conditions were not good. The analysis results obtained in [table 1](#).

### Stunting events

Based on [table 2](#) below, there are two categories of stunting, stunting and not stunting where 60 respondents with a percentage (75.9%) were declared not stunted, while 19 respondents with a percentage (24.1%) were declared stunted.

Bivariate analysis was carried out to find out the relationship between the dependent and independent variables using the Chi-square statistical test. This is to find out the relationship between the independent variable, namely environmental conditions and the incidence of stunting in toddlers in Mangkupalas Health Center.

## DISCUSSION

From the results of the bivariate analysis of the incidence of stunting under environmental conditions, the results

of the Chi-Square Test with  $\alpha = 0.05$  obtained that the value of  $p = 0.002 < \alpha$  ( $p < 0.05$ ) indicated that the test decision obtained was that  $H_a$  was accepted, meaning that there is a relationship between environmental conditions with the incidence of stunting in toddlers in Mangkupalas Health Center. The results of the study showed that the environmental conditions there were still very minimal, from the results of the questionnaire which stated that clean water sanitation and lack of latrines greatly influenced the incidence of stunting. Environmental sanitation, especially clean water, prevents the development of diseases which together with sanitation and hygiene affect health, nutritional status, especially malnutrition.<sup>5</sup> An environment that does not meet health requirements allows the occurrence of various types of diseases. The condition of the house has a significant effect on the nutritional status of toddlers. Good environmental sanitation can protect children against stunting.<sup>6</sup>

Similar to research conducted by uliyanti (2017) in West Kalimantan stated that there was a significant relationship between stunting and clean and healthy lifestyle.<sup>7</sup> The results of the univariate analysis obtained information that 30.4% had good PHBS, 61.8% were in the moderate category and 7.8% were not good.<sup>8,9,10</sup> The results of the research conducted show that clean and healthy living behavior in the downstream Matan sub-district is still relatively low. This statement is based on observational data on the clean and healthy lifestyle of the

respondents, especially in terms of the aspect of clean water facilities, namely only 66.7% can meet the needs of clean water, another aspect is toilet facilities, 69% of which fulfill or have good toilet facilities, then there were family members who smoked by 78%, for the aspect of eating vegetables and fruit only 64% fulfilled it while the remaining 30.4% did not eat fruit and vegetables.<sup>11</sup> The results of the study illustrate that parental education also influences the incidence of stunting. In this study, an average of 39.2% of parents had junior high school education. This is supported by Nurmaliza's research (2018) which says that low parental education affects knowledge of toddler nutrition, namely stunting, low maternal education is the main cause of stunting.<sup>12</sup>

## CONCLUSION

Based on the results of the study of 19 toddlers who were stunted with good behavior, there was 1 (2.4%), toddlers with poor behavior, there were 18 (48.6%) toddlers. Meanwhile, out of 60 toddlers with good behavior, there were 41 (97.6%) toddlers and there were 19 (51.4%) toddlers with bad behavior so that a Continuity Correctionb value of 0.000 was obtained which indicated that there was a significant relationship between environmental sanitation conditions and mother's behavior with incidents stunting in toddlers in the working area of the Mangkupalas Health Center.

The results showed that out of 79 respondents who were not stunted, there were 60 with a percentage of 75.9%. Meanwhile, 19 toddlers with a percentage of 24.1% were declared stunted. Based on the results of statistical tests, it can be concluded that there is a significant relationship between environmental conditions and the incidence of stunting in toddlers in the working area of the Mangkupalas Health Center.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

**Table 1. Environmental Conditions in the Working Area of the Mangkupalas Health Center.**

Environmental Conditions	Total	
	N	%
1. Well	32	40,5
2. Not good	47	59,5
<b>Total</b>	<b>79</b>	<b>100</b>

**Table 2. Incidence of stunting in the working area of the Mangkupalas Health Center.**

Incidence of stunting	Total	
	N	%
1. Stunting	60	75,9
2. Not stunting	19	24,1
<b>Total</b>	<b>79</b>	<b>100</b>

## ETHICS

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

**Introduction:** Accidents are unplanned and unintended incidents or often interpreted as events that cannot be prevented. Meanwhile, most entrepreneurs ignore the aspects of safety, health, and working conditions because they are considered a burden that requires large costs.

**Objective:** This study aims to determine the risk analysis of work accidents in the Ground Handling units of PT. Gapura Angkasa at Sultan Hasanuddin International Airport.

**Method:** An analytic observational study was conducted with a quantitative method and a cross-sectional approach. The sample included 95 workers, while the data were processed using SPSS (Statistical Package for the Social Sciences) and analyzed using the chi-square method.

**Results:** The results showed that there was a significant relationship between the assessment of unsafe conditions with accidents ( $p = 0.000$ ), as well as unsafe actions with accidents ( $p = 0.000$ ). There was also a significant relationship between the identification of unsafe conditions with accidents ( $p = 0.000$ ), as well as unsafe actions with accidents ( $p = 0.000$ ).

**Conclusion:** Based on the results, the company needs to improve safety at every job to reduce unsafe actions and conditions.

**Keywords:** Accident, Hazard Identification, Risk Assessment, Risk Control.

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## INTRODUCTION

Accidents can be defined as unplanned and unintended incidents, which are usually interpreted as some form of events that cannot be prevented. According to the law, each person managing a company must provide a workplace that aligns with OSH regulations.<sup>1</sup> Furthermore, hazards exist in almost the entire sector of a company, hence, efforts are needed to contain and overcome risks that might arise due to the work process. This requires a process consisting of identification, risk assessment and control, as well as evaluation of control sites that have been interpreted.<sup>2</sup> Meanwhile, the word accident is used to describe circumstances beyond the control of the person involved or an event associated with damage or injury.<sup>3,4</sup>

Hazards or accidents can cause damage through substances or machines, work methods, or other things in an organizational unit. They also include situations or actions that have the potential to cause damage or injury to living things, or other disturbances.<sup>8,9</sup> Work accident

risk analysis and control need to be carried out to reduce the number of fatalities as well as improve worker safety and company productivity.<sup>10</sup> Therefore, this study aims to determine the risk analysis of work accidents based on units in Ground Handling of PT. Gapura Angkasa at Sultan Hasanuddin International Airport.

## METHOD

This is an analytic observational study conducted at PT. Gapura Angkasa of Sultan Hasanuddin International Airport in August - October 2022 using a quantitative method with a cross-sectional approach. The population included all workers of the ground handling division with a total of 130. Meanwhile, the samples were 95 workers selected based on a method developed by Isaac and Michael where the number of samples must be 95 people for an error rate of 5% with a population of 130

The variables tested include work accidents, age, work period, working hours, posture, and knowledge. Data were collected through field observations and interviews with the aid of a questionnaire.

Before filling out the questionnaire, an approval of informed consent was submitted, while the conditions of the study location and the workers were directly observed. The questionnaire used was in the form of questions related to worker characteristics, namely accidents that have occurred in the ground handling area.

Furthermore, a risk control table was also made in HIRARC which aims to reduce the hazard in the work area. This table serves as reference material for the company to continue improving the quality of OSH, especially in the ground handling division. Data and information collected through observation with the questionnaire and measurements were analyzed using univariate (frequency) and bivariate (Chi-square) tests. Additionally, risk analysis was carried out such as hazard identification, risk assessment and control.

## RESULTS

As shown in table 1, the level of hazard is usually assessed from the lowest to the highest. Referring to AN/ZS 4360:2004, the risk level assessment is taken from

**Table 1. Chi-Square Test and Regression Analysis of Independent Variables on Accidents.**

Independent Variable	Hearing Disorders		P-value	
	Ever (n(%))	Never (n(%))	Chi-Square	Pearson Chi Square
<b>Age</b>				
Mature	67 (93.06%)	16 (69.57%)	0.004	8.7157
Old	5 (6.94%)	7 (30.43%)		
<b>Working Hours</b>				
Long > 8 Hours	38 (95%)	2 (5.00%)	0.056	3.6462
Fast <= 8 Hours	45 (81.82%)	10 (18.18%)		
<b>Gender</b>				
Male	61 (85.92%)	10 (14.08%)	0.463	0.5376
Female	22 (91.67%)	2 (8.33%)		
<b>Work Period</b>				
Under 5 years	56 (90.32%)	6 (9.68%)	0.235	1.4114
Above 5 years	27 (81.82%)	6 (18.18%)		
<b>Last Education</b>				
Senior High School	54 (87.10%)	29 (87.88%)	0.913	0.0119
Undergraduate	8 (12.90%)	4 (12.12%)		
<b>Identification of Unsafe Actions</b>				
Risky	77 (95.06%)	4 (4.94%)	0.000	18.2234
No Risk	8 (57.14%)	6 (42.86%)		
<b>Identification of Unsafe Conditions</b>				
Risky	79 (97.53%)	2 (2.47%)	0.000	37.8857
No Risk	6 (42.86%)	8 (57.14%)		
<b>Assessment of Unsafe Conditions</b>				
Risky	73 (96.05%)	12 (63.16%)	0.000	17.4632
No Risk	3 (63.16%)	7 (36.84%)		
<b>Assessment of Unsafe Actions</b>				
Risky	81 (95.29%)	4 (4.71%)	0.000	29.0457
No Risk	4 (40.00%)	6 (60.00%)		

Source: data processed (2022)

the multiplication of the likelihood (O) and the consequence scale (S) with levels ranging from low to high. There are 4 colors and letter codes for each risk or hazard level, including Green (L) or low-risk consequence level, Yellow (M), for Moderate, or medium, Blue (H) for high-risk, and Red (E) representing very high-risk.

## DISCUSSION

The analysis shows that hazard identification is carried out using primary data in the form of observation and distributing questionnaires to workers, HSE employees, and co-workers. Identification results were obtained in the form of 4 work sections namely a preparation stage, Approaching the Aircraft, Operations, and Leaving the Aircraft; as well as 20 work process stages.

Ergonomic hazards are caused by the inefficiency of how humans work with tools and the effect can be felt in the long term, especially when it is carried out repeatedly and continuously. Meanwhile, chemical hazards occur due to the contamination or exposure to harmful chemicals in the form of liquids, aerosols or solid materials [20]. Identification results were obtained from 4 work sections namely preparation stage, Approaching the Aircraft, Operations, and Leaving the Aircraft; as well as 20 work process stages. To facilitate work, Aircraft Towing Tractors, ATN, BTT, LST, and WST are used to move goods from the airport to the plane or vice versa.<sup>20</sup>

## CONCLUSION

Moreover, occupational safety risk assessment for the Ground Handling unit at PT. Garuda Angkasa of Sultan

Hasanuddin International Airport has risk levels ranging from the lowest score to the highest. The highest level of risk in the range of 15-20 was found in the process of approaching the aircraft including drowsiness while driving the equipment, slippery roads, rushing to approach the aircraft, absence of guides to direct the installation of the towbar, poor visibility, not following the procedure when pushing aircraft, and falling of objects from the trunk fall near the engine. To prevent work accidents, the company is recommended to improve supervision of the worker's behavior while working. Furthermore, there is a need to provide rewards and punishments to workers in the field to avoid the dangers of accidents

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang.

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All authors contributed equally in the writing of this article.

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## ABSTRACT

Oil and Gas Company X which has the most extensive exploration unit in Indonesia, has several exploration fields. Due to the operation field being far from Balikpapan City, the company provides special transportation facilities for going and returning employees on duty in the operating area. So that the role of drivers is crucial in the continuity of business processes in this company. Drivers are required to have high concentration and mentality in making decisions quickly and accurately. In addition, monotonous driver activity when road conditions are smooth can cause driver burnout to increase. This study aims to analyze the mental workload and the level of driver burnout and provide suggestions for reducing the level of mental workload and driver burnout. Mental workload was measured using the NASA-TLX method while MBI method used to analyze level of burnout. Result showed that the average mental workload of drivers was 69.1 (classified as high category), and the average operator burnout level was 14.44 (classified as low category). In addition, there is no significant correlation between mental workload and drivers' burn out. Suggestions was given in the form of encouraging driver to have regular schedule, sleep, break and vacation as well as better eating habit.

**Keywords:** NASA-TLX; MBI; Driver; Mental Workload; Burnout; Correlation.

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## INTRODUCTION

Driver burnout is a well-known contributor to potentially fatal car accidents. Burnout has several components, with symptoms including mental, physical, and muscular burnout, which they claim, are the most critical aspects of burnout in a driving context.<sup>1</sup> In addition, much of the research is consistent to assume that accident risks are strongly associated with driver mental workload, attending to the impact that it has on driving task performance and road safety.<sup>2</sup> Mental workload is the adaptation and interaction between work requirements and employee's perception, talents, abilities and emotions<sup>3</sup> and it is related to mental needs and the availability of human brain resources.<sup>4</sup> Thus, job burn out and mental workload are the contributors for potentially fatal car accidents.

Oil and Gas Companies X has several exploration fields which are spread over several areas, such as Samboja, Sanga-Sanga, Handil, and Tani Baru. Due to the operational field being far from Balikpapan City, the company provides

special transportation facilities for going and returning employees who work in the field. Thus, the driver's role is crucial in the continuity of the business processes in this company. Prolonged time on the road with too few breaks, traffic headaches, poor road conditions and lack of physical exercise can lead to drivers' burn out and high mental workload. Researching job burn out and mental workload of drivers will ensure that the security in the whole process of shuttle transport of the technician.

Several studies have been conducted to determine the relationship between job stress and burnout, i.e., job stress as one of the main factors affecting job burnout.<sup>5</sup> Furthermore, job burnout affects the daily life of a professional, increases time and costs, reduces employee satisfaction, and ultimately leads to job burnout.<sup>6</sup> Therefore, this paper aims to examines the mental workload and burnout experienced by drivers at Oil and Gas Companies X.

## METHODS

This study used quantitative research to collect quantitative data from 18

respondents. In addition, a descriptive study was conducted to determine the level of workload and the level of job burnout. In this study, linear regression was conducted to investigate the relationship between the independent variables (mental workload) and the dependent variables (job burnout) of the driver.

NASA-TLX was used to assess mental workload.<sup>3</sup> The NASA-TLX has six dimensions related to workload. The assessment is achieved by requesting the respondents to rate mental (MD), physical (PD), and temporal demands (TD) imposed by the completion of the task, as well as the level of frustration (F) they experienced, number of performance concerns they had, and overall effort required to complete the task. Mental and physical demands determine the level of intellectual/perceptual and physical work required for completion of a task, respectively. The temporal demand provides the measure for time pressure during the completion of the task. The effort component assesses mental and physical work required to perform at a certain proficiency level. The frustration

component evaluates the level of stress associated with completion of the task. In the first part of the NASA TLX, participants are asked to rate each dimension on a 0–100 scale at five-point intervals. In the second block, the dimensions are compared in a binary comparison and each dimension is selected as more important and effective than the other (according to participants) in the experienced mental workload. The mental workload is calculated. The score interpretation based on calculated WWL are low (0-9), medium (10-29), rather high (30- 49), high (50-79), very high (80-100).

Work Retention Scale developed by Maslach<sup>7</sup>, the MBI is a 22-item instrument used to assess burnout of the drivers. The MBI measures three dimensions of burnout: emotional exhaustion (EE), depersonalization (DP) and reducing personal satisfaction (PA) consist of 9, 5, and 8 items respectively. Likert scale ranging from 0 (never) to 6 (every day) were adopted. Scales are scored such that higher scores indicate more of each construct. Higher scores on the EE and DP subscales indicate a higher burnout symptom burden, lower scores on the PA subscale indicate a higher burnout symptom burden. Their range is 0-45, 0-25, and 0-40, respectively. High scores on anxiety (>27) and depersonalization (>13), and self-satisfaction (<31) indicate burnout. The reliability and validity of the MBI and its subscales are well established.

The collected data were analyzed using SPSS software version 23. Descriptive and analytical statistical tests, such as two-way ANOVA, paired t-test, independent t-test, chi-square, Pearson correlation coefficient, and significant level  $p \leq 0.05$ , were prepared to examine the effect of different variables.

## RESULTS AND DISCUSSION

The population of the drivers were male, aged 30-34 years old (16.6%) and 35-39 years, 40-44 years, 45-49 years, 50-54 years each with a percentage of 11.1%, 22.2%, 33.3% and 16.6% respectively.

Result showed that all dimensions of mental workload except for the frustration dimension classified as high category with mean, i.e., 10.4, 11.9, 12.7, 14.7, 13.1, 6.2 for mental demand, physical demand, temporal demand, own performance,

**Table 1. Level of Burnout.**

Dimensions	Mean	Level
Occupational Exhaustion (OE)	6.61	Low
Depersonalisation (DP)	2.44	Low
Reduction of Personal Accomplishment (PA)	5.39	Low
Total	14.44	Low

**Table 2. Correlation between the Mental Workload and Burnout.**

Variables	OE	DP	PA
MD	0.857	0.799	0.603
PD	0.334	0.339	0.655
TD	0.733	0.139	0.984
OP	0.888	0.257	0.778
EF	0.706	0.797	0.845
FR	0.992	0.769	0.226

effort and frustration respectively. The average score among the driver was 69.1 which classified as high. Interviewed the drivers resulted on finding activities that contributed to high score on each mental workload' dimension. Unpredictable road conditions that require drivers to make decisions quickly was the cause of high mental workload. Some physical activities that must be carried out as part of the job, such as lifting goods to be put into the vehicle and washing the vehicle when finished contributed to high score of physical demand. Meeting deadlines to deliver passengers safely in the shortest possible time was the cause of high score of temporal demand. Drivers obliged to give best service for passenger's safety and comfort in order to avoid poor feedback. This pressure contributed as factor lead to high score of effort.

On the other hand, frustration dimension score was low, since the drivers were enjoy doing the work and they experienced good working environment. In other word, job satisfaction led to low frustration.

The second objective of the study was to determine the level of job burnout. Table 1 showed the overall mean values and standard deviation analysis on job burnout. There was the low mean score on job burnout which was 14.44. Overall, the majority of the driver showed low levels of emotional exhaustion, low levels of depersonalization, and low levels of reduction of personal accomplishment.

The third objective of the study was to determine the relationship between workload and job burnout among drivers.

Table 2 showed the overall value of Pearson correlation coefficient between workload and job burnout. The results showed that there was no significant relationship between workload and burnout ( $p > 0.05$ : Pearson Correlation tests).

Result showed that level of burnout on drivers in Oil gas company X were low, and their mental workload were high. Drivers stated that they were enjoying the work so that the frustration had low category despite others dimension of mental workload classified as high category. Research in Brazil stated that the lower the level of emotional exhaustion, the higher the job satisfaction.<sup>8,9</sup> Thus, in this case study, burnout was not correlated with mental workload, because the drivers were satisfied with their job and this factor overcame all the mental demand that they experienced.

Job satisfaction was described of 6 dimensions, i.e., satisfaction of administration, team, leadership, compensation and benefits, training development, job objectives and performance appraisal.<sup>10</sup> Extended interview with the drivers showed that they satisfied with those dimension in Oil and Gas Company X. The examples of statements in the interview i.e., the drivers' passion was to give the best service to the passengers (technicians) and the relation between drivers were very good; they were support each other.

In order to manage high mental demand, the driver should:

- get regular sleep. Regular sleep can keep the driver alert while driving and manage the mental health tough.

- get regular schedule. Regular schedule impacts on regular sleeping and reducing fatigue
- get regular break and vacation. Regular break for example walking a little bit in rest area can break the monotony.
- Get better eating habits, for example reducing consumption of energy drink and soda.

## CONCLUSIONS

In this case study, the mental workload of the driver was high; however, the burn out level was low. Furthermore, burn out was not correlated with mental workload. This may be caused by the job satisfaction of the drivers. Further study needs to be conducted to measure the job satisfaction among drivers and evaluate the correlation with burn out and mental demand. Finding of this study showed that the mental workload of the drivers was high, therefore company management needs to measure driver's mental and burnout periodically. Furthermore, relevant authorities need to consider the suggestions in order to reduce the mental workload.

## CONFLICT OF INTEREST

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter discussed in this paper.

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## ETHICS

All of the authors confirmed that this paper is the authors' own original work, which has not been previously published elsewhere.

## AUTHOR CONTRIBUTION

Theresia AP, Mayestika A and Lina DF contributed to the design of the research. Mayestika A contributed to data collection and computation of the research. Theresia AP, Lina DF and Farida S contributed to analyze and supervised the finding of the research. All authors discussed the results and contributed to the final manuscript.

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# The Effect of Long Working Hours on Blood Pressure using Sleep Quality as an Intervening Variable for Transportation Sector Workers in Parepare, Indonesia

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## ABSTRACT

**Background:** Long working hours are various from one country to another. Long working hours can cause poor sleep quality. Therefore, the length of work can affect health and have an impact on the incidence of hypertension of workers.

**Objective:** This study aims to analyse the effect of length of work on the incidence of hypertension and sleep quality. Also, it shows the relationship between the three variables.

**Method:** Quantitative research with cross sectional method. Blood pressure check with automatic sphygmomanometer and Pittsburgh Sleep Quality Index (PSQI) questionnaire to assess sleep quality. The data were analysed using chi-square and logistic regression.

**Result:** Length of work has a direct effect on sleep quality with a p value of 0.003 (<0.05) and the magnitude of the influence can be seen in the estimated value, which is equal to 0.273. Long time working on blood pressure also has a direct relationship with the p value of 0.001 (<0.05) and the magnitude effect is 1.006. Sleep quality on blood pressure also has a direct relationship with p value 0.001 (<0.05) with a large influence of 0.517.

**Conclusion:** There is a direct and indirect relationship between length of work and blood pressure where sleep quality is the intervening variable. Working hours can directly cause hypertension and working hours can indirectly cause hypertension through sleep quality.

**Keywords:** Hypertension, Long Working Hours, Sleep Quality.

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## INTRODUCTION

Long working hours are worked for a period of time that exceeds standard working hours. However, the definition of standard working hours varies by country. For example, in France, standard working hours are 35 hours per week, in Denmark, 37 hours per week, and in the US, 40 hours per week. Similarly, the Labour Standards Act in Japan establishes a weekly maximum working hour of 40 hours. A systematic review conducted by Bannai and Tamakoshi found a relationship between length of work and health. It defines normal working hours as 40 hours per week or 8 hours per day.<sup>1</sup>

Furthermore, a meta-analysis study shows the relationship between long working hours and human health can increase the risk of hypertension. For example, 34% of professional drivers worldwide have hypertension. Another study in Brazil showed that the prevalence

of hypertension in land transportation workers was around 45.2%. In South India, it was found to be around 41.3% of cases. Meanwhile, in Nigeria, around 33.5% of the working group suffer from hypertension. In addition, in Ireland, it was found that a percentage (74%) of taxi drivers suffer from hypertension.<sup>2-5</sup>

Beyond that, long working hours can lead to fatigue, especially due to lack of sleep. Many studies reveal a positive relationship between working hours and sleep deprivation, time, and quality, due to work stress.<sup>6</sup>

## MATERIALS AND METHODS

### Study Design

The method of this research is quantitative. The research design uses observational and analytical cross-sectional approach. This research was conducted in Parepare city, with a total sample of 100 land transportation workers using an accidental

sampling technique.

### Data Collections

Data was collected through face-to-face interviews with respondents using questionnaires and tools. and materials such as an automatic sphygmomanometer. The questionnaire used in this study aims to find out information on the type of work, age, length of time worked, and quality of sleep. using the Pittsburgh Sleep Quality Index (PSQI).

### Data analysis

With the use of SPSS 25 software, the data was analysed. The characteristics of the respondents were analysed. univariately, and the relationship between variables was analysed bivariate. Multivariate analysis A linear logistic regression model was used to test the pressure variables at the same time. blood by using the path analysis model using the AMOS program.

## RESULTS

### Univariate analysis

Table 1 describes the characteristics of the participants. It turns out that the largest type of work is ojek online which is around 52%. Approximately 63% of participants have worked more than 8 hours per day. Besides that about 58% of participants had poor sleep quality and 41% of participants had hypertension.

### Bivariate Analysis

Table 2 shows that there were 37 participants who had an abnormal length of work and 31 of those experienced hypertension, compared to 63 participants with a normal length of work and 10 of those had hypertension. In addition, table 2 also shows that 42 participants with good sleep quality, and 9 of those

experienced hypertension compared to 58 participants with poor sleep quality, and 31 of those had hypertension. Table 3 shows 63 participants with normal length of work, and 31 of those experienced sleep quality bad, compared to 37 participants with abnormal length of work and 27 of those experienced quality bad sleep.

### Multivariate Analysis

Table 4 shows the length of work has a direct effect on the quality of sleep with a p value of 0.003 (<0.05) and the magnitude of the influence can be seen in the estimated value of 0.273 the number is positive, which means that there is a unidirectional relationship between length of work with sleep quality. There is also a relationship between length of work and blood pressure direct relationship with the p value of 0.001 (<0.05) and

the magnitude of the influence is 1.006 which means that there is a unidirectional relationship between the two variables. Then the quality of sleep as an intervening variable also has direct relationship with blood pressure which indicates a p value of 0.001 (<0.05) with a large influence of 0.517 the number positive value so that there is a directional relationship between sleep quality and blood pressure.

## DISCUSSION

Studies documenting the effects of prolonged action on blood pressure have been reported with mixed results. Inconsistency occurs due to the use of different instruments to measure blood pressure. Several studies have relied on blood pressure measurements such as sphygmomanometers or automated devices in public health facilities. These studies relate to others self-reported hypertension.<sup>7</sup>

The positive relationship between long working hours and the prevalence of hypertension was most frequently observed among employees. Different mechanisms have explained the relationship between long working hours and cardiovascular health. First, long working hours may be associated with sleep deprivation, which has been shown to increase cardiovascular risk. Overtime can be meaningful prolonged exposure and less time to recover from psychosocial stressors. Finally, lifestyle-related risk factors such as smoking, and alcohol consumption are also included.<sup>7</sup>

In addition, there is one hypothesis that might link working time to stress, which contributes to insulin resistance,

**Table 1. Characteristics of Rresearch Participants.**

Characteristics	Frequency (n)	Percent (%)
<b>Job</b>		
Online taxibike	52	52
Offline taxibike	25	25
Public transport drivers	1	1
Online courier	22	22
<b>Working Hours</b>		
Normal	63	63
Long Working Hours	37	37
<b>Sleep Quality</b>		
Good	42	42
Poor	58	58
<b>Blood Pressure</b>		
Normal	38	38
Prehypertensi	21	21
HT grade 1	29	29
HT grade 2	12	12

Source: Primary Data, 2022

**Table 2. Results of Bivariate Analysis.**

Variable	Blood Pressure					P value
	Normal	Pre HT	HT Grade 1	HT Grade 2	Total HT	
<b>Working Hours</b>						
Normal	37 (58.7%)	16 (25.4%)	9 (14.2%)	1 (1.58%)	10 (15.8%)	0,001
Long Working Hours	1 (2.70%)	5 (13.5%)	20 (54%)	11 (29.7%)	31 (83.8%)	
<b>Sleep Quality</b>						
Good	23 (54.8%)	10 (23.8%)	6 (14.2%)	3 (7.1%)	9 (21.3%)	0,006
Poor	15 (25.9%)	11 (19%)	23 (39.6%)	9 (15.5%)	31 (53.4%)	

Source: Primary Data, 2022

**Table 3. Results of Bivariate Analysis.**

Variable	Sleep Quality			P Value
	Good	Poor	Total	
Working Hours				
Normal	32 (50.8%)	31 (49.2%)	63	0,020
Long Working Hours	10 (27%)	27 (73%)	37	

Source: Primary Data, 2022

**Table 4. Results of Multivariate Analysis.**

	Estimate	S.E	P value
Sleep Quality <--- Working Hours	0,273	0,093	0,003
Blood Pressure <--- Working Hours	1,006	0,150	0,001
Blood Pressure <--- Sleep Quality	0,517	0,156	0,001

Source: Primary Data, 2022

arrhythmias, hypercoagulation, and ischemia leading to transient increases in blood pressure, all of which may increase the likelihood of cardiovascular and cerebrovascular events in individuals with high blood pressure, atherosclerotic burden and impaired glucose metabolism.<sup>8</sup>

Long working hours can lead to fatigue, especially due to lack of sleep related to the incidence of hypertension. Studies also show that sleep deprivation causes various health problems including hypertension.<sup>6</sup>

Poor sleep quality is a modifiable risk factor for increased blood pressure and the development of hypertension. Poor sleep quality is significantly associated with high blood pressure and hypertension in the general population.<sup>9</sup> One study reported that poor sleep quality is an important risk factor for hypertension, possibly due to higher activation of the sympathetic nervous system. Sleep functions to suppress blood pressure by reducing catecholamine secretion.<sup>10-11</sup>

## CONCLUSION

There is a direct and indirect relationship between length of work and blood pressure where sleep quality is the intervening variable. Working hours can directly cause hypertension and working hours can indirectly cause hypertension through sleep quality.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang.

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All authors contributed equally in the writing of this article.

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## ABSTRACT

**Background:** *Moringa oleifera* seeds have various bioactive compounds that have the potential as antibacterial. This research aimed to observe the inhibition activity of *M. oleifera* seeds on *Escherichia coli*.

**Methods:** The material used in this study was *M. oleifera* plant from East Nusa Tenggara. Moringa seeds were extracted using the maceration method. A standard solution of ceftriaxone sodium 100 ppm was used as a positive control. Absolute ethanol was used as a negative control. Giving Moringa seed extract in a well as much as 100 µL carried out 3 replications. After each sample was filled, incubated in an incubator at a temperature of 32.5°C for 24 hours. The zone of inhibition was measured using a caliper. Data analysis was done descriptively.

**Results:** The diameter of the inhibition zone against *E. coli* bacteria in positive control was 11.15 mm and negative control was 7.60 mm. The inhibition zone of *M. oleifera* seed extract in the first replication was 17.90 mm, the second replication was 18.90 mm, and replication activity was 16.95 mm, so the average was 17.92 mm. The results showed that Moringa seed extract had an inhibitory activity against *E. coli* bacteria of 17.92 mm.

**Conclusion:** These results indicate that Moringa seed can inhibit the growth of *E. coli* bacteria.

**Keywords:** inhibition, *Escherichia coli*, *Moringa oleifera*.

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## INTRODUCTION

*Moringa oleifera* is known as a useful plant that can grow in all seasons. Many people use it as a vegetable and as a treatment for several diseases. Almost all parts of the plant have benefits, i.e., leaves, seeds, flowers, stems, roots and others. Parts of this plant contain various potential compounds for various purposes.

Phytochemical screening showed the presence of tannins, flavonoids, glycosides, terpenoids, and phenols in *M. oleifera* leaf extract.<sup>1</sup> Another study through systematic phytochemical screening qualitatively shows that various part of plant moringa contains tannins, saponins, phenol and flavonoid.<sup>2</sup> Seed pods discarded from *M. oleifera* could also be utilized for industrial and contain vanillic, benzoic, ferulic, and flavonoid compounds myricetin, naringenin and kaempferol identified.<sup>3</sup> Qualitative phytochemical analysis of *M. oleifera* leaves was carried out using the standard procedure to identify the content of bioactive compounds (Alkaloids, Flavonoids, Tannins and Phenols).<sup>4</sup>

The literature review has uncovered various parts of plant *M. oleifera*, using various methods of extraction and

measurement zone resistors to various types of bacteria, which has shown the role used in water treatment, especially in areas with unsanitized water.<sup>5</sup> However, there is no study about seed Moringa's ability in East Nusa Tenggara as an antibacterial against *E. coli*. Therefore, this study aimed to evaluate the effect of *M. oleifera* on *Escherichia coli*.

## METHOD

**Research Design.** This research was a true experiment, divided into 3 groups (positive control, negative control and treatment groups): C(+)= Standard solution of ceftriaxone sodium 100 ppm; C(-)= Absolute ethanol; S1= moringa seeds extract concentration 10ul 1<sup>st</sup> test; S2= moringa seeds extract concentration 10ul 2<sup>nd</sup> test; S3= moringa seeds extract concentration 10ul 3<sup>rd</sup> test. The study was carried out in the laboratory of the service unit testing faculty pharmacy at Airlangga University Surabaya

**Extraction of *M.oleifera* seeds.** Moringa seeds to be used in this study were obtained from *M. oleifera* plant growing in East Nusa Tenggara. *M. oleifera* seeds were dried with an oven at 60°C for 24 hours. *M. oleifera*

seeds were mashed using a blender. After fine powder seed was obtained, *M. oleifera* dry weighed with scales analytic, dissolved in a solvent, stirred and rested for 24 hours. *M. oleifera* seeds powder used as much as 100 g in 500 mL solvent ethanol. Extract results maceration, filtered by Buchner funnel, then the steam dissolved with the rotary evaporator to produce thick extract ethanol. Then, the extract was evaporated with a vacuum rotary evaporator at 50° C, 70 rpm to obtain crude extract. The extract was obtained, accommodated in a bottle sterile and stored in the refrigerator.

**Measurement of antibacterial activity.** Prepare inoculum *E. coli* bacteria (ATCC 8739) with method measurement transmittance on tool spectrophotometer on long, long 580 nm to get 25% transmittance.

**Data Analysis.** The research results were presented as a table and figure and analyzed descriptively.

## RESULTS

This result showed that extract seed moringa has an activity power resistor to *E. coli* bacteria by 17.92 mm. It showed that moringa seeds extract potential as antibacterial.

**Table 1. Results inhibition test *M. oleifera* seeds extract against *E. coli* bacteria.**

Specimen	Zone diameter (mm)
C (-)	7.60
C (+)	11.15
S1	17.90
S2	18.90
S3	16.95
Mean S	17.92

## DISCUSSION

This study used bacteria *E. coli* test. The bacteria coli group is bacteria indicator for sanitation. The existence of bacteria in the water signifies the contamination of the water by human feces or animals. The existence of *E. coli* in the drinking water drink sample has been found widely, especially in developing countries. The existence of these bacteria relates to environmental and behavioral factors. The study stated a significant relationship between the number of *E. coli* in drinking water samples and lack of protection from water sources, defecating, poop cattle and closed latrine water.<sup>6</sup> The research in Guadalajara also shows that the total bacteria coliform group on big tested water samples exceed allowable conditions.<sup>7</sup> The existence of the indicated bacteria in the water sample can indicate that feces have contaminated the water sources, indicating the presence of other pathogenic bacteria.

This study found that moringa seed extract inhibited the growth of *E. coli* bacteria. This thing, of course, is related to the compounds in *M. oleifera* seed. This thing supported by a previous study that *M. oleifera* seed extract contains compound saponins, tannins and glycosides.<sup>8</sup> Moringa oleifera seed powder added with filtering sand shows potency antimicrobial and coagulative as turbidity and *E. coli* tub water bath.<sup>9</sup>

Some studies evaluated the effectiveness of Moringa seed in purifying water. This study shows moringa seeds have antimicrobial activity.<sup>10</sup> Other research has been conducted to evaluate variations in antimicrobial and antioxidant activity in several *Moringa oleifera*.<sup>11</sup> Moringa leaf water extract showed antimicrobial activity against test bacteria, fungi and yeasts at different concentrations.<sup>12</sup> Other studies have evaluated moringa seed powder as an antibacterial agent and coagulant. Bacteria

tests used are Salmonella, Staphylococcus and *E. coli*. Water used for treatment is river water.<sup>13</sup>

A study shows that powder seed moringa could be used as a drinking water coagulant and antibacterial against *E. coli*.<sup>14</sup> Another study done in Ethiopia shows that seed *M. oleifera* can lower turbidity and coliforms, which is beneficial in water.<sup>15</sup> An antibacterial seed moringa to several bacteria such as *E. coli*, *Pseudomonas aeruginosa*, and Staphylococcus.<sup>8</sup> Moringa seed is recommended for simple environmentally friendly water treatment, especially for people living where the water is cloudy and contaminated with bacteria.<sup>16</sup>

Moringa plants have an inhibitory activity to *E. coli* and *Staphylococcal aureus* bacteria. *M. oleifera* seed protein coagulant significantly reduced turbidity, decreased total coliforms in treated water and gave promising antimicrobial activity against bacterial isolates in water. Moringa leaf also has activity antibacterial to *E. coli* and Klebsiella.<sup>4</sup> The study also shows antimicrobial activity against *E. coli* and *Staphylococcal aureus*.<sup>1</sup> The results obtained from this study support the potential of Moringa seeds as antibacterial. This is also supported by other studies and references that say that the Moringa seeds contain various compounds that have the potential for it.

## CONCLUSION

The results showed that Moringa seed extract had an inhibitory activity against *E. coli* bacteria. Therefore, further research is needed to develop Moringa seed products that provide value for benefits to overcome various environmental health problems.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

Coronavirus (Covid-19) is deadly and has threatened world civilization. The government has made many efforts to prevent the transmission of this virus to other people, one of which is by implementing a *lockdown*. The *lockdown* caused many impacts, including the many parents who complained about their children's dependence on devices ranging from televisions, cellphones to tablets. This is very dangerous for children because it can harm their physical and mental health. Therefore, it is necessary to have information related to the psychological impact on children's stress levels during this pandemic. This research is a quantitative descriptive research with a *cross sectional*. The population in this study were 7,478 SD/MI students in the coastal area of Puger District, Jember Regency (BPS Jember, 2021). The sample in this study amounted to 380 respondents. Determination of the sample in the study using a multistage random sampling technique. The study's dependent variable was the child's stress level during the transition from WFH to WFO. The independent variables of this study are emotional aspects, eating patterns, learning patterns, comfort aspects, and safety aspects. The results showed that most of the respondents had a good emotional aspect (50%), a negative eating pattern (45.5%), a positive learning pattern (37.6%), a good comfort aspect (59.7%), a safe safety aspect. (61.6%), and low-stress level (42.1%). The bivariate results found that the variables that affect stress levels are emotional aspects (Sig. 0.033) and safety aspects (Sig. 0.000), while the variables that do not affect stress levels are eating patterns (Sig. 0.837), learning patterns (Sig. 0.697), and convenience aspects (Sig. 0.654). Based on the results of the identification and analysis of the factors that influence children's stress levels during the adaptation period from WFH to gender-based WFO, it can be concluded that psychological impact, emotional aspects and safety aspects have a significant effect on children's stress levels.

**Keywords:** psychological factors, stress level, children, adaptation, work from home, work from office.

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## INTRODUCTION

The COVID-19 pandemic has impacted many aspects of human life. More than 120 countries have restricted social interaction through school closures, affecting 1.6 million students worldwide.<sup>1</sup> Indonesia has closed all schools since early March, driving 60 million students out of school. Schools are encouraged to use multiple governments and private digital platforms to facilitate learning at home, offering free content and online and distance learning opportunities across the region. Around 47 million households (66%) have internet access, but challenges remain in online distance learning. Online learning is new to many students and teachers. In addition, a recent UNICEF survey found that many adolescents, especially girls, feel they lack digital skills.<sup>2</sup>

Children cannot socialize at school

and play outside during the Covid-19 pandemic. These are two important things to support learning and development. The impact of the lockdown can also be seen from the many parents who complain about their children's dependence on devices ranging from televisions, cellphones to tablets. This is very dangerous for children but can harm their physical and mental health. Understanding the pattern and distribution of vulnerability to the impact of the COVID-19 pandemic on children requires a gender-sensitive approach. This will ensure that the pandemic response can effectively address the different needs of girls and boys. This is worrying because social gender norms can lead to crises that actually exacerbate gender inequalities that existed before the crisis. As a result, gender issues, such as the comfort and safety of children, are not a priority in

dealing with a pandemic. For this reason, this research was conducted to examine the social and gender dimensions of the pandemic in children, especially when they have to study at home.<sup>3</sup>

Based on the background above, this research focuses on the psychological impact determinants consisting of emotional, eating patterns, learning patterns, comfort and safety on the stress level of children aged 9-13 years in Puger District.

## METHODS

The design of this study used a *cross-sectional* quantitative descriptive. This research was conducted at public elementary schools in the Puger District, which consisted of SDN Mojomulyo 1, SDN Mojomulyo 2, SDN Puger Wetan 1, SDN Pugerwetan 3, and SDN Puger

Kulon 1. The time of the study was from September to December 2022. The dependent variable research is children's stress level during the transition from WFH to WFO. The child's stress variable is assessed using the *Strength and Difficulties Questionnaire* (SDQ) with five aspects: *emotional symptoms, conduct problems, hyperactivity-inattention, peer relationship problems, and indifference*. The results will be categorized into low, medium, and high-stress levels. The independent variables of this study are divided into five: emotional aspects, eating patterns, learning patterns, comfort aspects, and safety aspects.

The population in this study was 7,478 SD/MI students in the coastal area of Puger District, Jember Regency (BPS Jember, 2021). The sample in this study was 380 respondents with exclusion criteria: Children aged 9-12 years, attending SD/MI schools in the coastal area of Puger District, living in the coastal area of Puger District, and doing online learning during the Covid-19 pandemic. In determining the sample, a multistage random sampling technique was used with the sampling stage from elementary schools in Puger District. Data collection in the field was carried out simultaneously by compiling a list of questions or statements, recruiting and training enumerators, then collecting data on the respondents. The data that has been collected will be analyzed by univariate, bivariate, and multivariate tests using the SPSS program. The bivariate test was performed by Chi-square test and the multivariate test by multinomial regression test.

## RESULTS

The results of univariate data analysis in which there were variables of demographic factors. Based on the respondents' religion, all respondents were Muslim (100%). Based on the ethnicity of the respondents, the majority were Javanese, with a total of 322 respondents (84.7%) and the rest were Madurese, with a total of 58 respondents (15.3%). Based on the order of birth of children in the respondent's family, the highest number was in the respondent who was the first child with a total of 156 respondents (41.1%) and the lowest number was in the respondent who was the sixth and seventh child with the

same number of 2 respondents (0.5 %). Based on the number of children in the family, the highest number was found in the number of children 2, with a total of 186 respondents (48.8%) and the lowest was in the number of children 6, with a total of 4 respondents (1.1%). Based on the social support of the respondents, it was found that most respondents had received good social support from the surrounding environment, with a total of 318 respondents (83.7%) and as many as 3 respondents still had not received good social support (8%).

Analysis Bivariate data analysis was carried out using the chi-square test to determine the relationship between emotional aspects, eating patterns, learning patterns, comfort aspects, and safety aspects on children's stress levels based on gender. The variable is related if the sig. test results are obtained.  $<0.05$ . Analysis of the Chi-Square test on psychological impact with children's stress level in the Adaptation Period from WFH to WFO based on gender. Based on the Asym value. Sig. The table shows that the emotional aspects of the female and male gender variables significantly influence stress levels (Sig  $< \alpha$ ). Based on the Asym value. Sig. In the table, it is found that the variables of changes in eating patterns in female and male gender do not affect stress levels (Sig  $> \alpha$ ). Based on the Asym value. Sig. In the table, it is found that the variables of changes in learning patterns in female and male gender do not affect stress levels (Sig  $> \alpha$ ). Based on the Asym value. Sig. The table shows that the comfort aspect variable in female and male gender does not affect stress levels (Sig  $> \alpha$ ). Based on the Asym value. Sig. The table shows that the variable aspects of security in the gender of women and men significantly affect stress levels (Sig  $< \alpha$ ).

Analysis Multivariate analysis showed the results of the logistic regression test in the study to determine the influence between the emotional aspects and safety aspects on stress levels in the male and female gender. Multivariate analysis was tested on variables found to have a relationship based on the previous bivariate test, namely emotional and security variables. In the male gender group, students with sufficient emotions

(sig. = 0.014) compared with students with good emotions have a higher risk of experiencing high-stress levels than low-stress levels. Students with poor security (sig.=0.000) compared to those with poor security have a higher risk of experiencing high stress than low-stress levels. In the female gender group, students with poor security (sig.=0.000) compared to students with poor security have a higher risk of experiencing moderate stress levels than low-stress levels. Students with enough emotions (sig. = 0.034) compared with those with good emotions have a higher risk of experiencing high stress than low-stress levels. Students with poor security (sig.=0.001) compared to those with poor security have a higher risk of experiencing high stress than low-stress levels.

## DISCUSSION

Variable emotional aspects of women's and men's gender significantly affect stress levels (Sig  $< \alpha$ ). Stress is a condition experienced by a person when there is a discrepancy between the demands received and the ability to overcome them.<sup>4</sup> The emotional tension children feel in coping with academic demands during a pandemic by studying at home impacts their physical and mental health. It is known from this that the emotional aspect influences the occurrence of stress. Prolonged stress can impact aspects and systems of a person's body. Stress has an emotional, cognitive, physiological and behavioral impact.<sup>5</sup> When the individual is in the child phase, the emotional aspect is still in the developmental stage. The help of parents and the environment is needed for children to understand their emotional self. Online learning due to the Covid-19 pandemic can lead to negative attitudes in children. This is shown by children being less cooperative because they rarely play together, lack of tolerance, individualistic attitudes arising because contact with friends is limited, children's emotions tend to feel sad, and children can experience verbal violence during the online learning process. The change in the period from *Work from Home* (WFH) to *Work from Office* (WFO) will, of course, also affect children's emotions. Children need to adapt again to contact with peers; there is inequality due to differences in the

learning process and peer acceptance of children in playing.<sup>6</sup>

Based on the Asym value. Sig. In the table, it is found that the variables of changes in eating patterns in female and male gender do not affect stress levels (Sig >  $\alpha$ ). Ponggeng explains that diet is an action when a person chooses, processes, and consumes food every day.<sup>7</sup> Children's diet during the adaptation period shows the highest results experiencing negative changes. This happens because, during the WFH period, children will get a good diet to avoid illness and limitations for children to buy snacks. When children enter the WFO period again, children will begin to be freed to consume snacks, and parents will become busier at work again. This research is in line with Imroni et al.'s research, which stated that there was no relationship between diet and stress events during the Covid-19 pandemic.<sup>8</sup> Nurdin's research explains that there is a significant average difference between children's eating behavior before and during online learning. During the pandemic, daily routines were disrupted due to quarantine, causing boredom to be associated with greater energy intake. Amaliyah's research looks at teenagers' diet during the Covid-19 pandemic; it shows that there is awareness in the behavior of consuming food according to three-time divisions (morning, afternoon and evening).<sup>9</sup>

This research is not in line with Bintang's research, which shows no significant difference between the diet before and after the home study policy.<sup>10</sup> Savitri *et al.* state that emotional eating relates to stressful events. *Emotional eating* is an emotion that can increase a person to consume food excessively as a response to negative emotions.<sup>11</sup> The Covid-19 pandemic caused the government to issue a WFO policy which is known to influence lifestyles to become less active and changes in eating patterns, which affect the emergence of stress and anxiety.<sup>12</sup> Based on the Asym value. Sig. In the table, it is found that the variables of changes in learning patterns in female and male gender do not affect stress levels (Sig >  $\alpha$ ). Children's learning patterns in the post-Covid-19 pandemic have shown positive changes. This happens because the child will be more organized in learning

according to the class being taught. Children tend to have difficulty learning during the WFH period due to limited facilities and information. This research is in line with Fauziyyah *et al.* there is an increase in stress and anxiety experienced by students when changing learning patterns during the Covid-19 pandemic.<sup>13</sup> Learning patterns have several learning styles that must be adapted to the needs of children, including visual learning styles, auditory learning styles, and kinesthetic learning styles.

Academic factors such as changes in learning styles from high school to higher education, lecture assignments, target grades, and academic achievement affect stress events.<sup>14</sup> Implementing the Learning From Home (BDR) program has been regulated in the Ministry of Education and Culture Circular Letter Number 4 of 2020 concerning the Implementation of Education Policies in the Emergency Period of the Spread of Covid-19, which states that the learning process is carried out from home or remotely. In a study conducted by Risnawati *et al.* states that there is a relationship between Distance Learning and stress levels in students during the Covid-19 pandemic. Based on the Asym value. Sig. The table shows that the comfort aspect variable in female and male gender does not affect stress levels (Sig >  $\alpha$ ).<sup>15</sup> The children in Puger District indicated that most felt comfortable at school or home. The child's comfort in the surrounding environment will be able to influence the child's attitude and behavior as well as the child's stress level. Davis *et al.* (1989) stated that comfort is the extent to which a person receives an impact after using technology to have fun in himself.<sup>16</sup> Branton in Osborne (1995) defines comfort as a condition from the loss of uncomfortable feelings to unbearable suffering, not a feeling from the happiest to the saddest, nor a momentary feeling.<sup>17</sup>

This research is not in line with research conducted by, which states that there is a relationship between occupancy congestion and stress events.<sup>18</sup> A study shows that people with many social relationships (marriage, close friends and relatives, religious membership and other group associations) tend to live longer and experience less stress than people who

have little social support.<sup>19</sup> According to Sugiarto, comfort is a feeling that arises when a person feels accepted as he is and happy with the existing situation and conditions.<sup>20</sup> It can be said that the tightness of housing and social relations is a factor in creating stress-related comfort.

Based on the Asym value. Sig. The table shows that the variable aspects of security in the gender of women and men significantly affect stress levels (Sig <  $\alpha$ ). The duration and freedom of children to use *gadgets* and access the *internet* can affect children's safety. Based on the results of this analysis, the level of security of children lacking in playing *smartphones* and the *internet* can influence and increase the risk of children experiencing high stress levels. Initially, cell phones were only used for communication and now have become gadgets that can do almost anything to help human activities, causing excessive use and creating the habit of checking smartphones which cause users to become compulsive, even causing smartphone addiction.<sup>21</sup> Someone only thinks that *smartphones* do not have a negative impact, so they don't care about their personal and social activities; this makes them more active and busy in using *smartphones*, this causes compulsion and reduces focus in academics and then stress conditions arise due to academic decline.<sup>22</sup> In line with research conducted by Pardosi (2020), the longer the time children spend playing on smartphones, the higher the level of stress experienced by children. This study's results align with Ismail's opinion, which states that a person can experience stress if he does not feel safe because of the risks and dangers at work.<sup>23</sup> Sari's research (2021: 8) states that the longer duration of smartphone use at night is associated with stressful events. Other studies state that job security has nothing to do with stressful events.<sup>24</sup>

## CONCLUSION

Based on the identification and analysis of the factors that influence children's stress levels during the adaptation period from WFH to gender-based WFO, it can be concluded that psychological impact, emotional aspects and safety aspects significantly affect children's stress levels.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

**Introduction:** Indonesia's first COVID-19 case was discovered on March 2, 2020 and continued to increase until October 2022. The latest update of Covid-19 cases in Indonesia was confirmed as 6,452,078 positive for COVID-19. COVID-19 has infected many people and has an impact on all aspects, from politics to public welfare, with different patient characteristics.

**Methods:** The method used in this study is a literature review by searching for relevant articles from an electronic database (Google Scholar).

**Results:** The results showed that the characteristics of COVID-19 patients consisted of gender, age of patients, occupations with the highest non-medical occupations, comorbid conditions, contact factors with most patients. positive for covid-19 caused by physical contact, symptoms with cough symptoms confirmed to be the most contaminated with covid-19, antigen swab examination, the average antigen swab test results showed positive results, PCR swab examination, most of the patients who underwent swab examination showed positive results. positive and the characteristics of the patient's condition when they go home, there are still many patients who are found to be in self-isolation first.

**Conclusion:** The characteristics of COVID-19 patients consist of gender, patient age, occupation, accompanying conditions, contact factors, symptoms, antigen swab examination, PCR swab examination and characteristics of the patient's condition when returning home.

**Keywords:** *Characteristics, Covid-19.*

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## INTRODUCTION

Covid-19 was discovered in 2019 which is a new viral disease that was previously found not to attack humans. Covid-19 is so pathogenic and spreading that the World Health Organization (WHO) declared it a Public Health Emergency of International Concern (PHEIC) on January 30, 2020 and declared a pandemic on March 11, 2020.<sup>1</sup>

The number of confirmed cases of Covid-19 in Indonesia continues to increase, which is also followed by an increase in death cases. Confirmed cases are people infected with Covid-19 and tested positive based on the results of the RT-PCR laboratory examination.<sup>2</sup> The longest incubation period is 14 days with an average of 5-6 days. There are people who are confirmed to have Covid-19 without symptoms (asymptomatic) and some are symptomatic (symptomatic). The symptoms are different for each person. Fever, cough and fatigue are the most common symptoms. Difficulty breathing, chest pain or loss of ability to speak or move are serious symptoms (Covid-19

Prevention Guidelines, 2020). Groups with an older age / advanced and have comorbid risk of experiencing more severe symptoms and even death. In Indonesia, deaths due to Covid-19 are probable/ confirmed cases of Covid-19 who died.<sup>2</sup>

The purpose of this paper is to provide an overview of the characteristics of COVID-19 patients commonly found in Indonesia.

## METHOD

The method used in this study is a literature review. by using a comprehensive strategy of searching relevant articles from an electronic database (Google Scholar) using the keywords "characteristics of covid19 patients" and "epidomology of covid19".

## DISCUSSION

### **The Relationship of Gender Factors to the Number of COVID-19 Patients**

Research conducted by Kurnianto, Putra, Fannya, Dewi (2021)<sup>3</sup> found that the characteristics of symptoms in COVID-19 patients in this study were mild symptoms (59%), aged 31-45 years were the majority

of patients with COVID-19 (29%), types The majority of the sexes were female (62%) and the majority of cases occurred in the Pisangan Baru area (35%).

Research conducted by Orfan, and Elmyar (2020)<sup>13</sup> Gender and place of residence of participants had a significant influence on knowledge and prevention practices against COVID-19. In addition, marital status only affects their practice of preventing COVID-19 infection. That is, married participants practiced preventive measures more frequently than their single counterparts to prevent contracting COVID-19. However, this did not affect their knowledge about COVID-19 and their attitude towards survivors.

### **The Relationship of Age Factors to the Number of COVID-19 Patients**

Research conducted by Lonta, et. al (2022)<sup>4</sup> found that the highest number of cases occurred in July 2021 with 509 cases, the highest positivity rate was 36.2% in January 2021, the highest number of deaths was 13 cases, women were the population group. with the highest confirmation rate, 25-34 year olds were the most infected with

## RESULTS

**Table 1. Results of the Synthesis of Articles.**

No.	Citation	Method	Sample/Place	Results
1.	Kurnianto, Putra, Fannya, Dewi (2021) <sup>3</sup>	This research method using descriptive analysis quantitative approach.	The data used is an epidemiological investigation form of 495 forms at the Matraman District Health Center.	The characteristics of symptoms in COVID-19 patients in this study were mild symptoms (59%), aged 31-45 years were the majority of patients with COVID-19 (29%), the majority gender was female (62%) and the majority of cases occurred in the Pisangan Baru area. (35%).
2.	Lonta, Ratag, Kalesaran (2022) <sup>4</sup>	Types of descriptive quantitative research and cross-sectional study design	Data from the Tomohon City Health Office.	The results of this study are the highest number of cases occurred in July 2021 with 509 cases, the highest positivity rate was 36.2% in January 2021, the highest number of death cases was 13 cases, women were the population group with the highest confirmation rates, aged 25-34 years. most infected with COVID-19.
3.	Faridah, Indrawati (2022) <sup>5</sup>	This research design is descriptive.	The sample is 544 respondents in Tanjung Jabung Barat District.	COVID-19 sufferers are more in patients who work as civil servants/private employees, namely 311 people (57.2%).
4.	Khaerunnisa, Rumana, Yulia, Fannya (2022) <sup>6</sup>	quantitative descriptive research with cross sectional design	The study was conducted at Mekar Sari Hospital Bekasi with a sample of 220 COVID-19 patients.	Has no comorbid conditions (59.5%) but the most comorbid conditions are Hypertension (22.3%). When going home the patient still has to do self-isolation (39.5%).
5.	Nabilah (2022) <sup>7</sup>	This study used a quantitative research method with a cross sectional study approach	The research sample was taken using a simple random sampling technique as many as 55 respondents in the city of Semarang.	There was no relationship between history of social contact with confirmed patients and COVID-19 prevention behavior in Semarang City with a significance value of 0.31 (p>0.05).
6.	Efrizah (2021) <sup>8</sup>	This research design is descriptive.	The sample of this research amounted to 10 research articles from local journals.	Coronavirus disease is a disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The main risk factors are contact history, age, gender, comorbidities, and immunosuppressive states. Diagnosis includes anamnesis of the patient, physical examination, and laboratory tests. History taking is done to confirm whether there is a history of contact, comorbidities, and other symptoms such as fever and shortness of breath. Next, the specimen is examined with a throat swab, X-ray examination
7.	Masrikah, Hasan, Yusran, Buyung (2022) <sup>9</sup>	This study uses a descriptive research design.	a sample of 754 people in the Covid-19 isolation room at RSUD Dr. H. Chasan Boesoirie Ternate.	Based on the results of treatment, the majority of patients returned home recovered or improved and were declared negative by the Covid-19 RT-PCR test.
8.	Angin, Astutik (2022) <sup>10</sup>	The type of this research is observational analytic with cross-sectional design.	A total of 285 respondents who live in East Java.	The results showed that there was a relationship between attitudes and perceptions about COVID-19 on compliance with the COVID-19 health protocol (p value = 0.01), and there was no relationship between knowledge (p value = 0.58), age (p value = 0.66), gender (p value = 0.61), and education (p value = 1.00) on COVID-19 health protocol compliance.
9.	Sanjaya, Paramita, Khalidi (2020) <sup>11</sup>	Descriptive research with retrospective approach.	The sample for this study were COVID-19 patients in Kutai Kartanegara for the July-December 2020 period with a total of 4787 samples.	Travel cases amounted to 320 cases (6.7%) with the most travel history coming from Central Java (26.3%). The number of cases of death were 94 patients (1.96%) with an average age of 54.99±11,374 years and the majority were men (60.8%) and had comorbidities (94.7%).
10.	Sukirman, Muryanto, Malfasari, Mahkota (2022) <sup>12</sup>	This type of research is an observational analytic study with a cross-sectional design.	all confirmed cases of COVID-19 from ten regencies and two municipalities in Riau Province.	Age group, case status and place of residence had a significant relationship with the incidence of COVID-19 by gender.

COVID-19. Research conducted by Abas, et.al (2021) COVID-19 can befall anyone regardless of age, everyone needs to know how it was transmitted and prevent the 2019 coronavirus.

### **The Relationship of Occupational Factors to the Number of COVID-19 Patients**

Research conducted by Faridah and Indrawati (2022)<sup>5</sup> found that there were more patients with COVID-19 who worked as civil servants/private employees, namely 311 people (57.2%).

This can be due to the comparison between the number of people and the number of health workers. The number of health workers with the number of people according to the Health PPSDM Agency by the Ministry of Health until July 2021 is known to be a ratio of 1:27.

### **The Relationship between Comorbid Conditions and the Patient's Condition at Home to the Number of COVID-19 Patients**

Research conducted by Khaerunnisa, et.al (2022)<sup>6</sup> found that patients who did not have comorbid conditions (59.5%) but had hypertension (22.3%). When going home the patient still has to do self-isolation (39.5%). The study stated that hypertension can worsen the condition of patients infected with COVID-19, this virus will bind to Angiotensin converting enzyme 2 (ACE2), an enzyme that attaches to the outer surface of several organs in the body, after binding the enzyme, the virus can enter organs and cause the patient to become infected with COVID-19.

### **The Relationship of Contact Factors to the Number of COVID-19 Patients**

Research conducted by Nabilah (2022)<sup>7</sup> found that there was no relationship between history of social contact with confirmed patients and COVID-19 prevention behavior in Semarang City with a significance value of 0.31 ( $p > 0.05$ ). Based on the results of the study, it was concluded that there was no relationship between history of social contact with confirmed patients and COVID-19 prevention behavior in Semarang City with a significance value of 0.31 ( $p > 0.05$ ). Research conducted by Irnaningsih, et.al 2021 attitudes and actions are variables

that influence COVID-19 prevention measures with a 95% confidence level. This is because people's attitudes and actions have a strong influence on preventive action.

### **The Relationship of Symptom Factors to the Number of COVID-19 Patients**

The most common symptom found in COVID-19 patients at Mekar Sari Hospital Bekasi was cough (84.1%). In the data of COVID-19 patients in Indonesia until July 29, 2021, it was also found that the most patients had cough symptoms, which was 63.5%.

Research conducted by Efrizah (2022)<sup>8</sup> concluded that the main risk factors for contracting COVID-19 are contact history, age, gender, comorbidities, and immunosuppressive conditions. Diagnosis includes patient history, physical examination, and laboratory tests. Anamnesis is carried out to ascertain whether there is a history of contact, comorbidities, and other symptoms such as fever and shortness of breath.

### **The Relationship between Antigen Swab Factors and PCR on the Number of COVID-19 Patients**

The highest level of anxiety in the antigen swab examination was severe anxiety by 91 respondents (79.8%), moderate anxiety by 12 respondents (10.5%), and low anxiety by 11 respondents (9.6%), based on Verawati's research, (2021)<sup>14</sup> more than 70% of the total respondents experienced a level of anxiety during the antigen swab examination, with the research title "The Effect of Anxiety on Swab Examination on Covid-19 Suspects in Gorontalo City" with the results of the study showing that 110 respondents (74.3%) experienced moderate anxiety and 99 respondents (66.9%) refused to do a swab examination.

## **CONCLUSION**

Based on the results of the research that has been done, it can be concluded that the characteristics of COVID-19 patients consist of gender, patient age, occupation, accompanying conditions, contact factors, symptoms, antigen swab examination, PCR swab examination and characteristics of the patient's condition when they go home.

## **CONFLICT OF INTEREST**

No conflict of interest.

## **FUNDING**

No third-party funding was involved in this study.

## **ETHICS**

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang.

## **AUTHOR CONTRIBUTIONS**

All authors contributed equally in the writing of this article.

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## ABSTRACT

The purpose of this study was to reveal the effect of environmental sanitation on the incidence of scabies disease. This study uses a literature review study with limitations for the last 10 years sourced from Google Scholar, SpringerLink, ProQuest, and ScienceDirect which were selected based on predetermined criteria. The results of this study indicate that as many as 12 studies that have been conducted reveal that environmental sanitation influences the occurrence of scabies disease. Concluded that environmental sanitation factors, especially water quality, residential density, and waste disposal facilities have a role in the occurrence of scabies in the community.

**Keywords:** Environmental Sanitation; Scabies Incidence; Community.

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## INTRODUCTION

To date, scabies disease is still one of the most difficult diseases to overcome and provides a fairly high transmission rate, especially in countries with tropical climates (endemic countries with the incidence of scabies). Scabies is an infectious skin disease caused by a female mite, namely *Sarcoptes scabiei* *Varieties Hominis*. Griana (2013)<sup>1</sup> explained that scabies generally causes itching on the skin caused by parasitic infestations and breed in tunnels under the skin so that an allergic reaction occurs in the form of red macules or papules. Currently, the incidence of scabies is still neglected and is considered a common thing in the community. This is also revealed to the World Health Organization (WHO)<sup>2</sup> that scabies disease will become a part of the roadmap for neglected tropical diseases in 2021-2030. This is because the incidence of scabies is not life-threatening, so its handling is not a priority. However, the incidence of scabies can be chronic and severe so it can cause dangerous complications<sup>3</sup> (Onayemi et al., 2005).

Based on WHO data in 2021, the prevalence of scabies worldwide occurs at around 200 to 300 million cases every year. Furthermore, WHO also revealed that the prevalence of scabies tends to be high in countries in Africa, South America, Australia, and also Southeast

Asia. Based on 2017 data from the International Alliance for the Control of Scabies (IACS), the incidence of scabies varies greatly, ranging from 0.3% to 46%. The incidence of scabies can be found in all countries with varying prevalence, especially in developing countries. The prevalence of scabies is around 6% to 27% in the general population. Meanwhile, the incidence of scabies, such as in Germany, occurs periodically or in long-endemic forms, 20.4% in India and 31% in Malaysia in children aged 10 to 12 years. The prevalence of scabies in tropical countries, such as Indonesia, ranges from 8.5-9% cases, in which scabies ranks third out of 12 infectious diseases that often occur in Indonesia. Mading & Indriaty (2015)<sup>4</sup> compared the prevalence of scabies by gender, where the prevalence of scabies is higher in men than women, with a ratio of 83.7%: 18.3%. The high prevalence of scabies is generally caused by population density and high interpersonal contact, such as in prisons, orphanages, Islamic boarding schools, etc.

Scabies is a disease that can interfere with human health and activities. This disease cannot be considered a disease that occurs in groups with a low economic level, but scabies has also now become a complex disease that can occur at all social levels. Scabies disease is a highly contagious disease, where the incidence

of scabies transmission generally occurs through direct contact between individuals and patients infected with scabies. For information, scabies can also be transmitted indirectly through pillows, towels, bed linen, clothing, or combs used by patients infected with scabies. Scabies disease is often found in children and adults. Generally, this disease can affect all age groups. According to Wjiyakusuma (2008)<sup>5</sup>, scabies is more common in areas with poor sanitation and attacks people who do not keep their bodies clean. One of the conditions for the occurrence of scabies is a very bad environment.

Based on Law No. 36 of 2009 concerning Health, the goal of pursuing environmental health is to realize a healthy environmental quality physically, chemically, biologically, and socially. This aims to make each individual achieve the highest degree of health. Sofiana (2017)<sup>6</sup> revealed that sanitation is a deliberate action in the culture of clean living to prevent humans from coming into direct contact with dirt and other hazardous waste materials, where these actions are expected to maintain and improve human health. The incidence of scabies transmission can occur if environmental hygiene is not maintained properly. Several factors of environmental sanitation are considered to have an important role in increasing the potential for scabies,

namely, water quality, residential density, indoor humidity, and waste disposal facilities.

According to Yudhaningtyas (2018)<sup>7</sup>, skin diseases can occur due to the unavailability of clean water to maintain personal hygiene. Poor water quality is one of the media for various kinds of disease transmission. Moreover, Sofiana (2017)<sup>6</sup> revealed that the more the number of occupants, the faster the air will experience CO<sup>2</sup> pollution, which contains toxins increasing. In this case, indoor residential density provides a risk of spreading disease transmission. In addition to residential density, indoor humidity also has a role in environmental-based disease transmission, such as making it easier for mites to immigrate (Yudhaningtyas, 2018)<sup>8</sup>. In addition, poor waste disposal facilities can negatively impact health, the environment, and the socio-economic and cultural life of the community. Garbage waste disposal facilities in open areas can provide space for the proliferation of various diseases.

Based on the background above, the effect of environmental sanitation on the incidence of scabies disease is still a very interesting phenomenon to be studied further. Therefore, this study aims to reveal the effect of environmental sanitation on the incidence of scabies disease in the community.

## RESEARCH METHODS

This study was a literature review study using a systematic literature review method to identify problems through research results that had been produced by researchers and practitioners. This study began by searching the medical literature that matched the inclusion criteria published from 2012 to 2022 via an e-database. The e-databases used in this study were Google Scholar, SpringerLink, ProQuest, and Science Direct using personal sanitation, environmental sanitation, scabies, and sarcoptes scabiei as the keywords. Furthermore, scientific articles that had been collected were screened based on inclusion criteria through a gradual review of titles, abstracts, and full text.

## RESULTS AND DISCUSSION

Based on initial observations, 576 articles were collected, consisting of 478 Google Scholar articles, 56 Springer Link articles, 23 ProQuest articles, and 19 Science Direct articles. From this total, title screening was carried out with the results of 85 articles matching the criteria. Then, abstract screening was carried out with the results of 41 articles that matched the criteria. From this total, a full-text screening was then carried out with the results of 12 scientific articles. Based on the systematic literature review process, 12 scientific articles were ready to be reviewed. The following is a flow chart of the systematic literature review process in Figure 1.

After conducting a systematic literature review process, a scoping review was carried out on 12 scientific articles. The following are the results of the scoping

review, which are presented in Table 1.

A total of 12 studies presented in Table 1 are relevant to the effect of environmental sanitation on the incidence of scabies in community groups in Indonesia. Studies conducted by Erna et al. (2013)<sup>11</sup>; Sholihah et al. (2015)<sup>18</sup>; Ayu (2017)<sup>17</sup>; Triani et al. (2017); Masyudi & Darusman (2018); Mayrona et al. (2018); Rofifah et al. (2018); Samosir & Sunarti (2019); Sari et al. (2020); Ahmad & Husni (2021); Sari et al. (2021); and Gultom, et al. (2022) use water quality, residential density, indoor humidity, and waste disposal facilities as indicators in measuring the effect of environmental sanitation on the incidence of scabies in the community. These articles, as a whole, use an analytical observational research design, which is research conducted by observing, comparing, analyzing, and evaluating variable data without providing intervention to the research

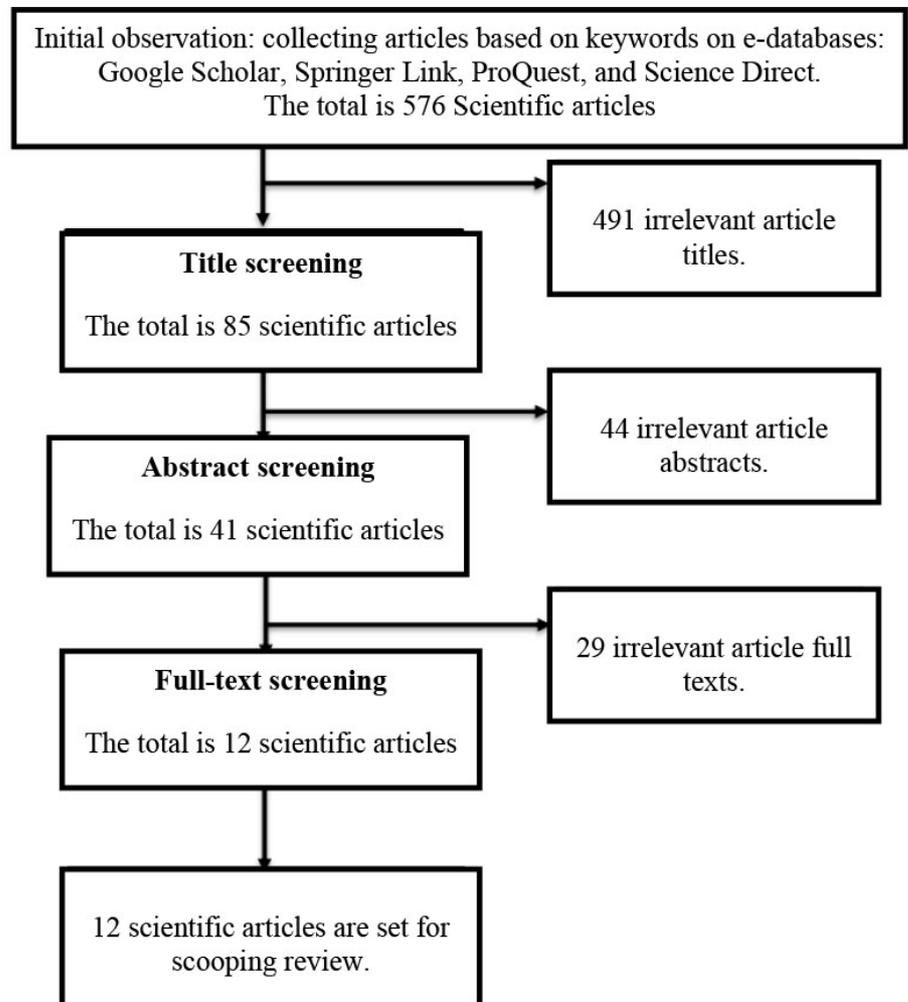


Figure 1. Flowchart of systematic literature review.

subject. Therefore, it is considered that they can provide accurate information in analyzing review articles. Overall, the 12 articles above conducted research

on Islamic boarding schools, detention houses, residential houses, coastal areas, and mining areas originating from various regions in Indonesia. This, of course, can

represent and provide an overview related to the condition of the spread of scabies disease caused by poor environmental sanitation factors in society in general.

**Table 1. The results of scoping review on the effect of environmental sanitation on the incidence of scabies.**

No.	Judul Artikel	Penulis, Tahun & Jurnal	Ringkasan Hasil
1.	The Effect of Environmental Sanitation on the Prevalence of Scabies at the Matholiul Huda Al Kautsar Islamic Boarding School, Pati Regency <sup>9</sup>	<b>Authors:</b> CindyTia Mayrona,Prasetyowati Subchan,andAryoko Widodo <b>Year:</b> 2018 <b>Journal:</b> Diponegoro Medical Journal, Volume 7, Number 1, pp:100-112.	<b>Research Design: Observational</b> Based on statistical results, the p-value was 0.029 ( $p < 0.05$ ), which meant that there was a significant effect between environmental sanitation practices and the incidence of scabies. In conclusion, students with poor environmental sanitation practices had a 0.7 times risk of suffering from scabies compared to students with good environmental sanitation, where sanitation practices include the cleanliness of bathrooms, bedrooms, trash cans, ablution places, and prayer places.
2.	The Effect of Personal Hygiene and Environmental Sanitation on Scabies Disease in Correctional Inmates of the Class I State Prison of Bandar Lampung, Lampung Province in 2020 <sup>10</sup>	<b>Authors:</b> TatiBaina GultomandSuami Indarwati <b>Year:</b> 2022 <b>Journal:</b> World Journal of Public Health, Volume 11 Number 2, pp:303-314.	<b>Research Design: Observational</b> The statistical results showed that the residential density of scabies had a value of 0.004 ( $p < 0.05$ ). Humidity on the incidence of scabies had a p-value of 0.014 ( $p < 0.05$ ). Both of these results can be concluded that residential density and indoor humidity influence the incidence of scabies in Correctional Inmates of the Class I State Prison in Bandar Lampung.
3.	The Relationship between Environmental Sanitation and Personal Hygiene on the Incidence of Scabies Disease in Correctional Inmates of the Class IIA Jambi Correctional Institution in 2013 <sup>11</sup>	<b>Authors:</b> Erna,Sakinah andMarta <b>Year:</b> 2013 <b>Journal:</b> Scientia Journal, Volume 2, Number 2, pp: 70-78.	<b>Research Design: Observational</b> The statistical results showed that the provision of clean water to the incidence of scabies had a p-value of 0.001 ( $p < 0.05$ ). The residential density to the incidence of scabies had a p-value of 0.030 ( $p < 0.05$ ). Both of these results can be concluded that the provision of clean water and residential density influence the incidence of scabies in Correctional Inmates of the Class IIA Jambi Correctional Institution.
4.	Factors Affecting the Incidence of Scabies in Fishermen in Rheum Baroh Village, Bireuen Regency <sup>12</sup>	<b>Authors:</b> Masyudi, and Darusman <b>Year:</b> 2018 <b>Journal:</b> MaKMA. Volume 1, Number 2, pp: 36-43.	<b>Research Design: Observational</b> The statistical results showed an effect of environmental sanitation on the incidence of scabies with a p-value of 0.008 ( $p < 0.05$ ). From these results, it can be concluded that environmental sanitation, in this case, waste disposal and clean water supply, significantly influences the incidence of scabies in fishermen in Rheum Baroh Village, Bireuen Regency. It is hoped that local Public Health Center officers can improve services and counseling on good environmental sanitation.
5.	The Relationship between Knowledge, Environmental Sanitation, and Personal Hygiene with Scabies (Observational Study in the Diamond Miners Community of Cempaka District, Banjarbaru Regency, South Kalimantan Province) <sup>13</sup>	<b>Authors:</b> Qomariyatus Sholihah, Aprizal Satria Hanafi, Lenie Marlinae, Laily Khairiyati, Rudi Fakhriadi, and Musafaah <b>Year:</b> 2015 <b>Journal:</b> Scientific Research Journal, Volume 3, Number 7, pp: 25-30.	<b>Research Design: Observational</b> The results of statistical analysis showed that environmental sanitation on the incidence of scabies had a p-value of 0.000 ( $p < 0.05$ ). From these results, it can be concluded that environmental sanitation, in this case, the provision of clean water and waste disposal facilities, can significantly influence the incidence of scabies in the Diamond Miners Community of Cempaka District, Banjarbaru Regency, South Kalimantan Province.
6.	The Relationship between Personal Hygiene and Environmental Sanitation on the Incidence of Scabies in Children at the Al-Hidayah Orphanage of Mataram <sup>14</sup>	<b>Authors:</b> Eva Triani, Dediando Hidajat, Rika Hastuti Setyorini, and Muthia Cenderadewi <b>Year:</b> 2017 <b>Journal:</b> Unram Medical Journal, Volume 6, Number 2, pp: 9-11.	<b>Research Design: Observational</b> The results of statistical analysis showed that unhealthy sanitation conditions on the incidence of scabies had a p-value of 0.01 ( $p < 0.05$ ). Based on these statistical results, it can be concluded that poor environmental sanitation can influence the incidence of scabies, in this case, the use of clean water and indoor humidity. Then, most of the male orphanage children are higher than the female children at the Al-Hidayah Orphanage of Mataram.

No.	Judul Artikel	Penulis, Tahun & Jurnal	Ringkasan Hasil
7.	The Relationship between Environmental Sanitation and Personal Hygiene on the Incidence of Scabies at the Anshor Al-Sunnah Islamic Boarding School in 2021 <sup>15</sup>	<b>Authors:</b> Nadila Sari, Lira Mufti Azzahri Isnaeni, and Yusmardiansah <b>Year:</b> 2021 <b>Journal:</b> Health Journal Tambusai, Volume 2, Number 4, pp: 9-17.	<b>Research Design: Observational</b> The statistical results showed that the provision of clean water on the incidence of scabies had a p-value of 0.022 ( $p < 0.05$ ). From these results, it was explained that of the 23 students who used clean water, 18 (78.3%) students experienced scabies, 38 students used clean water, and 21 (55.3%) students did not experience scabies. Based on these results, it can be concluded that clean water quality influences the incidence of scabies in students at the Anshor Al-Sunnah Islamic Boarding School.
8.	The Relationship between Dormitory Sanitation and Personal Hygiene of students on the Incidence of Scabies at the Al-Ikhsan Islamic Boarding School, Beji Village, KedungBanteng District, Banyumas Regency in 2018 <sup>16</sup>	<b>Authors:</b> Tri Nova Rofifah, Lagiono, and Budi Utomo <b>Year:</b> 2018 <b>Journal:</b> KESLINGMAS, Volume 38, Number 1, pp: 102-110.	<b>Research Design: Observational</b> The results of statistical analysis showed that the dormitory sanitation on the incidence of scabies had a p-value of 0.010 ( $p < 0.05$ ). These results revealed that indoor humidity, residential density, and water quality are sanitation factors that affect the incidence of scabies at the Al-Ikhsan Islamic Boarding School, Beji Village, KedungBanteng District, Banyumas Regency.
9.	Factors related to the Incidence of Scabies in Toddlers in the Working Area of Tulang Bawang Baru Public Health Center, Bunga Mayang District, North Lampung Regency <sup>17</sup>	<b>Author:</b> Shinta Arini Ayu <b>Year:</b> 2017 <b>Journal:</b> Holistic Health Journal, Volume 11, Number 1, pp: 1-4.	<b>Research Design: Observational</b> The results of statistical analysis showed that environmental sanitation on the incidence of scabies had a p-value of 0.000 ( $p < 0.05$ ). Her study explained that out of 76 respondents in the category of poor environmental sanitation, 20 (26.3%) were not affected by scabies. Moreover, out of 273 respondents in the good environmental sanitation category, only 6 (2.2%) were affected by scabies. Furthermore, these results reveal an influence of environmental sanitation variables, such as waste disposal/dirt and clean water supply on the incidence of scabies in toddlers in the working area of Tulang Bawang Baru Public Health Center, Bunga Mayang District, North Lampung.
10.	The Cause of the Incidence of Scabies in Students in Sintang Regency <sup>18</sup>	<b>Authors:</b> Kholilah Samosir & Sunarti <b>Year:</b> 2019 <b>Journal:</b> Journal of Health, Volume 12, Number 2, pp: 221-228.	<b>Research Design: Observational</b> The results of statistical analysis showed that environmental sanitation on the incidence of scabies had a p-value of 0.006 ( $p < 0.05$ ). These results reveal that environmental sanitation affects students' incidence of scabies in Darul Ma'rif Islamic boarding school students, Sintang Regency, where poor environmental sanitation poses a greater risk of scabies disease than good environmental sanitation.
11.	Personal Hygiene, Temperature, and Lighting Relationship with the Incidence of Scabies Disease at the Al - Falah Sukaening Islamic Boarding School, West Bandung Regency <sup>19</sup>	<b>Authors:</b> Nasir Ahmad, and Husni Malik Mubarak <b>Year:</b> 2021 <b>Journal:</b> Sesebanua Scientific Journal, Volume 5, Number 2, pp: 42-46	<b>Research Design: Observational</b> The results of statistical analysis showed that environmental sanitation on the incidence of scabies had a p-value of 0.001 ( $p < 0.05$ ), where the environmental sanitation of Islamic boarding schools influenced the incidence of scabies. These results explain that the incidence of scabies was found in 38 students (84%) who lived in rooms with lighting and indoor humidity that did not meet the requirements.
12.	Is There a Relationship Between Intrapersonal, Personal Hygiene, and Physical Environment With Incidence of Scabies? <sup>20</sup>	<b>Authors:</b> Iin Indah Sari, Emmi Bujawati, Sukfitrianty Syahrir, Nildawati Amir, and Munawir Amansyah. <b>Year:</b> 2020 <b>Journal:</b> Community Research of Epidemiology Journal, Volume 1, Number 1, pp: 59-73	The results of statistical analysis showed that environmental sanitation on the incidence of scabies had a p-value of 0.000 ( $p < 0.05$ ). These results explained that environmental sanitation, in this case, lighting and indoor humidity, influence the incidence of scabies. In their study, it was revealed that students who were in a room with lighting and humidity that did not meet the requirements had a 27 times greater risk of experiencing scabies when compared to students who were in a room with adequate lighting and humidity in students at the Sultan Hasanuddin Islamic boarding school.

Based on the results of the 12 studies above, overall, it shows that environmental sanitation, in this case, water quality, residential density, indoor humidity, and waste disposal facilities, have an influence on the incidence of scabies in the community, especially in areas that have quite high interpersonal contact. The results of the study from Erna et al. (2013); Sholihah et al. (2015); Ayu (2017); Triani et al. (2017); Masyudi & Darusman (2018); Mayrona et al. (2018); Rofifah et al. (2018); Samosir & Sunarti (2019); and Sari, et al. (2021) revealed that the quality of clean water has an impact on preventing the incidence of scabies. This result has been in the same direction and is regulated in the Minister of Health Regulation No. 416 of 1990 concerning Water Quality Requirements and Supervision that if the water quality requirements are not met, it can easily cause infectious diseases. Scabies is one of the infectious diseases which is a water-based disease, namely the transmission of diseases closely related to water use for personal hygiene and daily necessities (Yudhaningtyas, 2018).

The results of the study conducted by Erna et al. (2013); Rofifah et al. (2018); Samosir & Sunarti (2019); and rGultom, et al. (2022) revealed that residential density influences the incidence of scabies disease. These results have been in line with and regulated in the Minister of Health Regulation No. 829/1999 concerning Housing Health Requirements that the residential density that does not meet the requirements can affect air quality, where the more the number of occupants eats, the faster the air will be polluted which results in increased toxins. Residential density poses a risk of spreading infectious diseases; in this case, if the occupants are too dense and one of them has a disease, it can accelerate the transmission of the disease (Sofiana, 2017). Furthermore, the results of the study conducted by Triani et al. (2017); Rofifah et al. (2018); Samosir & Sunarti (2019); Sari et al. (2020); Ahmad & Husni (2021); and Gultom et al. (2022) revealed that indoor humidity has a risk for the incidence of scabies disease. These results have been in line with and regulated in the Minister of Health Regulation Number 1077 of 2011

concerning Air Sanitation Guidelines that the level of humidity in a good room is at 40-70%, where the humidity level of the room that does not meet the requirements can pose a risk of disease. The results of the study conducted by Sholihah et al. (2015); Ayu (2017); Masyudi & Darusman (2018); Mayrona et al. (2018); and Samosir & Sunarti (2019) revealed that the means of disposing of waste/garbage have a risk impact on the incidence of scabies. This result has also been regulated in the Minister of Health Regulation Number 3 of 2014 concerning Community-Based Total Sanitation that good waste management facilities can prevent the arrival of various types of bacteria, viruses, or parasites. Poor waste management can become a breeding ground for various diseases and have a negative impact on health or the surrounding environment.

## CONCLUSION

Based on the results and discussion of the literature review above, this study can be concluded that environmental sanitation has a significant influence on the incidence of scabies disease in the community, especially in areas that have high interaction between individuals, such as state prisons, densely populated residential houses, Islamic boarding schools, etc. Several environmental sanitation factors that influence the incidence of scabies are water quality, residential density, air humidity, and waste disposal facilities. Therefore, it is important always to pay attention to and maintain good environmental sanitation in order to avoid various infectious skin diseases.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

**Background:** Hazards in the work environment, such as exposure to smoke, can cause respiratory function disorders. Several factors from the workers' characteristics can also affect lung conditions, such as age, smoking habits, disease history, personal protective equipment, nutritional status, exercise habits, and duration of service.

**Objective:** This study aims to analyze the factors associated with impaired lung function in workers making typical Mandar food in TuboSendana Sub-District.

**Method:** A quantitative research with a cross sectional method. A spirometry examinations and interviews were conducted with 100 workers in TuboSendana District to determine the factors contributing to impaired lung function. The data were analyzed using chi-square and logistic regression.

**Result:** The results showed that there was a relationship between years of employment ( $p=0.048$ ), smoking status ( $p=0.002$ ), use of PPE ( $p=0.014$ ) and exercise ( $p=0.014$ ) with the lung function capacity of workers. Meanwhile there is no relationship between nutritional status ( $P=0.873$ ) and lung function capacities.

**Conclusion:** Duration of service, smoking status, exercise, and PPE use are related to the lung capacity of workers, and the most related (dominant) factor most related is smoking habits. It is recommended that workers adopt a healthy lifestyle by reducing smoking behavior and not smoking during work. It is recommended to increase self-awareness of using standardized PPE.

**Keywords:** Lung Function Capacity, Workers, Mandar Traditional Food.

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## INTRODUCTION

Occupational respiratory tract diseases are the respiratory tract disease or disorder that occurs due to inhaling harmful particles, mists, vapors, or gases while a person is working. In developed countries, occupational lung disease is one of the leading causes of illness and disability. However, in developing countries such as Indonesia, few cases of occupational lung disease are reported.<sup>1</sup>

The International Labor Organization (ILO) 2005 estimated the average incidence of occupational lung disease at around one case per 1000 workers per year. The World Health Organization (WHO) data shows that in developing countries, at least 400-500 million people suffer from respiratory diseases, from acute to chronic.<sup>2</sup>

Impaired lung function is also an infectious disease that ranks first as a cause of death. Hazards in the work environment, such as exposure to smoke, can cause respiratory function disorders.<sup>3</sup>

## MATERIALS AND METHODS

### Study Design

This research was conducted in Tubo Sendana Sub-District, Majene Regency, West Sulawesi. The study used a cross-sectional design. The sample in this study was 100 samples of workers making typical Mandar food (Smoked fish and Bolu Paranggi) in Tubo Sendana Sub-District. The sampling technique is total sampling.

### Data Collections

Data was collected through face to face interviews with respondents using questionnaires, using tools and materials such as body scales, height gauges, portable spirometers and chest measuring devices to obtain the calculation results.

### Data analysis

Using the SPSS 25 software the data were analyzed. The characteristics of respondents were analyzed univariately, and the relationship between variables was analyzed bivariately. A multivariate

analysis with a logistic linear regression model was performed to determine the variables most strongly associated with impaired lung function capacity.

## DISCUSSION

The results showed that workers with a length of service > 5 years had more abnormal lung function capacity, namely 78.7 %, compared to workers with normal lung function capacity, 21.3%. In comparison, new workers < 5 years have more capacity. Abnormal lung function of 60.4% compared to normal lung function capacity of 39.6%. The results of the chi-square statistical test ( $P=0.048$ ) showed that there was a relationship between years of service and lung function capacity of workers.

These results also conveyed that the longer working period of these employees, the capacity and ability of their lungs will decrease more and more.<sup>1</sup> This happens because their work environment causes their lung capacity to decrease. The

## RESULTS

### Bivariate Analysis

**Table 1. Study Variables.**

Variables	Lung Function Capacity				Total		P-Value
	Normal		Abnormal		N	%	
	n	%	n	%			
<b>Length of work</b>							
New	21	39,6	32	60,4	53	100	0.048
Long	10	21,3	37	78,7	47	100	
<b>Nutritional Status</b>							
Underweight	2	28,6	5	71,4	7	100	0.873
Normal	17	29,3	41	70,7	58	100	
Overweight	12	34,3	23	65,7	35	100	
<b>Smoking Behavior</b>							
No	8	16,3	41	83,7	49	100	0.002
Yes	23	45,1	28	54,9	51	100	
<b>Exercise</b>							
Yes	22	25,9	63	74,1	85	100	0.014
No	9	60,0	6	40,0	15	100	
<b>PPE Utilization</b>							
Yes	8	12,3	57	87,7	65	100	0.000
No	23	65,7	12	34,3	35	100	

Source: Primary Data, 2022

### Multivariate Analysis

**Table 2. The most dominant factors related**

Variable	B	SE	Sig.	Exp(B)	95% CI for Exp(B)		
					Lower	Upper	
Step1 <sup>a</sup>							
Length of Work	.374	.609	.539	1,454	.441	.4794	
PPE Utilization	-3,185	.826	.000	041	008	.209	
Smoking Behavior	2,928	1,322	.027	18,694	1,402	249,341	
Exercise	.545	.872	.532	1,724	.312	9,518	
Constant	-1,086	2,678	.685	.338			
Step2 <sup>a</sup>							
PPE Utilization	-.3,282	.689	.000	038	010	.145	
Smoking Behavior	2,317	.704	.001	10,149	2,556	40,302	
Constant	1285	405	.001	3,615			

Source: Primary Data, 2022

emergence of various types of pollution, dust and other pollution that continuously settles in their bodies.<sup>2</sup>

However, if the health conditions are measured, the longer they work, the lower their ability and lung capacity will be. Workers who have a long working period can have an impact on decreasing lung function. The longer the working period of someone who works in a place containing

hazardous materials, the greater the risk of exposure to the work environment which will have an impact on health, especially respiratory disorders.<sup>2</sup> The biggest risk when these workers inhale various dusts is of course it will have the impact of respiratory problems and decreased lungs.<sup>3</sup>

The results showed that workers with poor nutritional status had a higher

abnormal lung function capacity of 71.4% compared to normal lung capacity of 28.6%, while workers with normal nutritional status had a higher abnormal lung function capacity of 70.1% compared to workers with less nutritional status. normal lung capacity of 29.3%. Compared to the normal lung capacity of 34.3%, workers with poor nutritional status have an aberrant lung function capacity of

65.7%. Based on the chi-square test there is no relationship between the nutritional status of workers with lung function ability (0.873).

By using the body mass index as a measure of nutritional status, the results show that 58.0% of workers have normal nutritional status, 35.0% are overweight, and 7.0% are underweight. Decreased lung function ability may be caused by employees who are overweight or obese. This is related to disorders of the lung wall which can interfere with lung airflow and reduce lung function. According to study there was no relationship between dietary status and lung vital capacity based on spirometry data with a P value of 0.431.

In addition, in relation to nutritional status, the increasing age of workers is also able to affect the decrease in lung capacity they have. According to the older a person is, the lung capacity will decrease. A decrease in each person by 20 ml in one year. For this reason, even though the nutritional condition is greater or less, with increasing age, their lung capacity will still decrease. Then the gender factor is also the same, even though men have a greater potential but both men and women have the same opportunities to experience decreased lung capacity and respiratory problems.<sup>5</sup>

The results show that the majority of smokers have an aberrant lung function capacity of 83.7% compared to 16.7% of normal lung function, whereas non-smokers have an abnormal lung function capacity of more than 54.9%. compared to individuals with normal lung function capacity of 45.1%. The results of the chi-square test  $P = 0.002$  showed that there was a relationship between smoking habits and the ability of employees' lung function.<sup>6</sup> This relationship occurs because according to research data, there is no cigarette smoke that does not have a risk of health problems.<sup>4</sup> For this reason, even though it is in the form of smoke, the harmful content is still the same and can reduce lung capacity. Moreover, we as active and passive smokers will have the same opportunity, namely experiencing respiratory problems and decreased lung capacity. For this reason, cigarette smoke both triggers lung disorders that everyone has.

This is one of the causes of reduced lung function experienced by employees due to smoking habits and inhaling cigarette smoke, as well as frequent exposure to dust and toxic substances, which increase these opportunities. This is also reinforced by the condition of a person who is in a room or a certain environment with exposure to cigarette smoke, it turns out that it is also able to affect human lung capacity.<sup>1</sup> For this reason, the decrease in lung capacity is not only influenced by their smoking habits but also the influence of exposure to cigarette smoke from other parties in the environment. This condition is mostly experienced by cafe workers or other traditional food workers.<sup>4</sup> The content in cigarette smoke and smoked cigarettes can also accumulate in the body cumulatively, so that the longer someone smokes, the more harmful elements in cigarettes that enter the body, along with the high level of concentration of cigarette smoke in the smoker's work environment.<sup>5</sup>

Those who exercised more had a deviated lung function capacity of 74.1% compared to those with normal lung function capacity of 25.9%, while those who did not exercise had a greater pulmonary function capacity of 60.0% compared to those with abnormal lung function capacity. by 40.0%. The chi-square statistic  $P = 0.014$  shows that there is a relationship between exercise and the capacity of workers' lung function. The vital capacity of individuals who frequently exercise is greater than those who do not exercise. The habit of exercising will increase lung capacity by 30-40%. If someone does regular exercise but still smokes, he is still at risk of experiencing impaired lung function.<sup>5</sup>

The results revealed that workers who used personal protective equipment (PPE) had abnormal lung function capacity of 87.7 % compared to the normal 12.3%, while workers who did not use PPE had a greater functional capacity. Normal lungs comprised 65.7% of the sample, whereas aberrant lungs comprised 34.3%. The chi-square value of  $P = 0.000$  indicates that there is a relationship between the use of PPE and the lung function capacity of workers.

Personal Protective Equipment (PPE) is used to protect oneself and the body from

work risks and accidents, with the aim of preventing and reducing work accidents and work-related diseases. This study uses a device designed to protect the respiratory system from potentially harmful airborne particles. The equipment used meets safety and comfort standards. However, the use of PPE does not guarantee that a worker will not experience respiratory problems. This is in accordance with the statement from that the use of PPE in the form of masks does not necessarily guarantee health and maintains the lung capacity of employees.<sup>7,8</sup>

## CONCLUSION

There is a correlation between duration of service, smoking behavior, exercise, the use of PPE with lung function capacity among employees in the Tubo Sendana Sub-District who prepare Traditional Mandar food. There is no correlation between nutritional status and lung function capacity among employees. The habit of smoking has the greatest impact on the lung function ability of workers.

## SUGGESTIONS

In taking breath samples, some workers needed help understanding the procedure of repeatedly inhaling to repeat sampling. Still the researchers did not force this so some results were inaccurate. Researchers can then carry out long education before the examination in the videos that are easy to understand. For maximum results researchers can add supporting chest x-rays examinations. Future researchers can conduct further studies to compare the lung function capacity among workers exposed to smoke who have smoking habits and those who do not.

## CONFLICT OF INTEREST

No conflict of interest.

## FUNDING

No third-party funding was involved in this study.

## ETHICS

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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## ABSTRACT

At the end of 2019, precisely in December, the world was shocked by an incident that made many people nervous, known as the corona virus (covid-19). The incident began in China, Wuhan. There are more than 2.2 billion children in the world, which is about 28% of the world's child population, who experience mental health changes. Those aged between 10 to 19 years make up 16% of the world's population ( UNICEF, 2019 ). A systematic review of the literature through a review of journals on the impact of the covid- 19 pandemic the mental health of children and adolescents. Literature searches were conducted through Google and Google Scholar with the same keywords, namely The Covid 19 Pandemic, The Mental Health, Children and Adolescents, published in 2019-2020. In Indonesia itself, research on the mental status of adolescents was observed by I Gusti Ayu Rai Rahayu, with the title: The Impact of the Covid-19 Pandemic in Bandi Regency, Bali. Using a cross-sectional approach, the study was conducted on high school students with a sample of 301 people, it was found that 289 people (69.2%) indicated the presence of symptoms of PTSD (Post Traumatic Syndrome Disorder) and 18 people (6%) indicated the absence of symptoms. symptoms of PTSD. A well-functioning family is a family that can help relieve anxiety and encourage better management by learning from life, thereby improving their mental health.

**Keywords:** Covid-19, Mental health, Adolescents.

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## INTRODUCTION

At the end of 2019, precisely in December, the world was shocked by an incident that made many people nervous, known as the corona virus (covid-19). The incident began in China, Wuhan. Initially, this virus was thought to have been caused by exposure to the Huanan seafood wholesale market which sells many species of live animals. The disease quickly spread domestically to other parts of China. From December 18 to December 29 2019, there were five patients who were treated with Acute Respiratory Distress Syndrome (ARDS). From December 31, 2019 to January 3, 2020, this case increased rapidly, marked by the reported 44 cases.<sup>1</sup>

Indonesia is a developing country and the fourth most population country in the world, and thus was expected to suffer greatly and over a longer period of time. When the novel coronavirus SARS-CoV2 hit China most severely during the months December 2019 – February 2020. On January 27, 2020, Indonesia issued travel restrictions from Hubei province, which at the time was the epicenter of the global COVID-19, while at the same time evacuated 238 Indonesians from

Wuhan. President Joko Widodo reported that he first found two cases of COVID-19 infection in Indonesia on March 2, 2020. Patients who were confirmed to be COVID-19 in Indonesia started from an event in Jakarta where the patient was in contact with a foreign citizen (WNA) from Japan who lives in Jakarta. Malaysia. After the meeting the patient complained of fever, cough and shortness of breath.<sup>1</sup>

Policies have been carried out by the government since this virus began to enter Indonesia, including by setting a health protocol policy in accordance with the recommendation from the WHO to provide various health facilities for patients affected by the Corona virus as well as implementing a social distancing policy that developed into Large-Scale Social Restrictions (Large-Scale Social Restrictions). PSBB) in several regions in Indonesia, especially areas that are vulnerable to the Corona virus.<sup>2</sup>

The government through the Ministry of Education and Culture (Kemendikbud) has issued a series of policies in response to the development of the spread of covid 19, according to Circular Letter No. 4 of 2020 concerning the Implementation of Education policies in the Emergency

Period for the Spread of Corona Virus Disease (Covid 19).<sup>3</sup> With the Covid-19 pandemic, the government issued a policy for all schools to be closed, face-to-face learning must be replaced by distance learning or online learning. The COVID-19 pandemic requires students to study remotely and study at home with guidance from their parents. This very fast change without being accompanied by adequate preparation beforehand resulted in many stuttering in the implementation of government policies through online education.<sup>3</sup>

By using this online learning system, sometimes various problems faced by students and teachers arise, such as subject matter that has not been completed by the teacher and then the teacher replaces it with other tasks. This becomes a complaint for students because the tasks given by the teacher are more.<sup>4</sup> Another problem with the existence of this online learning system is that access to information is constrained by signals that cause slow access to information. Students are sometimes left with information as a result of an inadequate signal. As a result, they are late in collecting an assignment given by the teacher. Not to mention for

teachers who check the many assignments that have been given to students, making gadget storage space increasingly limited. The application of online learning also makes educators think again about the learning models and methods that will be used. Initially a teacher had prepared a learning model to be used, then had to change the learning model.<sup>4</sup>

There are more than 2.2 billion children in the world, which is about 28% of the world's child population, who experience mental health changes. Those aged between 10 to 19 years make up 16% of the world's population ( UNICEF, 2019 ). COVID-19 has affected the lives of people all over the world including children and youth in an unprecedented way.<sup>5</sup> Children affected by this pandemic, are experiencing the most vulnerable effects, as they are forced to stay at home for long periods due to isolation. School closures, resulting in reduced peer interaction and reduced opportunities for exploration and physical activity. All of this has a negative impact on children's mental health and well-being, leading to a variety of mental health problems, such as anxiety, stress, depression, and difficulty sleeping.<sup>5</sup>

## RESEARCH METHOD

Systematic review of literature through journal reviews on the impact of the COVID-19 pandemic on the mental health of children and adolescents. Literature searches were carried out through Google and Google Scholar with the same keywords, namely The Covid 19 Pandemic, Mental health, Adolescents, published in 2019-2020. The results of the search process obtained 10 articles that met the inclusion and exclusion criteria. In the search process, articles that met the inclusion criteria were collected and examined systematically.

## RESULT AND DISCUSSION

Traumatic events due to the Covid-19 Pandemic experienced by all individuals in the world, where feelings of security are reduced, comfort is disturbed, all activities are hampered and always remind them of the fact that there are death data and fast information updates through the media about the increase in positive cases per

day, due to cases and the very fast nature of the spread, including transmission by asymptomatic people, this can trigger negative effects on the mental health of individuals, families and communities including panic confusion over events that are the first time in their life.<sup>6</sup>

The study on the Mental impact of the Covid-19 Pandemic situation that Liu conducted in 2020 on 253 individuals from one of the areas most affected by the COVID-19 Pandemic in China reported a 7% incidence of post-traumatic stress symptoms 1 month after the pandemic outbreak.<sup>6</sup> Another study from China conducted by Zhang & Ma in 2020, observed that 53% of people experience feelings of terror. One extensive study determined that 0.9% of college students showed severe symptoms of anxiety, 2.7% moderate symptoms and 21.3% mild symptoms. Income stability and family life together with parents were found to have an effect on anxiety symptoms. Variables such as occupation, education and gender have been found to influence symptoms of anxiety and depression developing during the pandemic.<sup>6</sup>

Research published in the JAMA Pediatrics Journal and conducted in Hubei China and involving 2,330 school children shows that school-age children who are quarantined in their learning process due to Covid-19 show some signs of emotional distress. In fact, a follow-up study of these observations showed that 22.6% of the children observed experienced symptoms of depression and 18.9% experienced anxiety. The results of a survey conducted by the Japanese government also showed similar results, namely 72% of Japanese children felt stress due to Covid-19.<sup>7</sup>

The same thing happened in the United States. Investigations carried out by the Center for Disease Control (CDC) showed 7.1% of children in the age group 3 to 17 years had been diagnosed with anxiety, and about 3.2% in the same age group suffered from depression. In fact, other studies have shown that isolation due to Covid-19 causes the mental health conditions of children with special needs, such as ADHD, ASD, and other disabilities, to worsen.<sup>7</sup>

In Indonesia itself, research on the mental status of adolescents was

observed by I Gusti Ayu Rai Rahayu, with the title: The Impact of the Covid-19 Pandemic in Bangli Regency, Bali. Using a cross-sectional approach, the study was conducted on high school students with a sample of 301 people, it was found that 289 people (69.2%) indicated the presence of symptoms of PTSD (Post Traumatic Syndrome Disorder) and 18 people (6%) indicated the absence of symptoms. PTSD symptoms.<sup>6</sup>

In another study conducted by Muhammad Iqbal entitled Early Detection of Mental Health Due to the Covid-19 Pandemic at Unnes Sex Care Community through the Self Reporting Questionnaire Method, it was carried out with a quantitative descriptive approach with a sample of 44 people showing results, namely 28 people (63.6 %) respondents indicated experiencing mental health problems due to the Covid-19 pandemic, while mental health disorders experienced include: feeling tense, anxious, having trouble sleeping and having trouble thinking clearly and feeling tired all the time.<sup>8</sup>

In Indonesia, the implementation of this policy of limiting learning activities in schools certainly has a significant impact on the mental health of students, although to varying degrees. Data obtained from a rapid assessment survey conducted by the Covid-19 Handling Task Force (BNPB, 2020) shows that 47% of Indonesian children feel bored at home, 35% are worried about missing lessons, 15% of children feel insecure, 20% of children miss friends, friends, and 10% of children are worried about the family's economic condition.<sup>8</sup>

One example of a case that happened in Indonesia on October 17, 2020, precisely in Gowa Regency, South Sulawesi. A 2nd grade high school student who is desperate to end his life by drinking grass poison. It is suspected that the teenager was depressed due to the pressure of distance learning he experienced. Before drinking the poison, he had complained to a friend that he had difficulty accessing school assignments due to the poor signal in his home area. This is clear evidence that children and adolescents who experience restrictions on their learning activities at home are a vulnerable group to mental health disorders.<sup>8</sup>

Based on interviews, most respondents said that they were not comfortable with online learning, because basically not all children easily adapt and fit into such a learning model. Some children feel that online learning tends to make them uncomfortable and less fun.<sup>7</sup>

Basically all mental health disorders begin with feelings of anxiety (anxiety). Anxiety is a response to certain threatening situations, and is a normal thing to happen. Anxiety begins with a threatening situation as a dangerous stimulus (stressor). At a certain level, anxiety can make a person more aware of a threat, because if the threat is considered harmless, then a person will not do self-defense. In connection with facing the Covid-19 pandemic, anxiety needs to be managed properly so that it continues to provide awareness but does not cause excessive panic or lead to worse mental health disorders.<sup>6</sup>

Anxiety reactions will be different for each individual. For some people anxiety reactions are not always accompanied by physiological reactions. But in certain people, the complexity of the response in anxiety can involve momentary physiological reactions such as a faster heart rate, sweating, stomach pain, headache, itching and other symptoms. After a person begins to feel anxiety, the self-defense system will then reassess the threat accompanied by efforts to overcome, reduce or eliminate the feeling of being threatened. A person can use self-defense (defence mechanism) by increasing cognitive or motor activity.<sup>9</sup>

Anxiety usually comes from the perception of uncontrolled events, so that individuals will focus on controlled actions. In the context of this pandemic, examples of controlled actions taken include exercising, meditation, painting, playing music, gardening, cooking, reading books, watching movies, and so on. These various activities match individual interests and abilities as a formidable and protective strategy for dealing with stress, anxiety, and panic.<sup>9</sup>

The final stage in dealing with anxiety is finding solutions (coping) with forms of self-defense such as rationalization. Rationalization is not intended to make unreasonable actions make sense, but

rationalize. Rationalization is not meant to 'persuade' or manipulate others, but rather to 'persuade' oneself to accept one's own limitations. For example, an employee who during this pandemic works from home (work from home) will rationalize that he has less than optimal performance. Working at home during a pandemic is not just moving workspaces. This rationalization is not for others, but for himself, as an effort to maintain his mental health so that it does not cause frustration, guilt, and feelings of helplessness.<sup>9</sup>

Dr.dr.Fidiansjah, SpKJ., MPH as the Director of Prevention and Control of Mental Health and Drug Problems, the Ministry of Health also presented data from Wahana Visi Indonesia regarding the Rapid Assessment Study of the Impact of COVID-19 and its Effect on Indonesian Children. These data indicate that there is inequality in access to supporting facilities for online and offline learning experienced by children who have entered school age. As many as 68 percent of children can access supporting facilities during the learning period but there are also 32 percent of children who do not even get a learning program in any form.<sup>7</sup>

Therefore, the family factor is closely related to humans. Mental health that occurred during the Covid-19 pandemic is related to the family, because the family is the main place for children and adolescents to live and learn. A well-functioning family is a family that can help relieve anxiety and anxiety, and encourage better management by learning from life, thereby improving their mental health. Conversely, poor family functioning can increase psychological problems (such as anxiety and depression).<sup>5</sup>

## CONCLUSION

In the current era of the COVID-19 pandemic, we are required to work or carry out academic activities such as school and lectures from home, even though most individuals are forced to work directly as usual.<sup>10</sup>

One of the things that can be done to maintain mental health during a pandemic is to adapt to what is happening in the current environment. Adjustments need to be made to get harmony and harmony between environmental demands and

internal demands. Which is that one has to accept things when one has no control over the situation. Good adjustment is measured by how well a person copes with any changes that occur in his life. Self-adjustment is an important mental aspect and is closely related to one's belief in one's ability to control various obstacles and use one's potential. In adapting to the environment, problems, and new things, a process and effort is needed and if we fail to adjust, of course it can lead to disturbed mental health and lead to stress.<sup>10</sup>

## CONFLICT OF INTEREST

No conflict of interest.

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## ETHICS

Ethical clearance has been obtained from the ethics committee of Polytechnic Health Ministry of Health Kupang.

## AUTHOR CONTRIBUTIONS

All authors contributed equally in the writing of this article.

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