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*Exploring New Research in
Preventing Cardiovascular Disease
Palu, 17th - 18th October 2024*



Editor:

Kadar Ramadhan, Adhyanti, Christine, Alfrida Samuel Ra'bung, Mustafa,
Yuli Admasari, Irsanty Collelin

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PREFACE

It is with great pleasure that we present the proceedings of the 2nd International Conference of Health Polytechnic of Palu (IHP), held on October 17–18, 2024, in the vibrant city of Palu, Indonesia. The theme of this year's conference, "Exploring New Research in Preventing Cardiovascular Disease," highlights the critical importance of interdisciplinary approaches and innovative strategies in addressing one of the leading causes of morbidity and mortality worldwide.

This conference brought together researchers, practitioners, academicians, and policymakers from diverse fields to exchange knowledge and share groundbreaking ideas on the prevention of cardiovascular disease. The event served as a platform for disseminating cutting-edge research findings, fostering collaborative networks, and inspiring future research endeavors that aim to improve global health outcomes.

The papers included in this proceedings reflect the breadth and depth of the discussions that took place during the conference. They encompass a wide range of topics, including clinical interventions, nutritional approaches, public health strategies, and technological innovations in cardiovascular health. We are confident that these contributions will not only advance academic knowledge but also support evidence-based practices and policies in the fight against cardiovascular disease.

We would like to extend our deepest gratitude to all participants, authors, reviewers, and organizing committee members whose dedication and hard work made this conference a resounding success. Special thanks go to our keynote speakers and session chairs, who generously shared their expertise and insights, enriching the overall quality of the event.

Finally, we express our sincere appreciation to our sponsors and institutional partners for their invaluable support in making this conference possible. We hope that the ideas and collaborations sparked during this conference will lead to lasting impacts on research, policy, and practice in cardiovascular health.

We trust that the contents of this proceedings will be a valuable resource for scholars and practitioners alike and will serve as an enduring record of the intellectual and collaborative spirit of the 2nd International Conference of Health Polytechnic of Palu.

Sincerely,
Chairperson committee
2nd International Conference of Health Polytechnic of Palu

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The Use Of ALPISALIN As An Acupressure Aid At Points L14 And SP6 On The Intensity Of Pain In The First Stage Of Labor

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ABSTRACT

Introduction: Mothers experiencing pain during labor will cause stress, causing excessive release of catecholamine hormones and steroids. Pain that occurs in the active phase is physiological pain, but efforts are still needed to deal with pain in the first stage of labor. If pain during labor is not treated, it will cause painful problems for the mother in labor, but also has the potential to threaten the life of the fetus. A technique that can be used to reduce the intensity of labor pain is giving acupressure. ALPISALIN is a tool to increase the comfort of administering acupressure at points L14 and SP6 made from mahogany wood. The research aims to determine the effectiveness of using ALPISALIN as an acupressure tool for points L14 and SP6 on the intensity of pain in the first stage of labor. **Methods:** This research is a Quasi Experimental Design with a One Group Pre-Post Test Design approach. The population in this study was all mothers giving birth. The sampling technique was carried out by accidental sampling of 30 respondents. The research was conducted from April to June 2024. Data was collected by observing acupressure treatment using ALPISALIN with the Numerical Rating Scale (NRS) questionnaire. Univariate analysis of frequency distribution and Bivariate analysis of paired t test. **Results:** The research results showed that the average labor pain before acupressure points SP6 and L14 using ALPISALIN was 6.48 and after using ALPISALIN it was 3.84. The use of ALPISALIN as an acupressure tool for points SP6 and L14 was effective in reducing labor pain in the active phase of the first stage at Prima Husada Hospital Sidoarjo (p-value $0.0001 < 0.05$) with a reduction of 2.64. **Conclusion:** ALPISALIN can be used as a tool to provide acupressure at points L14 and SP6 in midwifery care for mothers in the first stage of labor which aims to reduce labor pain.

KEYWORDS: ALPISALIN, pain, childbirth, nonpharmacological, acupressure;

INTRODUCTION

Childbirth is a natural process carried out by a birthing mother and occurs physiologically in life. Childbirth can be defined as the process of movement of the fetus, placenta and membranes through the birth canal spontaneously, and without complications. This process begins with cervical dilatation due to uterine contractions with regular frequency, duration and strength until it opens completely and is ready to expel the fetus from the mother's womb (Alam,2020). The physiological response of the birth process can trigger uterine contractions which can cause pain and discomfort for a mother during labor. This situation

begins to arise in the first stage of labor, namely in the latent and active phases. In the first stage of labor, uterine contractions cause cervical dilatation and push the fetus towards the birth canal. Uterine contractions experienced by a mother can cause pain. Pain in the active phase is physiological pain that occurs over a longer period of time, so efforts are needed to deal with pain in the first stage of labor. If pain during labor is not treated, it will cause problems that are not only painful for the mother in labor, but also have the potential to threaten the life of the fetus. (Santiasari, 2020).

Based on the problems and impacts caused, management is needed to reduce pain in childbirth. Many methods are used to reduce labor pain, both pharmacological and non-pharmacological. The use of pharmacological methods is allegedly better effective than non-pharmacological methods. However, this method often causes side effects and sometimes does not have the expected effect. Non-pharmacological methods are believed to reduce labor pain and have non-invasive, simple effects and without harmful effects. (Danuatmaja, 2013). One non pharmacological technique that can reduce labor pain includes acupressure. This technique can be used as an alternative to reduce pain levels without causing detrimental effects. Acupressure is performed at points L14 and SP6. These two points are believed to be able to manage labor pain by stimulating local production of endorphins, which are painkilling substances that are naturally produced in the body. These substances can trigger a calming and uplifting response in the body, have a positive effect on emotions, can cause relaxation and normalization of body functions. (Sulistyoningrum, 2017).

ALPISALIN is a massage tool made from mahogany wood which is used as a tool to provide acupressure at points L14 and SP6. A small massage tool that can be held in the palm of the hand, to help provide acupressure 56 pressure at the L14 and SP6 points which is useful for reducing 1st stage labor pain.

From the results of a preliminary study conducted by researchers at Prima Husada Hospital, there was birth data for 308 women giving birth in 2019 or an average of 30 women giving birth every month. In 2020, there were 364 mothers giving birth or an average of 30 mothers giving birth every month. From this data, all deliveries were carried out without using acupressure techniques to reduce the intensity of labor pain. Management of reducing labor pain is carried out by mobilizing the patient, taking deep breaths, changing the patient's position on the right and left side. This study aims to determine the effectiveness of using ALPISALIN as an acupressure tool for L14 and SP6 points in reducing pain intensity during the first stage of labor at Prima Husada Hospital.

METHOD

Materials

The tools and materials used in this research are:

- a. ALPISALIN, an acupressure tool at points L14 and SP6 made of mahogany with tool dimensions 10x2x20 cm
- b. Numerical Rating Scale (NRS) questionnaire to measure the level of labor pain.
- c. observation sheet to record pain levels before and after using ALPISALIN

Data collection procedures

This research is a Quasi Experimental Design using the One Group Pre-Post Test Design approach. This design was developed to overcome difficulties in determining the control group in research. In this design, the group used for research cannot be chosen randomly. Before being given treatment, the group was given a pretest (first stage of data collection), then the group was given treatment/experiment, then a posttest was carried out.

The research was conducted on postpartum mothers during the first active phase at Prima Husada Hospital in Sidoarjo. The respondents in this study were all postpartum mothers who had entered the active phase of labor and met the inclusion criteria of 30 respondents obtained using accidental sampling techniques. The variables in this study were acupressure at points L14 and SP6 using the ALPISALIN tool as the independent variable and labor pain during the first active phase as the dependent variable. Acupressure is administered by pressing 15 times with a duration of seconds for each press, and pausing for 10-60 seconds. So the total duration for each point is around 30 minutes, and 60 minutes for both points (L14 and SP6). Univariate analysis uses frequency distribution and Bivariate analysis uses paired t test

RESULTS

Respondent Characteristics

Table 1 Distribution of Respondents Based on Age, Parity and Companion

Characteristics	F	(%)
Ages		
20 – 35	22	74 %
> 35	8	26 %
Parity		
Primiparous	13	44 %
Multiparous	17	56 %
Husband's companion	19	64 %
Other family	11	36 %

The characteristics of the respondents who participated in this research were that the majority of mothers were in labor with an age range between 20 - 35 years / healthy reproductive age, as many as 22 respondents (74%), and aged > 35 years as many as 8 respondents (26%). Respondents with the type of birth (parity) were 13 respondents (44%) primiparous and 17 respondents (56%) multiparous. Distribution of Respondents Based on Companion shows the results that during the birthing process, women giving birth were accompanied by a companion, namely 19 respondents (64%) were accompanied by their husbands, 11 respondents (36%) were accompanied by other family members.

Effectiveness of Using ALPISALIN as an Acupressure Tool for L14 and SP6 Points on Pain Intensity in the First Stage of Labor

Table 2 Frequency of Labor Pain Before and After Acupressure With ALPISALIN

Variable	Category	Before		After	
		f	%	f	%

Pain Intensity	No	0	0	0	0
	Light	0	0	7	
	Medium	20	66	23	23
	Heavy	10	34	0	77

Based on table 2, the results show that the frequency of labor pain before being given the acupressure technique with ALPISALIN in the Severe category was 10 respondents (34%) and in the Medium category was 20 respondents (66%). After being given the acupressure technique with ALPISALIN, the frequency of labor pain in the Severe category was no longer found, and changed to the Moderate category for 18 respondents (60%) and the Mild category for 12 respondents (40%).

Bivariate analysis in this study was carried out to determine the effectiveness of using ALPISALIN as an acupressure tool for points SP6 and L14 on the intensity of pain in the first stage of labor at Prima Husada Hospital Sidoarjo.

Table 3 Independent T-Test

	<i>Mean</i>	<i>SD</i>	<i>Mean Differ ence</i>	<i>T</i>	<i>Sig (2- tailed)</i>	<i>d f</i>	<i>N</i>
<i>Pre Test</i>	6.48	1.358					
<i>Post Test</i>	3.84	1.179	2,64	16.289	0.0001	2 4	2 5

Table 3 explains that the average pain felt by mothers in labor before being given acupressure intervention using ALPISALIN points SP6 and L14 was on a scale of 6.48 or in the Moderate Pain category, where objectively the subjects (respondents) hissed, grinned, could show the location of the pain, could describe the pain, and followed commands well.

Table 3 also shows that the average pain of mothers giving birth after being given acupressure intervention using ALPISALIN at points SP6 and L14 is on a scale of 3.84 or in the Mild Pain category, where objectively the subjects (respondents) can still communicate well. The number of respondents used as research samples (n) was 30.

The Standard Deviation value in the pre-test was 1.358 and the post-test was 1.179. The results in the table also show that the post-test average of 3.84 is smaller than the pre-test average of 6.48, so descriptively there is a difference/decrease in labor pain. The mean difference or average level of pain reduction was 2.64.

Table 3 shows the effectiveness of ALPISALIN as an acupressure aid at points L14 and SP6 in reducing the intensity of labor pain. The hypothesis is accepted if $t_{\text{count}} > t_{\text{table}}$ or significance < 0.05 . The hypothesis is rejected if $t_{\text{count}} < t_{\text{table}}$ or significance > 0.05 . Based on the table above, the calculated t value is 16.289. To find the t table value based on the df value and significance value ($\alpha/2$), the df value is 24 and the significance value is 0.025. Based on the distribution of t table values, the t table value was found to be 2.0639.

Thus, because the calculated t value is $16.289 > t \text{ table } 2.0639$, the hypothesis is accepted. So it can be concluded that ALPISALIN as an acupressure tool for points L14 and SP6 is effective in reducing labor pain, where the average reduction in pain is 2.640 with a significance value of $0.0001 < 0.05$.

DISCUSSION

Interpretation of Key Findings and Comparison with Previous Studies

a. Average labor pain before giving acupressure using ALPISALIN

Based on the research results, the average pain felt by mothers in labor before being given acupressure intervention at L14 and SP6 points was on a scale of 6.48 or in the Moderate Pain category, where objectively the subjects (respondents) hissed, grinned, could indicate the location of the pain, could describe the pain, and follow orders well.

The results of this research are in line with research by Ririn Ariyanti (2019) that of 30 respondents, the average pain scale for the treatment group before the intervention was 6.87, with a standard deviation of 0.915. With a confidence level of 95%, the pain scale of respondents in the treatment group before the intervention was estimated to range from 6.36 to 7.37.

This increase in pain perception is caused by labor having entered the active phase (maximum dilatation phase) with the cervix opening 5-6 cm. Opening the cervix is the process of enlarging the opening of the cervix from a tightly closed state to a hole large enough to allow the passage of the fetal head. In this phase, the uterine contractions become longer and stronger in intensity, during the contractions there will be constriction of the blood vessels which will cause muscle fiber anoxia. This will cause pain stimulation in addition to the compression of the nerve endings when the uterus contracts.

Flattening of the cervix in the active phase due to increasingly strong contractions will cause the walls of the uterine corpus which consist of muscles to become thicker and shorter, while the lower part of the uterus and cervix contain only a few muscles and contain a lot of collagen tissue which will be easily pulled until it becomes thin. Opening this condition will cause the pain to increase. This pain is called visceral pain (in the internal organs) stimulation of pain receptors in the abdominal cavity due to muscle spasms, ischemia, and tissue stretching. (Ariyanti, 2019).

The feeling of pain in labor is very subjective regarding the physical sensations associated with uterine contractions, dilation and effacement of the cervix, and descent of the head during labor. Differences in the perception of pain felt by postpartum mothers during the first active phase occur due to different individual abilities in responding to and perceiving the pain they experience. The ability to respond and perceive pain is influenced by many factors such as age, gender, meaning of pain, attention, previous experience, coping style, family support, fear and anxiety, personality, fatigue, culture, and society (Ariyanti, 2019).

b. Average labor pain after giving acupressure using ALPISALIN

Based on the research results, it shows that the average pain of mothers giving birth after being given acupressure intervention at points SP6 and L14 is on a scale of 3.84 or in the Mild Pain category, where objectively the subjects (respondents) can still communicate well. The number of respondents used as research samples (n) was 30. The Standard Deviation value in the pre-test was 1.358 and post-test was 1.179. Std value. The mean error for the pre-test was 0.272 and the post-test was 0.236. The results of this research are in line with Ririn Ariyanti's (2019) research. The average pain scale for the treatment group after acupressure therapy intervention was carried out on the in-partum mother PMB Ratri Restuni was found to have a scale of 4.37 with a standard deviation of 1.163.

Gently stimulating and massaging the acupressure points for 1 minute on the hand between the thumb and index finger can cause the release of endorphins. The term endorphin is a combination of the two words endogeneity and morphine, when the body releases these substances one effect is pain relief. Endorphins are thought to inhibit pain impulses by blocking impulse transmission in the brain and spinal cord (Ariyanti, 2019).

The labor pain felt by respondents during the first stage of labor has decreased. Labor pain that is not managed strongly has dangerous effects beyond the discomfort it causes. The effects that arise will affect the labor process as well as worsen the condition of the mother and fetus. Decreased pain after giving acupressure therapy helps respondents reduce the discomfort they feel due to labor pain (Ariyanti, 2019).

c. Effectiveness of ALPISALIN as an Aid for L14 and SP6 Point Acupressure on Pain Intensity in the First Stage of Labor

Based on the research results, the t value for respondents was 16.289 with a p-value of 0.0001. It can be seen that the p-value is smaller than the p-value (0.05), this indicates that H_0 is rejected. This means that there is a significant difference between the pain scale before and after the intervention in the respondents.

The results showed that there was a significant difference between the average pain scales. Before the acupressure therapy intervention was carried out using ALPISALIN at points L14 and SP6, the average pain scale for respondents was 6.48, then after the acupressure therapy intervention was carried out using ALPISALIN at points L14 and SP6, the average pain scale for respondents decreased to 3.84. Likewise, when a statistical test was carried out using the dependent t test, the data showed that the t value for the treatment group was 16.289 with a p-value of 0.0001. It can be seen that the p-value is smaller than the p-value (0.05), this indicates that H_0 is rejected. This means that there is a significant difference between the pain scale before and after the intervention in the respondents.

The results of this study are in line with the results of Hilda's (2020) research that there were significant differences between the groups of respondents who were given intervention, so that acupressure was effective in reducing labor pain. Acupressure of points SP6 and L14 in different cervical dilations causes a decrease in the intensity of labor pain. Point SP6 is spleen point number 6 located 4 fingers above the inner ankle and L14 is the large intestine point located between the first and second metacarpal bones (between the thumb and index finger) in the distal part of the folds of both hands (Alam, 2020).

Acupressure at points SP6 and L14 can reduce labor pain. Acupressure of these points can activate and increase the production of endorphin hormones so that pain is reduced. Activity in large and small nerve fibers influences the sensation of pain. Pain impulses pass through small diameter fibers. It is these nerve fibers that close the gate on impulses through small fibers. Acupressure is carried out by stimulating acupuncture points at points on the surface of the skin which contain many large diameter sensory nerve fibers and blood vessels which help close the gates for the transmission of pain-causing impulses, thereby reducing or eliminating pain (Nature, 2020).

The working mechanism of acupressure is by stimulating the nervous system, improving blood circulation, activating, and increasing the work of endorphin hormones. Massaging and pressing on acupressure points will stimulate A β nerve cells in the skin or type 1 nerve cells in muscles which are large diameter myelinated nerve cells that carry tactile or sensory messages. Stimulating acupressure points can activate sensory nerve receptors. The impulse will be transmitted to the spinal cord, then the mesencephalon with the pituitary hypothalamus complex, all three of which are activated to release endorphins which can suppress labor pain. This endorphin hormone is a pain-relieving hormone that is produced naturally by the body. Endorphin hormones will be released if a person is happy and calm. Acupressure treatment is carried out by pressing 15 times with a duration of 60 seconds for each press, and pausing for 10-60 seconds. So the total duration for each point is around 30 minutes, and 60 minutes for both points (L14 and SP6).

Implications for Public Health

The implications of this research for health are that pain in mothers giving birth can be reduced with non-pharmacological treatment, one of which is by using ALPISALIN to help provide acupressure at points L14 and SP6.

Limitations and Cautions

The limitation of this study is because the number of normal deliveries is unstable so that the time of data collection is delayed from the predetermined schedule. Further research will take the topic of efforts to relieve pain in non-pharmacological labor with different methods (with massage using ice gel).

Recommendations for Future Research

The limitation of this study is because the number of normal deliveries is unstable so that the time of data collection is delayed from the predetermined schedule. Further research will take the topic of efforts to relieve pain in non-pharmacological labor with different methods (with massage using ice gel).

CONCLUSION

Before administering acupressure using ALPISALIN, respondents experienced moderate and severe pain intensity. After giving acupressure using ALPISALIN, the pain intensity is mild and moderate. The use of ALPISALIN is effective in reducing the intensity of pain in women giving birth.

This research recommends, for educational institutions, it is hoped that this research can become a reading tool in libraries to develop husbands' knowledge and attitudes in supporting pain reduction for labor with non-pharmacological methods.

AUTHOR'S CONTRIBUTION STATEMENT

The author confirms the sole responsibility for the conception of the study, presented results, and manuscript preparation.

CONFLICTS OF INTEREST

In this research there is no conflict of interest with all parties

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Literature review: Intestinal parasitic infections with stunting in children

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ABSTRACT

Introduction : Stunting is a global nutritional problem that can have long-term impacts on children's growth and development. This study aims to conduct a systematic review of the relationship between intestinal parasite infections and stunting in children. **Methods**: The systematic review method was conducted by collecting data from various databases, including PubMed, Scopus, and Google Scholar, using relevant keywords. Inclusion criteria included observational studies that discussed intestinal parasite infections and stunting in the child population. Of the 50 articles found, 10 studies met the inclusion criteria and were analyzed. **Results** : The results showed a significant association between intestinal parasite infections, especially roundworms and hookworms, and an increased risk of stunting. Proposed mechanisms include nutrient malabsorption and chronic inflammation caused by infection. **Conclusion** : This study suggests the importance of prevention and treatment of parasitic infections as a strategy to reduce stunting in children, especially in areas with a high prevalence of parasitic infections. These findings can be the basis for the development of nutrition and public health policies.

KEYWORDS : stunting, intestinal parasite infections, children, literature review.

Introduction

Today, it is projected that around 162 million children under the age of five experience stunting globally. According to trend analysis, it is predicted that by 2025, 127 million children under the age of five will be affected by stunting. Indonesia is ranked 5th in the world for stunting prevalence, with approximately 9 million cases or 37% of children affected. Stunting poses significant risks to children's growth, intelligence, and long-term socio-economic potential.

A history of infectious diseases is one of the risk factors for stunting. In 2020, WHO data showed that the prevalence of stunting among toddlers reached 22%, equivalent to 149.2 million children. Compared to 2019, the stunting rate showed only a marginal decrease of 0.4% (WHO, 2021). In Indonesia, the 2019 Toddler Nutritional Status Survey reported a stunting prevalence of 27.7%, a slight improvement from the 30.8% recorded in the 2018 Basic Health Research (Riskesdas).

Stunting results from chronic malnutrition, particularly during the first 1,000 days of life. Its impact is generally evident by the age of two. According to the Decree of the Minister of Health Number 1995/MENKES/SK/XII/2010, stunting is defined as height-for-age below -2 standard deviations (SD) on the growth curve. Severe stunting is categorized with a z-score below -3 SD.

The adverse effects of stunting include inhibited physical growth, delayed motor and verbal development, susceptibility to infectious and non-infectious diseases, and decreased productivity in adulthood. Stunting also increases the likelihood of obesity and associated degenerative diseases.

The direct causes of stunting are related to nutritional intake and infectious diseases, particularly intestinal parasite infections. Indirect factors include poor parenting practices, limited access to health services, and inadequate environmental sanitation.

Method

This study employed a literature review methodology, analyzing published studies from 2012 to 2023. Articles were retrieved from databases including PubMed, ScienceDirect, and Google Scholar using keywords such as "intestinal parasite infection," "stunting," and "children."

Inclusion Criteria

Research articles addressing the relationship between Soil-Transmitted Helminths (STH) infections and stunting in children, Studies published between 2012 and 2023, Articles written in English or Indonesian, Studies with clear methodologies.

Exclusion Criteria

Articles with incomplete structures. Studies with inaccessible complete data. Studies lacking quantitative and qualitative research results. Publications consisting of opinions or comments.

Study Selection

Out of 40 identified articles, 10 studies met the inclusion criteria after screening for relevance and full-text availability.

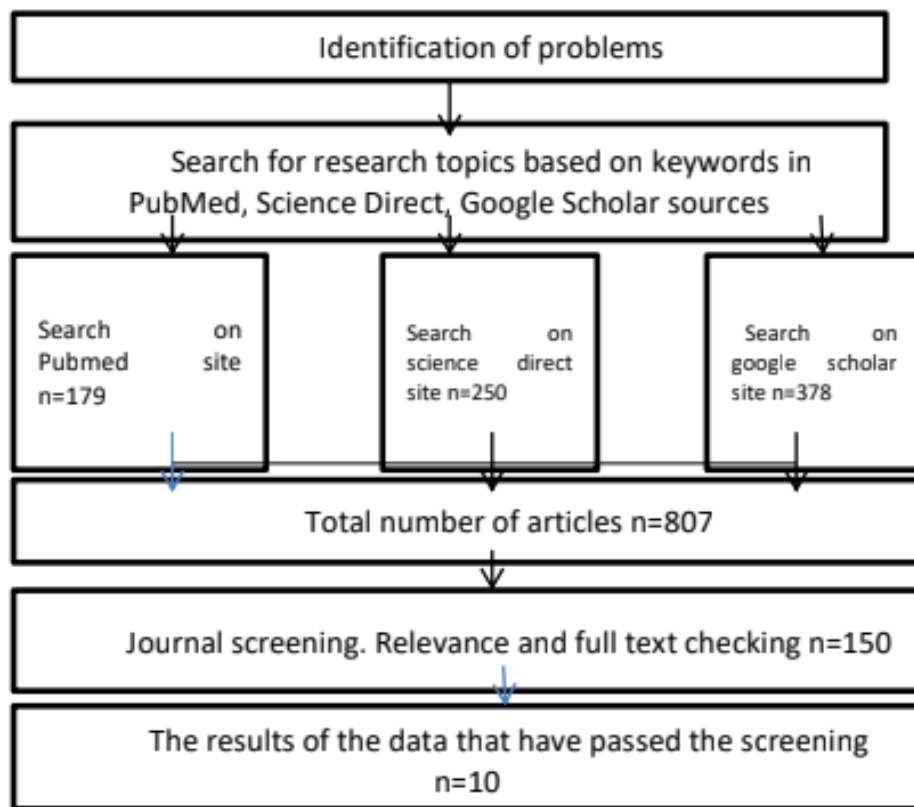


Table 1

Summary Data Description Literature Review Findings Factors Related to Incidents Stunting in Children

N O	RESEARCH TITLE, NAME OF RESEARCHER, YEAR/LINK	OBJECTIVE	STUDY POPULATI ON AND SAMPLES	METHOD	RESULTS	CONCLU SION
1.	How colonization bottlenecks, tissue niches, and transmission strategies shape protozoans infections Dana A. May, Fatima Taha, Matthew A. Child, Sarah E. Ewald (2023) https://pubmed.ncbi.nlm.nih.gov/37839913/	This research aiming For understand H o bottleneck colonization, niche network, and strategy trans mission to form infectio n protozoa. Main focus is for investigat e impact and implications of factors this is in dynamics	Samples that use in this research covering various species protozoa that to infect human or animals, as well as organisms its host. Samples too includin g data and	Research method this include data collection from the study experimen tal, field survey, and analysis related literature. Approach experimen tal and	Research result show that colonizatio n bottleneck, network niches, and transm ission strategy have an importat role in forming protozoal infection These	From this research, concluded that bottleneck colonizati on, niches network, and transmissi on strategy is a factor key in to form proto zoal infection. The

		infection by protozoa.	literature which is relevant For support analysis and understanding about bottleneck colonization ,network niches, and strategy transmission.	observational used for understand interaction between protozoa and organism its host. Analysis statistics and models mathematics too Possible used for describe and predict infection dynamics.	conditions influence possibility of infection, pathogenesis, and transmission success from protozoa to its host organism. In addition, this study may highlight specific patterns in infection dynamics, such as relationship between genetic diversity protozoa and strategy the transmission that develop	understanding that better about. Interaction between protozoa and organism the host can give insight that valuable for development strategy prevention and control protozoal infection infuture. With to consider these factors, can developed the approach that more effective in management the disease that caused by protozoa
2.	Effects of intestinal parasitic infections on nutritional status of primary children in Imo State Nigeria Onyenonachi Charity Ihejirika1,&, Obioma Chebechi	A study cross-sectional done between the months April to October 2015, For determine impact parasitic infection	Sample size determined use formula Daniel's statistics [8] for determination sample size use prev	Stool sample checked use Kato Katz method and techniques formal	Results: A total prevalence rate of 16.6% was recorded in the study area with Ascaris	Conclusion: compared to with study previously , there is a decline prevalence of

	<p>Nwaorgu2, Chikere Ifeanyi Ebirim3, Callistus Muodebe Nwokeji/ 2019 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6658158</p>	<p>intestines (IPIs) to nutritional status children age study in geographic zone Owerri and Orlu, in Country Imo Part, Nigeria</p>	<p>alencepopul ation. One thousand two hundreds of students bin. Index aged 5-13 year selected through the process random, (six hundreds of students the tall one-from each zone) for determin e prevalence of anemia. Simple random sampling method was also used to select three hundred (300) students (150 students from each zone) from 1200 students were selected to determine the prevalence of intestinal parasitic infections and anthropometric studies. Students with a</p>	<p>concentrat ion- ether, while blood sample checkedus e method cyamethah aemoglo anthropometry used as status indicator nutrition childrenfo r-age, weight body-for-age, and weight-for-height <-2 standard deviations (SD) classified as dwarf, wasted, and underweig ht respectivel y</p>	<p>lumbricoid es (4.0%), Trichuris trichiura (0.6%), Hookwor ms (1.0%) Taenia sp (0.3%), Entaomeb a histolytica (5.3%), Entamoeb a coli (2.7%) and Giardia lambia (2.7%) Majority (73.4%) children experience d mild intensity infections. The results of the anthropometric study showed that 79 (31.3%) of children suffer from malnutritio n.</p>	<p>infection intestinal parasites and anemia among children age school . Parasite mia low intensity With parasites intestines no have an effect sign ificant on malnut rition and hemoglobi n profile children in study area. Bytherefor e, sanitation enhanced and dewormin g efforts should be strengthen ed to ensure further reduction in the prevalence of intestinal parasitic infections.</p>
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			history indicating common chronic diseases in childhood such as sickle cell anemia, human immunodeficiency virus (HIV) excluded from this study			
3	Parasitic infections, malnutrition and anemia among preschool children living in rural areas of Peshawar, Pakistan Infecciones parasitarias, desnutrición y anemia en niños en edad preescolar que viven en áreas rurales de Peshawar, Pakistán Zia ud Din ¹ , Lubna Pervez ¹ , Arshad Amir ² , Muhammad Abbas ¹ , Imran Khan ¹ , Zafar Iqbal ³ and Mudassar Iqbal ³ Departments of 1 Human Nutrition and 3 Agricultural Chemistry. University of Agriculture. Peshawar, Pakistan. 2 Department of Health.	The aim of this study was to estimate the severity of malnutrition and anemia problems associated with IP in preschool children and to identify risk factors that may contribute to these health problems.	A sample size of 385 children was estimated considering a prevalence of worm infestation of 50% in rural and semi-urban areas, with a precision of 5% and an alpha-error of 0.05. However, the sample size was increased to 450 to compensate for the expected non-response rate of 15-20%. Peshawar has three rural health centers where	Four hundred and thirty seven mother-child pairs were randomly selected from a rural area of Peshawar, Pakistan. Children with visible and invisible worms were identified. The nutritional status of the respondents was evaluated. A structured questionnaire was used to collect data on	The mean age of the children was 24 ± 10 months. A total of 120 (27.5%) of children's stool samples were positive for infection with several parasites. Of the total, 267 (61%), 109 (25%) and 140 (32%) children experienced anemia, stunting, wasting, and	In general, malnutrition and anemia are very common in children associated with IP. precision of 5% and alpha-error of 0.05. However, the sample size was increased to 450 to compensate for the expected non-response rate of 15-20%. Peshawar has three rural health centers where households and

	<p>Government of KPK. Pakistan / 2018 https://sciel.ojs.icsii.es/scielo.php?script=sci_arttext&pid=S0212-16112018000900022</p>		<p>households and families from surrounding rural areas (villages and remote villages) register their children for routine immunization and other health facilities. Children aged 6-59 months were identified and randomly selected from the records of the three rural health centers. Inclusion criteria were: children who were free from disease, any chronic/infectious, and who did not have acute diarrhea, constipation, or dysentery. Infants > 6 months who were exclusively breastfed</p>	<p>relevant parameters. Appropriate statistical tests were used to analyze the data.</p>	<p>underweight, respectively. Most of the children who experience wasting (59% wasting versus 41% normal) and anemia (66% anemia versus 41% normal). A sample size of 385 children was estimated considering the prevalence of worm infestation of 50% in rural and semi-urban areas, with excluded. The child's family was contacted; only one child per household was included after obtaining written consent from the parent/guardian. This study</p>	<p>families from the surrounding rural areas (villages and remote villages) register their children for routine immunization and other health services. Children aged 6-59 months were identified and randomly selected from the records of the three rural health centers. Inclusion criteria were: children who were free from any chronic/infectious diseases, and who did not experience acute diarrhea, constipation, or</p>
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			<p>were also excluded. The child's family was contacted; only one child per household was included after obtaining written consent from the parent/caregiver. The study was approved by university ethics committee.</p>		<p>was approved by the university ethics committee. 34% non-anemic) were infected with parasites ($p < 0.05$).</p>	<p>dysentery. Infants > 6 months who were breastfed exclusive too</p>
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4.	<p>Environmental Risk Factors Associated with Child Stunting: A Systematic Review of the Literature Dwan Vilcins*,†, Peter D. Sly* and Paul Jagals*/2018 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6748290/</p>	<p>The aim of this study was to investigate environmental risk factors associated with stunting on children through a systematic review of the existing literature. Sample:</p>	<p>The sample in this study includes previously conducted studies that investigate the relationship between certain environmental factors and stunting in children. This sample may include a population of children from various geographic regions and demographic backgrounds.</p>	<p>A systematic search of the literature was performed using PubMed, EMBASE, Scopus, TOXNET, and CINAHL. A search of the grey literature was conducted. Papers were included in this review if they examined an association between childhood stunting and exposure to environmental risk factors</p>	<p>We included 71 reports in the final analysis. The included studies showed that foodborne mycotoxins, a lack of adequate sanitation, dirt floors in the home, poor quality cooking fuels, and inadequate local waste disposal areas associated with an increased risk of childhood stunting. Access to safe water sources was studied in a large number of studies, but the results remain inconclusive due to inconsistent study findings. Limited studies</p>	<p>A diverse range of environmental risk factors are, to varying degrees, associated with stunting, demonstrating the importance of considering how the environment interacts with nutrition. Health promotion activities may be more effective if they consider environmental factors alongside nutritional interventions</p>
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					<p>were available for arsenic, mercury, and environmental tobacco, and thus their role in stunting remains inconclusive. The identified research did not control for nutritional intake. A causal model identified solid fuel use and foodborne mycotoxins as being environmental risk factors with the potential to have direct impact effects on childhood growth.</p>	
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5.	<p>Molecular and descriptive epidemiology of intestinal protozoan parasites of children and their pets in Cauca, Colombia: a cross-sectional study E. Gonzalez-C2 , Myriam Consuelo Lopez3 , Julio Cesar Giraldo4 and Juan David Ramírez1/2019 https://pubmed.ncbi.nlm.nih.gov/30808303/</p>	<p>The aim of this study is to explore the usefulness of molecular methods. In understand the dynamics of parasitic protozoan transmission in the southwestern region of Colombia By analyzing these samples, this study aimed to identify the presence and prevalence of Blastocystis, G. duodenalis, Cryptosporidium spp., and Entamoeba complex in the studied population and to explore the relationship between risk factors. environment and presence of parasites</p>	<p>The population studied were school age children attending child care institutions. in the commune eight Popayán, Cauca. The samples used were 266 stool samples consisting of 258 from children and eight from pets.</p>	<p>descriptive cross-sectional study of school-age children attending daycare institutions in a commune eight Popayán, Cauca (Southwestern Colombia) . A total of 266 stool samples were collected (258 from children and eight from pets). Blastocystis, G. duodenalis, Cryptosporidium spp., and Entamoeba complex were identified by microscopy, quantitative real-time PCR (qPCR), and conventional PCR. The agreement</p>	<p>A total of 258 stool samples from children were analyzed by microscopy and 255 samples were analyzed by qPCR. Prevalence of Blastocystis ranges between 25.19% (microscopy) and 39.22% (qPCR), G. duodenalis between 8.14% (microscopy) and 10.59% (qPCR), Cryptosporidium spp. is estimated at 9.8% (qPCR), and Entamoeba complex between 0.39% (conventional PCR) and 0.78% (microscopy). The agreement</p>	<p>This study reveals the utility of molecular methods to describe the transmission dynamics of parasitic protozoa in Southwest Colombia. The presence of some of these protozoa in domestic animals may be involved in their transmission.</p>
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				<p>between qPCR and microscopy was assessed using the Kappa index. Molecular characterization was performed to identify Blastocystis subtypes (18S), <i>G. duodenalis</i> assemblages (tpi and gdh), and species/subtype <i>Cryptosporidium</i> (18S and GP60). Potential associations between intestinal parasitism and sociodemographic factors were examined using bivariate analysis.</p>	<p>between microscopy and qPCR was very low. Blastocystis ST1 (alleles 4, 8, and 80), ST2 (alleles 11, 12, and 15), ST3 (allele 31, 34, 36, 38, 57, and 151), and ST4 (alleles 42 and 91), assemblages <i>G. duodenalis</i> AII, BIII, BIV, and D, <i>C. parvum</i> subtype IIa, and subtype <i>C. hominis</i> IbA9G3R2 was identified. The only identified member of the <i>Entamoeba</i> complex corresponds to <i>E. histolytica</i>. No statistically significant associations were</p>	
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					found. identified between parasitic infections and any sociodemographic variables	
6.	Nutritional status and intestinal parasites among young children from pastoralist communities of the Ethiopian Somali region. Kadra A. Osman ^{1,2,3} Jakob Zinsstag ^{2,3} Rea Tschopp ^{2,3,4} Esther Schelling ^{2,3} Jan Hattendorf ^{2,3} Abdurezak Umer ^{1,2,3} Seid Ali ^{1,2,3} Colin I. Cercamondi. 2019 https://pubmed.ncbi.nlm.nih.gov/32026575/	The aim of this study was to evaluate the nutritional status and prevalence of intestinal parasites among young children from pastoral communities in the Somali region of Ethiopia. Thus, this study aims to understand the relationship between nutritional conditions and the presence of intestinal parasites in this pastoral child population.	The sample in this study were young people from Pastoralist communities in the Somali region of Ethiopia. This sample may consist of children from a variety of demographic and environmental backgrounds.	Prevalence of stunting, wasting, underweight and upper arm circumference (MUAC) <12.5 cm each of 30, 34, 40, and 16%. Median (IQR) hemoglobin, ferritin, and retinol-binding protein concentrations were 9.5 g dL ⁻¹ (8.2, 10.9), 6.2 µg L ⁻¹ (4.0, 10.2), and 0.8 mol L ⁻¹ (0.67, 0.91), respectively. Prevalence of anemia, iron deficiency, and	The prevalence of IPI is 47%; the most common IPIs were Giardia lamblia (22%) and Ascaris lumbricoides (15%). Giardial infection but not A. lumbricoides increases the risk of MUAC <12.5 cm (adjusted odds ratio [aOR]: 3.50, interval 95% confidence interval [CI] [2.21, 5.54]). The chance of developing anemia is 97% (aOR: 0.03, 95% CI [0.03, 0.07]) and	Malnutrition and IPI are alarmingly high in children aged <5 years in ESRS. Giardial infection and poor nutritional adequacy appear to be the major contributing factors to the critical nutritional status and should be addressed with appropriate interventions.

				vitamin A each of 75, 91, and 30%.	89% (aOR:0.11, 95% CI [0.11, 0.23]) less for children with FVS >2 or with exclusive breastfeed each for up to 6 months.	
7.	Molecular Mechanisms of Persistence in Protozoan Parasites .Asfiha Tarannum, Cristian Camilo Rodríguez Almonacid, Jorge Salazar Bravo and Zemfira N. Karamy. 2010 https://pubmed.ncbi.nlm.nih.gov/32026575/	The aim of this study is to provide a comprehensive overview of recent developments in the investigation of protozoan persistence in vertebrate hosts.		The focus is primarily on persister function, its establishment within the host, and the specific molecular interactions between host and parasite as they persist.	The main findings of our study indicate that protozoan parasites deploy multiple molecular and physiological strategies to evade immune surveillance and maintain their persistence. In addition, some parasites undergo stage differentiation, allowing them to adapt to different host environments.	More often than not, stress is the cause such as exposure to drugs has been shown to have a significant impact on the formation of protozoan persistence. Understanding the molecular mechanisms that regulate the persistence of protozoan parasites in vertebrate hosts may

					nt and immunity challenge.	strengthen back to insight we are currently discussing host-parasite interactions and facilitating the development of more efficacious disease therapies.
8.	Molecular and descriptive epidemiology of intestinal protozoan parasites of children and their pets in Cauca, Colombia: a cross sectional studies. Ximena Villamizar ¹ , Adriana Higuera ¹ , Giovanni Herreral ¹ , Luis Reinel Vasquez-A2 ² , Lorena Buitron ² , Lina Maria Muñoz ² , Fabiola E. Gonzalez-C2 ² , Myriam Consuelo Lopez ³ , Julio Cesar Giraldo ⁴ and Juan David Ramírez ^{1*} /2019 https://pubmed.ncbi.nlm.nih.gov/30808303/	We carried out a descriptive cross sectional study in school-age children attending a daycare institution in commune eight of Popayán, Cauca (South west Colombia).	A total of 258 fecal samples from children were analyzed by microscopy and 255 samples were analyzed by qPCR.	A total of 266 fecal samples were collected (258 from children and eight from pets). Blastocystis, G. duodenalis, Cryptosporidium spp. and the Entamoeba complex were identified by microscopy, quantitative real-time PCR (qPCR) and conventional PCR. The concordance of	The prevalence of Blastocystis was between 25.19% (microscopy) and 39.22% (qPCR), that of G. duodenalis was between 8.14% (microscopy) and 10.59% (qPCR), that of Cryptosporidium spp. was estimated at 9.8% (qPCR), and that of the Entamoeba complex was between 0.39% (conventional	This study revealed the usefulness of molecular methods to depict the transmission dynamics of parasites protozoa in southwest Colombia. The presence of some of these protozoa in domestic animals may be involved in their transmission.

				<p>qPCR and microscope was assessed using the Kappa index. Molecular characterization was conducted to identify Blastocystis subtypes (18S), <i>G. duodenalis</i> assemblages (tpi and gdh) and <i>Cryptosporidium</i> species/subtypes (18S and GP60). Potential associations between intestinal parasitism and sociodemographic factors were examined using bivariate analyses.</p>	<p>nal PCR) and 0.78% (microscopy). The concordance between microscopy and qPCR was very low. Blastocystis ST1 (alleles 4, 8, and 80), ST2 (alleles 11, 12, and 15), ST3 (alleles 31, 34, 36, 38,57, and 151), and ST4 (alleles 42 and 91), <i>G. duodenalis</i> assemblages AII, BIII, BIV and D, <i>C. parvum</i> subtype IIa and <i>C. hominis</i> subtype IbA9G3R2 were identified. The only identified member of the <i>Entamoeba</i> complex corresponded to <i>E. histolytica</i>. No</p>	
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					statistically significant association was identified between parasitic infection and any sociodemographic variable	
9.	Stunting and intestinal parasites in school children from high marginalized localities at the Mexican southeast .Carolina Cruz-Cruz ¹ , Dolores López-Hernández ² , Juan Antonio Hernández Shilón ² , Lorena Mercedes Luna-Cazáres ³ , Jorge E. Vidal ⁴ , Javier Gutiérrez-Jiménez ¹ . / 2018 https://pubmed.ncbi.nlm.nih.gov/32012134/	They were also affected by intestinal helminths	Inhabitants of the state of Chiapas, the poorest population in Mexico, registers the highest prevalence of child malnutrition as well as intestinal parasitic infections. W	A total of 106 school-age children were recruited for nutritional assessment as well as parasitic load measures.	Most children exhibited stunting (88.7%). In these children the prevalence of intestinal parasites was 32.1%, being <i>A. lumbricoides</i> the species with the highest prevalence (25.5%) with moderate parasitic load (15.1%). Positive associations were observed among the presence of intestinal parasites and the municipalit	Extreme poverty conditions in these localities of Mexico are far from reaching the sustainable development goals.

					y where children live, the type of footwear, or the educational level of the mother.	
10.	Parasitic infections, malnutrition and anemia among preschool children living in rural areas of Peshawar, Pakistan Infecciones parasitarias, desnutrición y anemia en niños en edad preescolar que viven en áreas rurales de Peshawar, PakistánZia ud Din ¹ , Lubna Pervez ¹ , Arshad Amir ² , Muhammad Abbas ¹ , Imran Khan ¹ , Zafar Iqbal ³ and Mudassar Iqbal/ 2018 https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0212-16112018000900022	it has previously been shown that parasitic infections (PI) have deleterious effects on the nutritional status of the host, particularly among young children.	the objective of this study was to estimate the severity of the problem of malnutrition and anemia in association with PI in preschool children and to identify the possible risk factors that contribute to these health problems	four hundred and thirty seven mother-child pairs were randomly selected from rural areas of Peshawar, Pakistan. Children with visible and invisible worms were identified. The nutritional status of the respondents were evaluated. Structured questionnaires were used to collect data on relevant parameters. Appropriate statistical	the average age of the children was 24 ± 10 months. A total of 120 (27.5%) fecal samples of children tested positive for several parasites. Of the total, 267 (61%), 205 (47%), 109 (25%) and 140 (32%) children were anemic, stunted, wasted and underweight, respectively. The majority of wasted children (59% wasted versus 41% normal) and anemic	in general, malnutrition and anemia were highly prevalent in children in association with PI.

				tests were used to analyze the data.	(66% anemic versus 34% non-anemic) were infected with parasites ($p < 0.05$). Independent factors related to child anemia included child age, family size, mothers' awareness of overall child healthcare, and PIs. PIs were independent risk factors for malnutrition and general child wasting. Sociodemographic, parental and child-related risk factors for PIs included mothers' poor nutritional status and awareness level regarding	
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					overall child health care, fathers'	
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DISCUSSION

The results of the literature review of ten articles on the relationship between intestinal parasitic infections and stunting in children are summarized in the table. Figure 2 shows that children who experience intestinal infections have a risk of around 44.407%. This result is statistically significant (Proportion = 44.407%; 95%CI = 97.71 to 98.28; $p < 0.0001$).

A study by Luna et al. (2023) revealed that intestinal parasite infections affect children's growth and development disorders, known as stunting. This study explored the relationship between Soil Transmitted Helminths (STH) infections and the incidence of stunting in children in Indonesia, especially in the provinces of East Nusa Tenggara and Sumatra. The results showed that children infected with STH had a two-fold higher risk of stunting than children who were not infected (Wirjanata et al., 2023).

Had a two-fold higher risk of stunting than children who were not infected (Wirjanata et al., 2023). Research by Hlaing et al. (2022) also found a relationship between STH infection and stunting in children. This study was conducted using a Kato Katz (KK) microscope and real-time PCR (qPCR) on 264 children in Bagu Phyu, Myanmar. The results showed that around 84% of children in Myanmar were infected with STH, which is also associated with stunting (Hlaing et al., 2022).

Diptyanusa et al. (2022) showed that STH infection has a significant relationship with stunting. Through a literature review method, this study revealed that STH infection can cause changes in intestinal structure, resulting in decreased villi function and decreased immune cells that protect the intestines. This results in a reduced ability of the body to absorb nutrients important for the growth and development of children.

Nuraini et al. (2022) conducted a study with a cross-sectional design on 60 child respondents aged 0-59 months, and analyzed the data with univariate and bivariate analysis. The results showed that children infected with STH had an 8.84 times higher risk of experiencing stunting than uninfected children.

Hailegebriel (2020) also concluded that STH infection has an impact on child growth and development disorders, including stunting. This study was conducted through a systematic review and meta-analysis in school-age children in Ethiopia, focusing on external factors such as poor sanitation, poor hand hygiene, unhygienic drinking water, and inadequate family education.

Conclusion

The rate of intestinal parasite infection in children in Indonesia is still relatively high, influenced by tropical and humid climate, poor environmental sanitation, poor hand hygiene, unhygienic drinking water, and inadequate family education. This infection can have a significant impact on children, one of which is causing growth and development disorders

known as stunting. The results of the meta-analysis showed that infected children had a risk of around 44.407% of experiencing stunting compared to uninfected children (Proportion = 44.407%; 95%CI = 97.71 to 98.28; $p < 0.0001$).

CONFLICT OF INTEREST

There is no conflict of interest

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Android-Based Basic Life Support Educational Video for Laypeople

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ABSTRACT

Introduction: Prevalence of cardiac arrest outside hospital reaches 70% causes by many factors, which is by cardiovascular diseases. The appropriate help in dealing cardiac arrest is to provide basic life support (BLS). High mortality rate of out hospital cardiac arrest (OHCA) is due to the community's lack of ability to provide basic life support. This research aims to develop android-based basic life support educational media for laypeople to increase their knowledge and ability. **Methods:** This research method used research and development approach. Product development consisting of application design, media and material expert feasibility test and application trials by laypeople who were selected using purposive sampling. Research data were collected using questionnaires, quantitative and qualitative analysis were conducted. **Results:** Feasibility test from media experts obtained a score of 94,78% means very appropriates category and 90% from material experts means very appropriates category, and the test results from 31 respondents obtained a score of 91,29%, means very appropriate category. **Conclusion:** The android-based of basic life support educational media is very feasible in terms of media, materials and meets the requirements for laypeople to manage out of hospitals cardiac arrest.

Keywords: *basic life support, educational media, android, laypeople*

INTRODUCTION

One of the highest causes of death is cardiovascular disease. Cardiovascular disease can trigger an emergency, namely cardiac arrest (1). Cardiac arrest is a condition in which the heart stops to carry out its circulatory function, which is pumping blood throughout the body. Cardiac arrest is a life-threatening emergency condition because it can affect a person anytime and anywhere, in the hospital or outside the hospital (2).

Between 300,000 and 50,000 sudden cardiac arrests occur each year and 10.8% of cardiac arrest survivors who receive proper help from emergency medical services survive (3). It is estimated that by 2030, around 23.3 million people will die from heart disease. Data from the World Health Organization (WHO) states that cardiac arrest outside hospitals witnessed by the general public reached 37.1, witnessed by medical personnel as much as 12.8%, and it is estimated that as many as 50.1% of cases are invisible (4). This data corroborates the opinion that cardiac arrest is more commonly witnessed by ordinary people (1). If cardiac arrest occurs outside the hospital, the role of the community around the location is needed to be able to provide basic life support in order to save the victim's life (5).

The principle of helping cardiac arrest victims is to provide basic life support quickly and appropriately. The accuracy and speed of rescue have a big effect on the level of safety of the victim's life. Therefore, providing basic life support to cardiac arrest victims, especially those that occur outside the hospital, must be able to be done by anyone. This can be realized if the general public is able to become a chain of safety when finding victims with signs of cardiac arrest that occur outside the hospital. To answer this challenge, the community must be equipped with knowledge on how to carry out basic life support (6). To be able to increase public knowledge about basic life assistance, it is necessary to carry out continuous education so that the community is exposed to this information.

Various methods and educational media can be used to increase public knowledge. The use of educational media plays an important role in the learning process because the media is a means of conveying messages and the content of learning materials. Media has specific and varied characteristics, therefore choosing educational media must be done carefully so that it can be used appropriately and learning goals can be achieved (7).

The selection of educational media needs to be adjusted to technological developments. In the era of technology 4.0, digitalization is developing very rapidly. The learning process can be accessed through smartphones because the development of smartphone features today already has various capabilities such as internet access and also has an operating system like a computer. Smartphones can now be used for various purposes such as entertainment and education. Smartphones are developed with applications that are able to support their use, including one of them as a health education medium (8).

Education in the community as an effort to improve knowledge and ability to manage cardiac arrest must be carried out periodically with efficient and interesting methods and media. An android-based digital education method needs to be developed to make it easier to educate and advocate for the public on the importance of knowledge and skills about the administration of basic life support. Android-based educational media is considered easy and efficient, can be accessed anytime and anywhere because everyone has a smart phone, an attractive display and an easy-to-understand language. The purpose of this research is to develop and analyze android-based educational media applications as an educational means to increase knowledge and abilities about cardiac arrest management outside hospitals, namely providing basic life support carried out by lay helpers.

METHOD

This research uses a research and development (R&D) design. Research and development (R&D) is research to produce products through the process of discovering potential problems, designing and developing a product as a solution to the problems found. This research is appropriately used to produce innovation (9). This research designs and develops an application, namely android-based basic life support education media. The application development stage starts from literature studies and field studies to develop application concepts and suitability with the needs of the community. The next stage is to design and develop the application in collaboration with the technology developer. The last stage is testing application feasibility test by one media expert and one material expert. A small-scale application trial was also carried out on 31 application user respondents. Data collection was conducted using a questionnaire with a Likert Scale, namely 5 (Strongly Agree), 4 (Agree), 3 (Normal), 2 (Disagree), 1 (Strongly Disagree). Interpretation of feasibility is 0%-20% = Very unworthy, 21%-40% = Not worthy, 41%-60% = Fair enough, 61%-80% = Fair, 81%-100% =

Very worthy (10). This research was carried out in two health centers in Kendari City and has received a letter of ethical feasibility with number DP.04.03/F.XXXVI.15/ 022 /2024

RESULT

Through this research, an android-based educational media application has been developed, namely Education BHD Helper Layman. The main function of this application is to answer the challenges of technological innovation, especially in the learning process. Android-based educational media displays advantages in the form of ease and speed of access where applications can be accessed offline after the application is successfully downloaded on a smartphone device. Android-based educational media was developed to provide convenience in transferring health information for the general public. Android-based basic life support education media was developed to increase people's knowledge and ability to recognize signs and symptoms of cardiac arrest and provide basic life support to cardiac arrest victims.

After the application is successfully developed, then the application feasibility test (validation) and application trials in small groups are carried out. The feasibility test (validation) is carried out by material experts and media experts. The trial was carried out by application users, namely the general public.

Media Member Qualification Test

Validation by media experts uses questionnaires to assess applications from media aspects. The questionnaire used contains questions to validate the appearance of the application, the ease of use of the application, and the consistency and presentation of the graphics displayed in the application. Media experts provide recommendations in the form of improvements to the application's appearance to use brighter colors and ease of use at the login stage.

Table 1. Media Expert Validation Analysis

Variable	Media Expert Validation
Total Score	109
Score Percentage	94,78
Score Interval	81%-100%
Category	Highly Worthy

Material Expert Qualification Test

Validation by material experts assesses the feasibility of the application from the aspect of material content, including the suitability of content, language, and educational presentation. The material experts who validate are experts in the field of emergencies.

Table 2. Material Expert Validation Analysis

Variable	Material Expert Validation
Total Score	54
Score Percentage	90
Score Interval	81%-100%
Category	Highly Worthy

Application Trial

The application trial stage was carried out on 31 general public respondents. During the trial, respondents downloaded the application, registered, watched educational videos and filled out questionnaires. The trial questionnaire consisted of 14 items related to respondents' perception of the ease of use of the application, the usability of the application, behavioral intentions, attitudes towards actual use.

Table 3. Application Test Analysis

Variable	App Trial
Total Score	1981
Score Percentage	91,29
Score Interval	81%-100%
Category	Highly Worthy

DISCUSSION

This android-based basic life support educational media application has passed a series of feasibility tests by media experts and material experts. The feasibility test was carried out to improve the product that had been developed through revision and input provided by experts until the result was obtained that this application was very feasible to be used as an educational medium that could be accessed by the public widely and freely.

The increase in the use of smartphones and the ease of access to information through mobile applications can be used as an educational medium to increase knowledge, thereby helping to increase knowledge independently about health information relevant to their lives in accordance with the development of the sophisticated era (11). The factor that causes the popularity of online media is the speed factor, which is the efficiency of the application in providing data according to the user's wishes (12). Various health information, especially regarding the concept of cardiac arrest starting from the definition, recognizing signs and symptoms and its management can be easily known through access to android-based educational media.

Currently, there are many information media that facilitate and provide detailed educational information about heart health. Android-based educational media has become popular because it has many advantages compared to other online educational media (13). Android is now an alternative to educational media because of its effective and easy learning process, providing advantages in the form of learning media with an attractive appearance, providing a lot of information that is easily accessible and making it easier to communicate (14).

Android-based basic life support educational media has been developed and is considered very feasible to be used as an educational media for the community. This media is expected to be able to become a means of independent learning for the community so that the community becomes aware and able to provide basic life support to cardiac arrest victims they encounter in their respective neighborhoods. Education on basic life support for the general public plays a major role in improving response and safety in various emergency situations (15). Basic life support for cardiac arrest victims can be done by anyone, including ordinary people. The help provided by the public has a great influence on the safety of the victims. Because providing help and providing temporary assistance until getting competent medical care can make the difference between life and death for a victim who has a cardiac arrest and respiratory arrest (16).

It is undeniable that technological developments have changed aspects of people's lives, including their learning process. Due to the changing times, the learning process now does

not always have to be done conventionally. With android-based learning media, learning can be done anywhere, anytime and by anyone through a smartphone. From the results of this study, an overview was obtained that the community can improve their knowledge and abilities independently because they are able to access educational media easily. This research produces innovations that can be used by the community as an educational medium in improving their knowledge and ability to recognize and provide basic life support to cardiac arrest victims. So that ordinary people can carry out their function as a safety chain to reduce the death rate due to cardiac arrest outside hospitals.

LIMITATIONS OF RESEARCH AND RECOMMENDATIONS

This research developing an educational media. This research has only reached the stage of application development and feasibility test. It is necessary to conduct follow-up tests to assess the effectiveness of the application, especially to measure changes in the knowledge and abilities of ordinary people before and after learning with this educational media that has been developed.

CONCLUSIONS AND SUGGESTIONS

Based on the research that has been carried out, in accordance with the discussion that has been outlined in the previous chapter, it can be concluded that the development of an android-based basic sniff assistance educational media application has been developed and can be installed through the Play Store. This android-based application has passed validation by media experts with a very sieve category and also a material expert with a very decent category. Trial use of application products by respondents on a small scale with a very feasible category. This application can be used as an educational medium to increase the knowledge and ability of the community in the management of cardiac arrest outside the hospital.

AUTHOR'S CONTRIBUTION STATEMENT

This research can be carried out well because of the contribution of the research team members. Specifically, the research team has taken their respective roles and completed them well. Starting from preliminary studies, collecting literature sources, preparing proposals, collecting data, analyzing data, preparing results, to preparing publication manuscripts. This process is carried out sequentially and all teams are actively involved.

CONFLICTS OF INTEREST

The researcher stated that there was no conflict of interest in the conduct of this study, where there was no financial linkage, personal relationship, or professional affiliation that could affect the results of this study.

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Analisis Perilaku Seks Pranikah Remaja Menggunakan Theory Planned Behavior

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ABSTRACT

Introduction: Perilaku seks pranikah di kalangan remaja terus meningkat, data laporan dari survei nasional tahun 2019 terdapat sebanyak 74% remaja pria dan 59% remaja perempuan pertama kali melakukan hubungan seks antara usia 15-17 tahun. Apabila perilaku seks pranikah remaja luput dari perhatian maka dapat berisiko terinfeksi penyakit menular seksual, kehamilan tidak diinginkan di usia muda dan aborsi. Tujuan Penelitian Untuk menganalisis determinan. Perilaku Seks Pranikah Remaja Menggunakan Theory Planned Behavior. **Methods:** Penelitian ini menggunakan rancangan penelitian analitik observasional dengan pendekatan *cross sectional study*. Sampel adalah siswa kelas X dan XI di SMA Negeri 1 Limboto sebanyak 233 responden. Teknik pengambilan data simple random sampling dengan menggunakan lembar kuesioner. Analisis data menggunakan analisis univariat dan bivariate. **Results:** Sebagian besar untuk variable perilaku seks pranikah tidak pernah melakukan sebanyak 157 (67,4%) sikap negatif yaitu sebanyak 142 (60,9%), untuk variabel norma subjektif tinggi sebanyak 130 (55,8%), untuk variable kontrol perilaku tinggi sebanyak 131 (56,2%) dan untuk variabel tidak ada niat sebanyak 133 (57,1%). Analisis bivariat didapatkan ada hubungan antara sikap, norma subjektif dan control perilaku dengan niat ($P < 0,05$) namun tidak ditemukan hubungan antara niat dengan perilaku seks pranikah ($P > 0,05$). **Conclusion:** Perilaku seks pranikah masih ditemukan dikalangan remaja, walaupun niat ada namun tidak berhubungan dengan perilaku seks pranikah
KEYWORDS: Theory planned behavior; Remaja; Seks Pranikah

LATAR BELAKANG

Perilaku seks adalah segala bentuk tingkah laku yang didorong oleh hasrat seksual baik sesama lawan jenis maupun sesama jenis. Perilaku seks ini dimulai dari merasa tertarik dengan seseorang sampai bercumu, berkenan, bersenggama itu adalah bentuk tingkah laku seksual. Perilaku seksual ini bias tertuju pada orang lain maupun diri sendiri. Bentuk seksual dapat berupa tindakan fisik dan verbal secara langsung dan tidak langsung¹. Pranikah adalah masa sebelum menikah dimana pasangan saling mengenal satu sama lain dan mempersiapkan diri untuk membina hubungan pernikahan. Masa pranikah adalah masa yang penuh dengan kegembiraan, harapan, serta tanda tanya².

Data *World Health Organization* (WHO) 2019 diperkirakan sekitar 40 hingga 60 juta orang melakukan seks bebas setiap tahun ada sekitar 1,2 miliar atau 1,5% dari penduduk dunia hamil diluar nikah, terutama pada pelajar sekolah menengah atas 41% mereka pernah melakukan hubungan seksual, dan 43% tidak menggunakan kondom saat melakukan hubungan seksual. Data *World Health Organization* (WHO) menyatakan pada tahun 2020.

Diseluruh dunia, 1,5 milyar remaja merupakan satu diantara lima orang. Mereka remaja yang berusia 10-24 tahun merupakan 25% dari penduduk Indonesia Tahun 2017 ³

Menurut *theory of planned behavior* (TPB) perilaku Seks pranikah sangat mempengaruhi niat atau maksud (*intention*) dari Perilaku tersebut. Adapun sikap dipengaruhi oleh *behavioral belief* yang terdiri dari kepercayaan pada hasil dan evaluasi hasil. Selanjutnya, norma subjektif dipengaruhi oleh *normatif belief* yang terdiri dari kepercayaan terhadap pandangan orang lain (teman, keluarga, dan tetangga) yang dianggap penting. Sementara *perceived behavioral control* dipengaruhi oleh *control belief* yang terdiri dari faktor pengendalian *internal* dan faktor pengendalian *eksternal* seperti pengetahuan, keterampilan, dan pengalaman ⁴

Pada tahun 2019 di Gorontalo pernikahan dini sesuai data di Kementerian Agama Provinsi Gorontalo, tercatat sebanyak 356 pernikahan dimana berusia di selang 16-19 tahun, terbanyak di kabupaten Gorontalo, dengan 108 pernikahan. Radar Gorontalo 2019, mengungkapkan berdasarkan data yang ada, pernikahan dibawah umur dari Maret 2020-2021 mencapai 243 pasang. Berdasarkan data Badan Pusat Statistik pada tahun 2020 Kabupaten Gorontalo termasuk dalam urutan ke 1, jumlah remaja yang menikah pada usia 12-19 tahun berjumlah 3.898. Berdasarkan studi pendahuluan yang dilakukan disekolah menengah atas yang ada di kecamatan limboto yaitu SMA Negeri 2 Limboto tahun 2024 didapatkan 20 responden, bahwa dari 20 responden terdapat 90% siswa pernah berpacaran, 85% siswa pernah berpegangan tangan, 55% siswa pernah melakukan berpelukan, 30% siswa pernah melakukan berciuman (pipi atau bibir), 30% siswa pernah menonton video porno, 25% siswa pernah meraba bagian yang sensitif, 10% siswa pernah melakukan petting, 0% siswa pernah melakukan oral seks. Tujuan penelitian ini adalah untuk mengetahui analisis perilaku Seks Pranikah Menggunakan Theory Of Planned Behavior di SMA Negeri 1 Limboto.

METODE

Desain penelitian ini menggunakan jenis penelitian kuantitatif dengan metode pendekatan Cross Sectional. Jenis penelitian ini untuk menganalisis secara rinci terkait keadaan saat ini dengan menjelaskan fenomena atau karakteristik individu, keadaan, atau kelompok. Penelitian ini dilakukan pada Januari-Maret tahun 2023 yang dilaksanakan di SMA Negeri 1 Limboto. Adapun populasi terdiri dari 745 siswa. Sampel yang diambil sebanyak 233 sampel yang ditentukan menggunakan teknik sampel purposive sampling.

Klasifikasi variabel terdiri dari variabel dependen yaitu perilaku seks pranikah, variabel independen terdiri dari Sikap, Norma Subjektif, Kontrol Perilaku, dan Niat. Teknik pengumpulan data menggunakan kuesioner yang telah disediakan dengan metode kuesioner serta mengumpulkan data-data yang didapatkan melalui hasil dari kuesioner yang dibagikan.

Teknik analisis data dalam penelitian ini menggunakan analisis univariat dengan menggunakan persentase untuk mendistribusikan frekuensi variabel independen yang meliputi sikap, standar subjektif, kontrol perilaku, dan niat serta analisis bivariat menggunakan uji chi square.

HASIL

Analisis Univariat

Tabel 1
Distribusi Responden Berdasarkan Karakteristik Siswa
SMA Negeri 1 Limboto Tahun 2024

Variabel	N	%
Jenis Kelamin		
Laki-Laki	147	63,1%
Perempuan	86	36,9%
Perilaku Seks Pranikah		
Tidak Pernah Melakukan Seks	157	67,4%
Pranikah	76	32,6%
Sikap		
Negatif	142	60,9%
Positif	91	39,1%
Norma Subjektif		
Rendah	103	44,2%
Tinggi	130	55,8%
Kontrol Perilaku		
Rendah	102	43,8%
Tinggi	131	56,2%
Niat		
Tidak Ada	133	57,1%
Ada	100	42,9%

Sumber : Data Primer 2023

Tabel 1 menunjukkan bahwa distribusi responden berdasarkan jenis kelamin dari total responden sebanyak 233 responden didapatkan responden tertinggi ada pada jenis kelamin laki-laki sebanyak 147 responden (63,1%). Distribusi responden berdasarkan perilaku seks pranikah dilihat dari total sebanyak 233 responden, paling banyak pada kategori tidak pernah melakukan seks pranikah yaitu sebanyak 157 responden (67,4%). Distribusi responden dilihat dari sikap dengan total sebanyak 233 responden, paling banyak pada kategori sikap negatif yaitu sebanyak 142 responden (60,9%). Distribusi responden dilihat dari norma subjektif didapatkan sebanyak 233 responden, paling banyak pada kategori norma subjektif tinggi sebanyak 130 responden (55,8%). Distribusi responden dilihat dari kontrol perilaku dengan total sebanyak 233 responden, paling banyak pada kategori kontrol perilaku tinggi sebanyak 131 responden (56,2%). Distribusi responden dilihat dari niat, dengan total sebanyak 233 responden, paling banyak pada kategori tidak ada sebanyak 133 responden (57,1%).

Analisis Bivariat

Tabel 2
Analisis perilaku seks pranikah pada Siswa SMA Negeri 1 Limboto menggunakan
Theory Plannet Behavior

Variabel	Niat				Total		p-Valeu
	Tidak Ada		Ada				
	n	%	n	%	N	%	
Sikap							
Negatif	101	71,1	41	28,9	142	100	0,000
Positif	32	35,2	59	64,8	91	100	
Norma Subjektif							
Rendah	27	26,2	76	73,8	103	100	0,000
Tinggi	106	81,5	24	18,5	130	100	
Kontrol Perilaku							
Rendah	27	26,5	75	73,5	102	100	0,000
Tinggi	106	80,9	25	19,1	131	100	

Sumber : Data Primer 2023

Tabel 2 hasil analisis menunjukkan bahwa sikap perilaku seks pranikah siswa SMA N 1 Limboto berdasarkan sikap diperoleh sikap negatif sebanyak 142 siswa (100%) dengan siswa yang memiliki niat sebanyak 41 siswa (28,9%) sedangkan sikap positif sebanyak 91 siswa (100%) dengan siswa yang memiliki niat sebanyak 59 siswa (64,8%). Berdasarkan uji statistik dengan menggunakan uji chis-square diperoleh nilai p-value 0,000 ($p < 0,05$), menunjukkan bahwa H_0 ditolak dan H_a diterima yang berarti ada hubungan antara sikap negatif dengan perilaku seks pranikah siswa SMA Negeri 1 Limboto dengan menggunakan Theory Plannet Behavior.

Hasil analisis menunjukkan bahwa perilaku seks pranikah siswa SMA N 1 Limboto berdasarkan norma subjektif diperoleh norma subjektif rendah sebanyak 103 siswa (100%) dengan siswa yang memiliki niat sebanyak 76 siswa (73,8%) sedangkan norma subjektif tinggi sebanyak 130 siswa (100%) dengan siswa yang memiliki niat sebanyak 24 siswa (18,5%). Berdasarkan uji statistik dengan menggunakan uji chis-square diperoleh nilai p-value 0,000 ($p < 0,05$), menunjukkan bahwa H_0 ditolak dan H_a diterima yang berarti ada hubungan antara norma subjektif rendah dengan perilaku seks pranikah siswa SMA Negeri 1 Limboto dengan menggunakan Theory Plannet Behavior.

Hasil analisis menunjukkan bahwa perilaku seks pranikah siswa SMA N 1 Limboto berdasarkan kontrol perilaku diperoleh kontrol perilaku rendah sebanyak 102 siswa (100%) dengan siswa yang memiliki niat sebanyak 75 siswa (73,5%) sedangkan kontrol perilaku tinggi sebanyak 131 siswa (100%) dengan siswa yang memiliki niat sebanyak 25 siswa (19,1%). Berdasarkan uji statistik dengan menggunakan uji chis-square diperoleh nilai p-value 0,000 ($p < 0,05$), menunjukkan bahwa H_0 ditolak dan H_a diterima yang berarti ada hubungan antara kontrol perilaku rendah dengan perilaku seks pranikah siswa SMA Negeri 1 Limboto dengan menggunakan Theory Plannet Behavior.

Tabel 3
Analisis perilaku seks pranikah pada Siswa SMA Negeri 1 Limboto menggunakan
Theory Plannet Behavior

Niat	Perilaku Pranikah				Total		<i>p-Value</i>
	Tidak Pernah		Pernah				
	n	%	n	%	n	%	
Tidak Ada	93	69,9	40	30,1	133	100	0,397
Ada	64	64,0	36	36,0	100	100	
Total	157	67,4	76	32,6	233	100	

Sumber : Data Primer, 2023

Tabel 3 hasil analisis menunjukkan bahwa sikap perilaku seks pranikah siswa SMA N 1 Limboto berdasarkan niat diperoleh siswa yang tidak memiliki niat sebanyak 133 siswa (100%) berdasarkan pernah melakukan perilaku pranikah sebanyak 40 siswa (30,1%) sedangkan siswa yang memiliki niat sebanyak 100 siswa (100%) berdasarkan pernah melakukan perilaku pranikah sebanyak 36 siswa (36,0%). Berdasarkan uji statistik dengan menggunakan uji chis-square diperoleh nilai p-value 0,397 ($p > 0,05$), menunjukkan bahwa H_0 diterima dan H_a ditolak yang berarti tidak ada hubungan antara niat siswa dengan perilaku seks pranikah siswa SMA Negeri 1 Limboto dengan menggunakan Theory Plannet Behavior.

PEMBAHASAN

Sikap

Sikap adalah penjumlahan perasaan positif atau negatif seseorang terhadap suatu objek, orang, lembaga, atau aktivitas (Planned Behavior Theory). Sikap mempengaruhi niat, menurut teori perilaku terencana. Antecedent pribadi, seperti pengalaman dan pengetahuan, membentuk sikap⁵

Berdasarkan hasil penelitian di Sekolah SMA Negeri 1 Limboto, sebelum pengisian kuesioner peneliti memberikan materi terlebih dahulu kepada responden terkait perilaku seks pranikah, kemudian responden mengisi kuesioner dan setelah itu menanyakan kepada responden apakah ada yang sudah berpacaran, lalu berpelukan, kemudian salah satu responden mengatakan pernah berpacaran pernah berpegangan tangan, berpelukan kemudian jangka waktu pacaran yang cukup lama yaitu 1 tahun.

Upaya pencegahan yaitu untuk pihak sekolah membuat suatu organisasi dimana, organisasi tersebut dapat memberikan edukasi serta arahan mengenai kesehatan reproduksi, seksualitas, serta apa saja bentuk-bentuk perilaku seks pranikah. Dan yang lebih penting lagi yaitu pihak sekolah dapat berkomunikasi dengan orang tua siswa-siswi, sehingga apa dilakukan oleh siswa-siswi disekolah dapat diketahui oleh orang tua, dan itu untuk menghindari terjadinya perilaku seks pranikah yang tidak diinginkan.

Norma Subjektif

Berdasarkan hasil penelitian di Sekolah SMA Negeri 1 Limboto, sebelum pengisian kuesioner, peneliti memberikan materi terkait perilaku seks pranikah. Kemudian setelah memberikan materi, meminta responden untuk mengisi kuesioner dan setelah itu peneliti

sedikit bertanya responden mengerti apa itu norma subjektif. Adapun tanggapan dari perwakilan remaja putri menjelaskan tentang norma subjektif seperti sikap atau perilaku sekelilingnya dan dukungan dari lingkungan. Berbeda dengan tanggapan dari perwakilan remaja putra terkait norma subjektif berdasarkan perilaku seks pranikah menurutnya norma subjektif ini terkait perilaku seseorang terhadap saran atau tanggapan orang lain.

Adapun hal-hal yang akan terjadi ketika telah melakukan seks pranikah itu adalah pernikahan dini, kehamilan yang tidak diinginkan dan berujung aborsi, serta contoh paling sederhana yaitu akan memicu pikiran stress. Melihat hasil di atas, dapat diasumsikan bahwa beberapa responden memberikan jawaban yang sangat bertolak belakang terhadap sebagian besar pertanyaan perilaku seks pranikah menonton video porno. Dan ada juga responden menjawab sangat setuju ketika melakukan perilaku seks pranikah setelah adanya ikatan pernikahan. Hal ini bagus karena responden sadar bahwa perilaku seks pranikah seperti menonton video porno itu tidak baik dan pastinya orang tua tidak pernah mau ketika anaknya masih dibawah umur menonton video yang tidak pantas dilihat.

Upaya untuk mencegah terjadi perilaku seks pranikah tersebut adalah ketika disekolah pihak sekolah harus mengadakan atau membuat edukasi kesehatan reproduksi atau mengenai seksualitas dan praktik seksual yang terjadi sebelum menikah atau apa yang dimaksud dengan praktik seksual sebelum menikah. Dan pencegahan yang bisa dilakukan oleh orang tua yaitu lebih memperhatikan lagi anak-anaknya agar tidak bergaul dengan teman-teman yang dapat mengajak mereka untuk melakukan perilaku seks pranikah.

Hal ini sejalan dengan temuan ⁶ yang menyatakan bahwa perilaku seksual remaja sebelum menikah berisiko disebabkan oleh buruknya komunikasi interpersonal antara orang tua dan pengaruh teman yang pernah melakukan perilaku seksual. Jika seorang remaja memiliki jalur komunikasi yang terbuka dengan orang tuanya, maka orang tua tersebut akan lebih mengetahui pengetahuan dan perkembangan anaknya serta akan mampu membimbing remajanya ke arah yang benar jika ia memiliki kebiasaan seksual dan pergaulan yang buruk ⁵

Kontrol Perilaku

Berdasarkan hasil penelitian di Sekolah SMA Negeri 1 Limboto, Sebelum pengisian kuesioner, peneliti memberikan materi terkait gambaran perilaku seks pranikah, kemudian memberikan arahan terkait pengisian kuesioner. Setelah pengisian kuesioner, peneliti meminta tanggapan dari beberapa responden terkait apa itu perilaku seksual menjelang pernikahan adakah yang tahu tentang hubungan seksual pranikah, atau pernah mendengarnya. Sebagian dari mereka sudah banyak yang tau di karenakan sudah pernah baca dari internet dan media sosial. Adapun tanggapan dari salah satu perwakilan remaja putri menjelaskan sesuai apa yang dia ketahui terkait kontrol perilaku terkait seks pranikah, dimana menurutnya kontrol perilaku adalah pandangan seseorang terhadap melakukan sesuatu menurutnya dia memberikan gambaran atau contoh di lingkungan pertemanan ada yang menganggap seks pranikah seperti berciuman, berpelukan itu adalah hal yang biasa saja.

Upaya untuk mencegah terjadi perilaku seks pranikah tersebut adalah ketika disekolah pihak sekolah harus mengadakan atau membuat edukasi kesehatan reproduksi atau mengenai seksualitas dan perwujudan dari tindakan seks sebelum menikah. Dan pencegahan yang bisa dilakukan oleh orang tua yaitu lebih memperhatikan lagi anak-anaknya agar tidak bergaul dengan teman-teman yang dapat mengajak mereka untuk melakukan tindakan yang menjurus pada seksualitas sebelum perkawinan yang sah.

Hal ini sejalan dengan temuan penelitian ⁷ yang menyatakan bahwa remaja percaya bahwa pengendalian diri terhadap hasrat seksual akan terkendali, dan melakukan perilaku seks bebas berarti merusak nama baik keluarga. Menurut penelitian, remaja melihat perilaku seksual promiscuous sebagai awal dari pernikahan dini atau hilangnya keperawanan ⁵

Niat

Menurut teori perilaku terencana, salah satu faktor utama perilaku adalah niat, yang diartikan sebagai kecenderungan atau rencana seseorang untuk melakukan suatu perilaku. Sikap, standar subjektif, dan kontrol perilaku yang dirasakan adalah tiga prediktor utama yang mempengaruhi niat berperilaku. Pengaruh faktor individu, sikap, standar subjektif, dan kontrol perilaku yang dirasakan dapat membentuk keinginan seseorang untuk melakukan suatu perilaku tertentu, yang diukur dengan niat. Tujuan individu untuk menahan diri melakukan perilaku seksual berisiko sebelum menikah sangat berkorelasi dengan kekuatan dan efektivitas dukungan kontekstual untuk tujuan tersebut ⁸

Berdasarkan temuan penelitian yang dilakukan di SMA Negeri 1 Limboto pada pendahuluan dan sebelum pengisian kuesioner peneliti memberikan materi atau menjelaskan mengenai apa itu niat perilaku seks pranikah. kemudian responden mengisi kuesioner tersebut, dan setelah pengisian kuesioner peneliti menanyakan kembali kepada responden apakah memiliki niat terkait perilaku pranikah. Peneliti meminta masing-masing perwakilan dapat memberikan jawaban dari perwakilan remaja putri dan perwakilan remaja putra, tanggapan dari perwakilan remaja putri bahwa tidak memiliki niat dalam melakukan perilaku pranikah begitupun dengan tanggapan perwakilan remaja putra juga sama tidak memiliki niat untuk melakukan perilaku pranikah di karenakan masi ingin mencapai cita-cita. Peneliti menarik kesimpulan bahwa sebagian besar responden remaja putri dan remaja putra sudah paham apa itu seks pernaikah paham terhadap apa jadinya jika melakukan perilaku seksual sebelum menikah.

Upaya untuk mencegah terjadi perilaku seks pranikah tersebut adalah ketika disekolah pihak sekolah harus mengadakan atau membuat edukasi kesehatan reproduksi atau mengenai seksualitas dan bentuk-bentuk perilaku seks pranikah atau apa saja perilaku seks pranikah. Dan pencegahan yang bisa dilakukan oleh orang tua yaitu lebih memperhatikan lagi anak-anaknya agar tidak bergaul dengan teman-teman yang dapat mengajak mereka untuk melakukan perilaku seks pranikah, dan terlebih utama yaitu komunikasi antara orang tua harus baik agar supaya anak itu tidak merasa bahwa orang tuanya cuek terhadap anaknya, agar supaya anak tidak akan berniat melakukan seks pranikah ketika dia diluar rumah.

Hal ini sejalan dengan penelitian Azinar (2020) menyatakan bahwa niat merupakan salah satu faktor penentu perilaku seksual pranikah pada remaja. Remaja memiliki rasa ingin tahu yang tinggi, termasuk keinginan untuk tumbuh dan menjadi diri sendiri. Hal ini menyebabkan remaja ingin melakukan segala sesuatu yang dilakukan orang dewasa, termasuk hal-hal yang berkaitan dengan seksualitas ⁵.

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Identification of Consumption Patterns of Non-Anemic Adolescent Girls in Padang City

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ABSTRACT

Introduction: Adolescent girls are at risk of anemia. Data from Indonesia indicate that the incidence of anemia in adolescents was 32 percent in 2018. This study aims to identify the eating patterns of non-anemic adolescent girls. **Methods:** This analytical survey study employed a cross-sectional approach. Samples were selected using a purposive sampling technique and included adolescent girls who met the inclusion criteria. Hemoglobin levels were measured using a digital hemoglobin meter, and eating patterns were assessed using the Food Frequency Questionnaire (FFQ). **Results:** The results indicate that the majority of 57 teenage girls (67.9%) consumed a higher energy intake. The mean protein intake for adolescent girls was 74.99 grams, while the mean protein requirement is 65 grams. Approximately 72.6% of respondents consumed above the required protein intake, while 27.4% met the requirements adequately. Most adolescents met their energy and macronutrient needs, including protein and carbohydrates, and consumed sufficient vitamin C. **Conclusion:** Based on the study results, respondents generally had adequate macronutrient intake. However, intake of some micronutrients did not meet the required levels. The study showed that adolescents with normal hemoglobin levels had sufficient protein and vitamin C intake.

Keywords: Hemoglobin levels; Anemia; Adolescent

INTRODUCTION

Adolescent girls are at risk of anemia, a global health issue prevalent in developing countries (1-6). A systematic review revealed that 23% of adolescents in Ethiopia were anemic (7). In Indonesia, 2018 data indicates that 32% of adolescents experienced anemia (8).

This condition can impact their physical growth and fitness, causing fatigue, decreased concentration, and impaired learning and memory, which may affect academic performance. Anemia in adolescent girls often persists into pregnancy, increasing the risk of complications for both mother and baby. These risks include pregnancy and childbirth complications that can lead to mortality, as well as low birth weight and impaired infant growth and development (10,11).

Adolescent girls are more at risk of developing anemia. A literature review indicates that nutritional status significantly influences the incidence of anemia in adolescents (12). High nutrient requirements, including increased iron needs and regular blood loss during menstruation, contribute to this risk. Poor dietary habits, such as irregular eating schedules, eating on the go, and skipping breakfast, are common among teenagers (13). Moreover, dietary restrictions for weight management and frequent consumption of fast food can affect adolescents' nutritional adequacy. Misunderstandings about dieting for ideal body weight further exacerbate the issue, leading to choices that do not meet nutritional needs. The

prevalence of anemia can also increase due to habits like consuming fast food and drinking tea after meals (14,15). Many anemic women exhibit poor nutritional status (16).

A study conducted at a school in Padang reported a prevalence of anemia in adolescents of 49.1% (17). According to data from the 2018 Basic Health Survey in West Sumatra, 11.29% of adolescents in Padang City were undernourished, while 14.86% were over-nourished (18). SMK 06, a vocational school with a focus on fashion and beauty, consists entirely of female students (19). An initial survey indicated that there was no assessment of hemoglobin levels or nutritional status among the students.

Based on the background, the researchers are interested in analyzing the consumption patterns of non-anemic adolescent girls in Padang. The study aims to determine hemoglobin levels, assess the nutritional status of adolescent girls, and examine the consumption patterns of non-anemic adolescent girls.

METHOD

This study is an analytical survey with a cross-sectional design. It examines consumption patterns as the independent variable and hemoglobin levels as the dependent variable. The research was conducted at SMK N 06 Padang in July 2022. The population consisted of female students in Padang City in 2022. To ensure homogeneity among participants, the sample was drawn from students at SMK N 06 Padang City, specifically the Class of X Beauty and X Clothing, totaling 144 female students. A purposive sampling technique was used to select 84 girls who met the inclusion criteria. Eligibility required participants to be young women who had experienced menarche, were not menstruating at the time of the study, were in good general health, had normal hemoglobin levels ($>12\text{g\%}$), and did not have blood disorders such as thalassemia or sickle cell anemia. They also could not suffer from chronic diseases such as kidney disease, malaria, or intestinal worms. Additionally, participants could not be using medications that affect hemoglobin levels (such as chemotherapy or ARV) and had to consent to participate in the study.

The data used in this study was primary data. Hemoglobin levels were measured using a digital Hb measuring instrument. Consumption patterns were assessed with the Food Frequency Questionnaire (FFQ), which provides an overview of energy and nutrient consumption frequency, including daily and weekly (20,21). Nutritional status was measured using the FFQ. Data processing involved editing, coding, entry, cleaning, and analysis using the SPSS software. Data analysis included descriptive and correlative analytic tests. Categorical data (anemia and nutritional status) were presented as frequencies and percentages. Numerical data on hemoglobin levels were reported as mean values, standard deviations, and maximum and minimum values. Kendall's tau test was employed for correlative analysis of ordinal scale data. The study passed ethical review by the Health Research Ethics Committee of Universitas Perintis Indonesia, approval number 125/KEPK.F1/ETIK/2022.

RESULTS

The study was conducted at SMK N 06 Padang with 84 female student respondents. The ages ranged from 14 to 17 years, with a mean age of 15 and a standard deviation of 0.67. All respondents were teenagers. The data for hemoglobin levels, percentage of energy intake, and height were normally distributed. However, data for BMI/age, percentages of iron, protein,

fat, carbohydrate, fiber, vitamins A, B, C, calcium, phosphorus, magnesium, and zinc intake, as well as age and body weight, were not normally distributed.

Table 1. Distribution of numerical scale data

No	Variable	Standard	Mean	SD	minimum	Maximum
1	Hemoglobin Level	12	15.05	1.53	12.20	18.20
2	Age		15.24	0.65	14	17
3	Energy intake	2,050	2,583.12	692.44	1,201.0	3,956.0
4	Protein Intake	65	74.99	2.49	67	78
5	Carbohydrate Intake	300	423.88	83.35	288.4	474.2
6	Fat Intake	70	48.37	1.75	47.3	51.2
7	Fiber Intake	29	11.18	1.35	9	12
8	Vitamin A Intake	600	306.50	267.64	153	767
9	Vitamin B Intake	1.10	0.72	0.01	0.70	0.72
10	Vitamin C Intake	67.50	75.00	8.72	70	90
11	Iron intake	15.00	8.75	1.30	8	11
12	Calcium Intake	1,200	223.42	94.71	166	378
13	Magnesium intake	222.50	307.25	13.51	284	315
14	Zinc intake	9.00	8.50	0.87	7	9
15	Phosphorus Intake	1,250	975.50	46.20	896	1,002
16	Manganese Intake	1.60	9.00	0.00	9	9

The mean age of respondents was 15 years, ranging from 14 to 17 years, indicating that all were teenagers. The mean hemoglobin level was 15.05 g/dL, with all 84 participants having normal levels. None of the respondents were menstruating at the time of the study.

Table 2. Distribution of Categorical scale data

No	Variable	categoric	Frequency	Percentage
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1	Anemia status	normal	84	100
2	Nutritional status	Malnutrition	1	1.19
		undernourished	6	7.14
		Normal	60	71.4
		Overweight	17	20.2
3	Energy Intake	Less	4	4.8
		Good	23	27.4
		More	57	67.9
4	Protein intake	Good	23	27.4
		More	61	72.6
5	Carbohidrat intake	Good	23	27.4
		More	61	72.6
6	Fat intake	Less	84	100
7	Fiber intake	Less	84	100
8	Iron intake	Less	84	100
9	Calsium intake	Less	84	100
10	Magnesium intake	More	84	100
11	Zinc intake	less	23	27.4
		good	61	72.6
12	Fosfor intake	less	23	27.4
		good	61	72.6
13	Mangan intake	more	84	100
14	Vitamin A intake	Less	61	72.6
		good	23	27.4
15	Vitamin B intake	Less	84	100
16	Vitamin C intake	good	61	72.6
		more	23	27.4

The mean weight of the adolescent girls was 48.63 kg, with an average height of 154 cm. The mean BMI/age was -0.28. According to the BMI/age category, 60 adolescents (71.4%) had a normal BMI/age. One was classified as malnourished, six were undernourished, and 17 were overweight.

The mean total energy intake for female adolescents was 2,583 Kcal, while the average energy requirement was 2,050 Kcal. Most of the 57 adolescent girls (67.9%) consumed more energy than required. Twenty-three (27.4%) had adequate energy intake, while four (4.8%) had insufficient intake. The mean total protein intake was 74.99 grams, whereas the average protein requirement was 65 grams; 61 adolescents (72.6%) consumed more protein, while 23 (27.4%) had adequate intake. All adolescents consumed less fat than required, with a mean intake of 48.37 grams compared to the 70 grams needed. Most of the 61 adolescents (72.6%) had higher carbohydrate intake, with a mean total of 432.88 grams, surpassing the requirement of 300 grams. All 84 adolescents had insufficient fiber intake, with a mean of 11.18 grams against a requirement of 29 grams. Overall, most adolescents met their energy and macronutrient needs for protein and carbohydrates, but all were deficient in fat and fiber intake.

Most of the 61 adolescent girls (72.6%) had insufficient vitamin A intake, while 23 (27.4%) had excessive intake. The mean vitamin A intake was 306.50 IU, compared to the requirement of 600 IU. All 84 girls had insufficient vitamin B intake, with a mean of 0.72 mg, against a requirement of 1.1 mg. Most of the group (72.6%) had adequate vitamin C

intake, whereas 23 girls (27.4%) had excessive intake. The mean vitamin C intake was 75.00 mg, exceeding the requirement of 67.50 mg. Overall, vitamin A and B intakes were insufficient, but vitamin C intake was sufficient.

All the 84 adolescent girls had insufficient calcium intake. The mean was 223.42 mg while the calcium requirement for female adolescents was 1,200 mg. Most girls (72.6%) had adequate phosphorus intake, but 23 (27.4%) had insufficient intake, with a mean of 975.50 mg against a requirement of 1,250 mg. All participants had excessive magnesium intake, averaging 307.25 mg, while the requirement was 222.50 mg. They all had insufficient iron intake, with a mean of 8.75 mg compared to the requirement of 15 mg. Most adolescents (72.6%) had adequate zinc intake, but 23 (27.4%) were insufficient, with an average intake of 8.50 mg against a requirement of 9 mg. All participants consumed excess manganese, with a mean of 9 mg compared to the requirement of 1.6 mg. Overall, most adolescent girls were deficient in calcium, phosphorus, magnesium, iron, and zinc.

DISCUSSION

All the 84 respondents had normal hemoglobin levels, and none were menstruating. While anemia is usually more prevalent during menstruation, these findings differ from 2018 Indonesian health research, which reported a 32 percent prevalence of anemia in adolescents (4). However, other studies indicate a higher prevalence at 45.2% (22).

Based on dietary pattern identification, all respondents consumed sufficient macronutrients and protein. The primary protein sources were eggs, fresh fish, and chicken. In terms of micronutrients, respondents had high vitamin C intake compared to daily needs, mainly from fruits like oranges. The satisfactory protein intake among respondents contributed to normal hemoglobin levels in all 84 participants (22–24). Hemoglobin, a protein that binds iron, is crucial in erythrocytes. Proper protein intake enhances erythrocyte glutathione synthesis (25). A positive correlation exists between protein intake and hemoglobin levels (26). Protein deficiency can increase the risk of nutritional problems, including anemia (27). A high-protein diet may reduce the risk of iron deficiency (28).

The results of a logistic regression test in a study on adolescents indicated that protein intake worsened anemia (29). Hemoglobin levels are related to the intake of protein and iron (30). Sufficient calorie and protein intake is essential for maintaining anabolism in preventing and treating anemia, including in chronic patients (31). A cross-sectional study in Japan found that high-protein fish consumption can reduce anemia prevalence in elderly men (32). In China, a study showed that consuming eggs and meat during puberty can help reduce anemia risk (33). Another cross-sectional study of preconception women showed a correlation between low nutritional intake, including energy and protein, and the prevalence of anemia (34).

Micronutrient deficiencies, including vitamin C, are associated with anemia (35). Administering vitamin C alongside iron supplements can increase hemoglobin levels (36). Vitamin C affects iron absorption and hemoglobin formation; low intake from fruits impacts these levels. Acting as a coenzyme or cofactor, vitamin C reduces ferric to ferrous iron in the small intestine, enhancing absorption and preventing anemia. It also inhibits hemosiderin formation, improving iron mobilization. Vitamin C can increase non-heme iron absorption by up to four times and facilitates iron transfer from plasma transferrin to liver-stored ferritin (37).

Vitamin C activates folic acid into tetrahydrofolic acid and is a major antioxidant (38). It acts as an antioxidant in hydroxylation reactions, strengthens blood vessels, prevents bleeding, reduces infection risk post-childbirth, aids fetal bone formation, activates leukocytes to boost immunity, and repairs tissue (37). A trial administering vitamin C supplements to pregnant pigs positively impacted birth weight and hemoglobin levels. Supplementation in the third trimester showed significant results for hemoglobin levels (39). Combining oral iron and vitamin C increased hemoglobin in children with Iron-Refractory Iron Deficiency Anemia (IRIDA) (40). Educating adolescents on nutrition can improve iron and vitamin C intake, preventing anemia (41).

The limitation of this study was its focus solely on the dietary patterns of non-anemic individuals without testing iron reserves in the blood. Future research should consider a larger participant group and more complex biomarkers.

CONCLUSION

The majority of the respondents have adequate macronutrient intake; however, their micronutrient intake does not meet the required level. Protein intake is sufficient, resulting in normal hemoglobin levels, as it positively correlates with these levels. A high-vitamin C diet also may reduce the risk of anemia. Research on anemia prevalence in adolescent girls during menstruation is recommended for comparison. Further investigation should assess macro and micronutrient levels in adolescents. Educating on diet and providing balanced nutrition for adolescent girls and preconception women should be promoted to reduce nutritional deficiencies, including anemia.

AUTHOR'S CONTRIBUTION STATEMENT

The author are fully responsible for the complete contents of the manuscript.

CONFLICTS OF INTEREST

All authors have declared that no competing interests exist.

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The Effectiveness Of Storytelling Method On Children's Knowledge And Attitude About Fruit And Vegetable Consumption In Public Elementary School In Bengkulu City

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ABSTRACT

Just 4.5% of fruits and vegetables are consumed in Indonesia, despite the recommended to eat at least 300–400 g daily. A diet deficient in fruits and vegetables may lead to a number of issues, including deficiencies in vitamins, minerals, fiber, and acid-base balance. The purpose of this study is to ascertain how well the storytelling approach affects children's attitudes and knowledge about eating fruits and vegetables in SD Negeri 78 and 79 in Bengkulu City. The quasi-experimental approach is being used in this quantitative study. A two-group pretest and posttest design is used in the study. The study's population consisted of all 99 class V pupils at SDN 78 and all 113 class V students at SD 79. Random sampling was used as the sample method. The instrument takes the shape of a questionnaire, and the Wilcoxon signed rank test is used for data analysis. Pretest (81.25) and posttest (92.00) were the study findings for the average knowledge of the fairy tale book group, while the hand puppet group had pretest (76.00) and posttest (97.00). Pretest (29.88) and posttest (38.30) were conducted for the hand puppet group. The research found that students who received media interventions consisting of fairy tale books and hand puppets had a knowledge score of 0.000 and an attitude score of 0.001 for the media intervention using books and 0.000 <0.05 for the hand puppets. It is envisaged that this study would lead to the development of alternative teaching resources in the classroom, improving students' attitudes and understanding about eating fruits and vegetables and preventing illnesses.

KEYWORDS: *Story Books, Hand Puppets, Knowledge, Attitude*

INTRODUCTION

Various nutrients, including vitamins, minerals and fiber, can be found in fruits and vegetables. Minerals and vitamins are bioactive substances that help the body's metabolism and function as antioxidants to protect cells from damage. Antioxidants in agricultural products protect cells from damage caused by free radicals and oxidation, which can worsen health problems (Ministry of Health of the Republic of Indonesia, 2018).

To maintain a healthy diet, you need 400 grams of fruits and vegetables per day. This includes 250 grams of vegetables (equivalent to 2 servings or 2 cups of cooked and dried vegetables) and 150 grams of fruit (equivalent to 3 medium-sized bananas, 1 ½ pieces of medium-sized papaya, or 3 medium-sized oranges). Adults and adolescents in Indonesia are advised to consume 400-600 grams of fruits and vegetables daily, while toddlers and school-

age children should consume 300-400 grams. Vegetables make up about two-thirds of the recommended intake (World Health Organization, 2018).

Deputy Minister of Health, Dr. Dante Saksono Harbuwono, confirmed that the obesity rate in Indonesia is increasing. He made this statement in 2023. The incidence of obesity recorded by Riskesdas increased from 15.3% in 2018 to 21.8% in 2019.

Fruit and vegetable consumption among Indonesians, especially school-age children, is still very low. The 2018 Regional Health Research (Riskesdas) found that only 4.5 percent of the Indonesian population consumes enough fruits and vegetables, and this figure drops even lower to 4.4 percent among school-age children. In 2018, the Bengkulu Provincial Basic Health Research found that among children aged 5-9 years and 10-14 years, 12.20% and 9.35% of total fruit and vegetable consumption was below 5 servings, respectively. For the population to be considered to consume the "right" amount of fruits and vegetables, they should consume at least five servings of fruits and vegetables every day.

When a person does not consume enough fruits and vegetables, their body becomes acidic and lacks vitamins, minerals, fiber, and other essential elements. This leads to a number of diseases. According to research conducted by Wulandari and Nugroho (2022), the prevalence of obesity in children correlates with fruit and vegetable intake. So, this will trigger various diseases in the future if no one does anything about it.

The results of Srue and Ernawati's (2021) research provide an explanation for why children do not eat enough fruits and vegetables, including lack of access to these foods at home and at school, lack of interest and habit of consuming these foods, and non-introduction of these foods when given complementary foods. Miniarti et al. stated that cultural, environmental, socioeconomic, and ethnic variables are variables that influence vegetable intake.

Mitsla Chusnica Aulia's (2019) research shows that, even without parental pressure, exposing children to information about the benefits of eating fruits and vegetables from an early age affects their intake of these foods. Children, despite their limited understanding, will eat more fruits and vegetables if they know why. According to research conducted on Taiwanese school children, knowledge has the power to change people's perspectives and actions.

A common behavioral problem, especially among school-age children, is the lack of fruit and vegetable consumption. In this situation, it is necessary to educate children so that they will consume more fruits and vegetables. To bring about the changes needed for progress, education is a teaching method that seeks to influence the actions of individuals or groups. The use of media to aid the efficient and effective delivery of content is fundamental to the education process (Prastikaningrum et al., 2015). (Prastikaningrum et al., 2020).

METHOD

This kind of research is quantitative and uses a quasi-experimental approach. In this study, a pre-test and post-test design was used. The pre-test was given to the subjects before the intervention (treatment) began, and the post-test was given after the intervention (treatment) ended.

RESULTS

Respondent Characteristics

Table 1 Characteristics of students based on age, gender and mother's education at SDN 78 kota bengkulu

No	Characteristics Variab	(F)	(%)
1.	Age		
	10 Years	9	22,5
	11 Years	28	70,0
	12 Years	3	7,5
2.	Gender		
	Female	25	62,5
	Male	15	37,5
3.	Mother's Last Education		
	ELEMENTARY-MIDDLE SCHOOL	4	10,0
	HIGH SCHOOL	26	65,0
	Higher Education	10	25,0

Based on table 1, most (70%) respondents were 11 years old. Most (62.5%) of the respondents were female and most (65%) of the respondents' mothers' last education was high school.

Table 2 Characteristics of students based on age, gender and mother's education at SDN 79 kota bengkulu

No	Characteristics Variables	F)	%)
1.	Age		
	10 Years		,0
	11 Years	3	2,5
	12 Years		2,5
2.	Gender		
	Female	2	5,0
	Male	8	5,0
3.	Mother's Last Education		
	ELEMENTARY MIDDLE SCHOOL		,0
	HIGH SCHOOL	0	5,0
	Higher Education		0,0

Table 2 shows that the majority of respondents (82.5%) were 11 years old. Females made up the majority of respondents (55%), while senior high school was the last level of education for the majority of respondents' mothers (75%).

Mean knowledge before and after being given fairy tale book and hand puppet media

Table 3. Mean Children's Knowledge about Fruit and Vegetable Consumption in State Elementary Schools 78 and 79 Bengkulu City

Group	n	Knowledge	Before	After
Storybook	40	Min – Max Mean	60-90	80-100
		± SD	81.25 ± 7.228	92.00 ± 7.232
Hand Puppet	40	Min – Max Mean	50-90	80-100
		± SD	76.00 ± 10.328	97.00 ± 5.639

Table 3 shows that the average knowledge score data collected before the storybook intervention was 81.25, with a range of 80-90. After the intervention, it increased to 92.00 with a minimum value of 80 and a maximum of 100. Then the average knowledge score before the intervention using hand puppets was 76.00 with a minimum value of 50 and a maximum of 90. After the intervention, it increased to 97.00 with a minimum value of 80 and a maximum of 100.

Mean attitude before and after being given fairy tale book and hand puppet media

Table 4. Mean Attitudes of Children on Fruit and Vegetable Consumption in SDN 78 and 79 Bengkulu City

Group	n	Knowledge	Before	After
Storybook	40	Min – Max Mean ± SD	26-35 30.85 ± 1.889	30-40 32.70 ± 2.775
Hand Puppet	40	Min – Max Mean ± SD	27-34 29.88 ± 1.556	30-40 38.30 ± 2.388

Based on table 4, the mean attitude score before intervention with fairy tale book media is 30.85 with a minimum of 26 and a maximum of 35. After the intervention, it increased to 32.70 with a minimum value of 30 and a maximum of 40. The mean attitude score before intervention with Hand Puppet media is 29.88 with a minimum value of 27 and a maximum of 34. After the intervention, it increased to 38.30 with a minimum value of 30 and a maximum of 40.

The Effectiveness of Storytelling Method on Children's Knowledge in State Elementary Schools 78 and 79 Bengkulu City

Table 5. Effectiveness of the Storytelling Method on Children's Knowledge at State Elementary Schools 78 and 79 Bengkulu City

Group	N	Knowledge	Before	After
Storybook	40	Min – Max Mean	60-90	80-100
		± SD	81.25 ± 7.228	92.00 ± 7.232
Hand Puppet	40	Min – Max Mean	50-90	80-100
		± SD	76.00 ± 10.328	97.00 ± 5.639

There was a 5.0% increase in knowledge assessment between the group using the storybook (92.0%) and the group using the hand puppet (97.00), according to table 5. For both book and hand puppet categories, the nonparametric Wilcoxon signed rank test yielded a p value of 0.000. This finding suggests that narratives told using hand puppets are more successful than those told through storybooks in educating children about the need for a balanced diet that includes fruits and vegetables.

Effectiveness of Children's Attitudes on Fruit and Vegetable Consumption in Primary Schools 78 and 79 Bengkulu City

Table 6. Effectiveness of Children's Attitudes on Fruit and Vegetable Consumption in Primary Schools 78 and 79 Bengkulu City.

Variables	Before	After	<i>p value</i>	
	Mean ± SD	Mean ± SD	Δ Mean	
Storybook	30.85 ± 1.889	32.70 ± 2.775	1,85	0,001
Hand Puppet	29.88 ± 1.556	38.30 ± 2.388	8,42	0,000

According to Table 6, there was a 5.6-point increase in the attitude assessment between the two groups, with the hand puppet group scoring 38.30 and the storybook group scoring 32.70. Among the storybook and hand puppet groups, the nonparametric Wilcoxon signed rank test yielded a p value of 0.001. This finding suggests that narratives told using hand puppets are more successful than narratives told through storybooks in educating children about the need for a balanced diet that includes fruits and vegetables.

DISCUSSION

Respondent Characteristics

Eleven years of age is a common age for children. Ensuring education, health promotion and skills for school-age children is a very strategic group to do so. Training children's motor skills, such as through exercise, proper nutrition management, and daily consumption of fruits and vegetables, is best done at this age. Children between the ages of three and twelve can benefit from storytelling. The power of storytelling and hand puppets to change children's attitudes and understanding of eating fruits and vegetables increases with repeated exposure to these messages. The purpose of this educational entertainment media is to raise children's awareness and encourage them to eat more fruits and vegetables through the use of picture books with interesting and colorful storylines. (Widyastuti, 2020).

The last education of mothers was mostly senior high school. In particular, parents with higher health education have a good chance of receiving health information. This is also according to research (Fitryadi, 2020) This study describes the relationship between parents' education level and their children's fruit and vegetable intake, as well as fruit and vegetable availability, family income, and pocket money. Providing counseling to mothers to increase their awareness of the importance of fruit and vegetable intake in their children's diet is a good idea as there is a correlation between mothers' education level and the amount of fruit and vegetable consumption by their children (Putri, 2020).

Children's knowledge of fruit and vegetable consumption at SD Negeri 78 and 79 Bengkulu City

In this study, there was an increase in knowledge, obtained data on the average knowledge score before being given an intervention using a fairy tale book, namely 81.25 with a minimum score of 60 and a maximum of 90. After being given the intervention, it increased to 92.00 with a minimum score of 80 and a maximum of 100. Then the average knowledge score before being given an intervention using hand puppets is 76.00 with a minimum value of 50 and a maximum of 90. After being given the intervention, it increased to 97.00 with a minimum value of 80 and a maximum of 100.

Hal This is because children's cognitive capacities vary, which in turn causes them to interpret the research in different ways. In addition, the fairy tale book group may have limitations that cause children to become bored.

Notoatmodjo (2018) argues that when people seek information about an item through their senses, knowledge follows. Everyone has different knowledge because our senses see the world differently (Adiputra et al., 2021).

With an average score of 76.00, the children's understanding was relatively high before they were taught through the hand puppet medium (pretest). The average result of the posttest measuring children's knowledge after receiving instruction through the storybook media was 97.00, indicating that they were highly informed. Education with the hand puppet medium resulted in an increase in children's knowledge. Evidence like this shows that storytelling with hand puppets can really broaden people's horizons.

Consistent with Elia's findings in her research (2021) on the topic of the effect of hand puppets on listening skills, Paul T. Rankin found that listening accounts for 45% of language use, speaking 30%, reading 16%, and writing 9% (Rahma, 2019).

Research conducted by Tiara, Dife Nur, et al. (Tiara et al., 2019) reported that the knowledge level of students at SDN 3 Cipatat increased; specifically, it increased from 68.8% (knowledge level before media intervention) to 90.6%.

Esa's research (2022) also proved that there was an increase in knowledge after being given education, the results before the intervention were 10.15 after giving the intervention 19.80.

Children's attitudes about fruit and vegetable consumption at SD Negeri 78 and 79 Bengkulu City

Six positive questions and four negative questions make up the ten Likert-type statement items in this study. In this attitude statement, there was an increase in attitude, obtained data

on the average attitude score before intervention with fairy tale book media, namely 30.85 with a minimum of 26 and a maximum of 35. After being given the intervention, it increased to 32.70 with a minimum value of 30 and a maximum of 40. The average score of attitude scores before intervention with Hand Puppet media was 29.88 with a minimum value of 27 and a maximum of 34. After being given the intervention, it increased to 38.30 with a minimum value of 30 and a maximum of 40.

In accordance with previous research, this finding (Fitryadi, 2020) showed positive changes in children's attitudes towards fruits and vegetables, with results reaching 82,000 before the intervention.

The results of Elia's research (2021) revealed that the experimental group had an average post-test score of 91.25, up from 53.75 at the pre-test. Hand puppets improved participants' listening skills, according to the study.

According to Khaliq (2020), children's listening skills are much better when teachers use hand puppets. The creative and lifelike nature of hand puppets makes them stand out from other forms of media, drawing students' attention as they listen to the story the teacher is reading.

Effectiveness of children's knowledge and attitude about fruit and vegetable consumption in SDN 78 and 79 Bengkulu City

The increase in knowledge scores was shown by the statistical test results, with the hand puppet group having an average rating of 97.00 and the storybook group 92.00, an average difference of 5. The p-value for the non-parametric Wilcoxon signed rank test was 0.000. The hand puppet group had a mean score of 38.30 and the storybook group had a mean score of 32.70, with a mean difference of 5.6. Among the fairy tale book and hand puppet groups, the non-parametric Wilcoxon signed rank test yielded a p value of 0.001. These findings suggest that, when compared to the fairy tale book medium, the storytelling approach including hand puppets is superior in educating children on the need for a healthy diet rich in fruits and vegetables.

Elia (2021) found that $\text{sig. } 0.004 < 0.05$ when calculating the paired sample t-test with a significance threshold of $\alpha = 0.05$. There is a strong correlation between using hand puppets to teach listening skills and better learning outcomes, as shown by the paired sample t-test.

Learning achievement with an average difference through a t-test of -9.899 and an average increase (gain) of 1 with an average difference of 23.35 based on the interpretation of the gain index, then Ayuningtyas' (2023) research on hand puppet media to improve speaking skills is feasible and effective to use in learning. Based on the results of this study, the use of hand puppets in the classroom can help students become better public speakers, especially for the Indonesian curriculum which requires students to read fairy tales aloud.

In research (Sa'adah & Liansari, 2024) The results of the researchers' calculations show that the use of hand puppet media has a considerable effect on improving the speaking ability of third grade students of SD Muhammadiyah 11 Randegan, with a coefficient of 0.64. Thus, the use of hand puppet media to teach Indonesian language skills is effective.

Conclusion

1. The majority of respondents were female, the majority of mothers' highest level of education was senior high school, the majority of children surveyed were 11 years old, and the majority of children at SDN 78 were also 11 years old.
2. Storybooks and hand puppets raise awareness among the general public about the need to eat a diet rich in fruits and vegetables.
3. Storybooks and hand puppets can change people's minds about eating more fruits and vegetables.
4. In terms of children's understanding and attitude towards fruits and vegetables, storybook media and hand puppet media were significantly different.
5. Storybooks are less successful than media using hand puppets.

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The Effect of Snowball Throwing Learning Model On Marriage Age Maturity Knowledge

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ABSTRACT

Introduction: Data for 2022 based on BPS data 35,21 % of men are married at the age of 22-24 years and 26,48% of women are married aged 16-18 years and 37,27% are married aged. So early marriage has an impact on fertility, especially for women. Defects in babies and mothers die during childbirth because the reproductive organs are still not optimal. Snowball throwing model is training students activeness and readiness in material discussion sessions and providing answer so that discussions will be more interactive. In order to purpose the study is what the effect of the snowball throwing model on knowledge?

Methods: a quasiexperiment method with a Non-Equivalent Control Group Pretest-posttest design. The population was 260 respondents from class VIII and IX using non-probability sampling techniques. Data analysis used the Wilcoxon Signed Rank Test. **Results:** There is an influence between knowledge and attitudes before and after implementing the snowball throwing learning model regarding maturing marriage age among students at SMPN 1 Mojo, Kediri Regency. **Conclusion:** The application of the snowball throwing learning model has an influence on knowledge and attitudes about maturing marriage age among students at SMPN 1 Mojo, Kediri Regency.

KEYWORDS: Marriage, Snowball Throwing, Knowledge,

INTRODUCTION

Based on data from the Central Statistics Agency (BPS) in 2022 in Indonesia, it was found that 35.21% of young men had their first marriage at the age of 22-24 years, as many as 27.5% at the age of 19-21 years and as many as 6.36% at the age of 16-18 years. Meanwhile, 26.48% of women had their first marriage at the age of 16-18 years and 37.27% had their first marriage at the age of 19-21 years (Kominfo, 2022). Early marriages below the ideal age limit for marriage also occur in Kediri Regency. Based on data from the Population Control Service, Family Planning, Women's Empowerment and Child Protection (DP2KBP3A) of Kediri Regency, according to the bride age report of the Ministry of Religion of Kediri Regency in 2022, as many as 3,203 teenagers in Kediri Regency married at the age of under 21 years and in January-October 2023 As many as 2,710 teenagers in Kediri Regency married under the age of 21. Maturation of Marriage Age uses a learning model as an effort to provide support to students to be better prepared to reach maturity at the same time as minimizing the rate of early marriage among teenagers. According to Rosidah (2020), the Snowball Throwing learning model can develop students' thinking abilities through discussion activities, where students ask each other questions and provide answers so as to create an active atmosphere that can improve students' critical thinking abilities and learning motivation. Based on previous research by Umairroh (2019), there was an increase in students' knowledge and attitudes about maturing marriage age after using the Snowball Throwing learning model. So the author wants to conduct research on the influence of the snowball

throwing learning model on knowledge and about maturing marriage age at SMPN 1 Mojo, Kediri Regency.

METHOD

This study uses a quasi experiment method with a non-equivalent control group pretest posttest research design. In this design, the study uses an experimental group with a comparison group (control group) and begins with the provision of a pre-test given to both groups, then the experimental group is treated with the intervention of the snowball throwing learning model and the comparison group (control group) is given another method intervention, namely the lecture method. The research ended with the post-test given to both groups. The post-test was given twice but what was included in the results of the study was a second post-test 15 days apart after the intervention. This research was conducted at SMPN 1 Mojo, Kediri Regency with a total of 260 students who were divided into two groups, namely 130 students in the experimental group and 130 students in the control group. Inclusion of experimental samples: students in grades VIII and IX with academic and non-academic achievements.

The variables used are the independent variable, namely the application of the snowball throwing learning model about the maturity of the marriage age, while the bound variable is the knowledge and attitude of students about the maturity of the marriage age by measuring the characteristic variables, namely age, gender, and source of information. The instrument used in this study is in the form of a questionnaire containing written questions to obtain information from the respondents being studied. The questionnaire consists of three, namely a questionnaire on respondent characteristics, knowledge and attitudes about the maturity of marriage age that has been tested for validity and reliability, which means that the variables for knowledge are valid and reliable.

The data analysis used was univariate analysis in the form of frequency distribution, namely the characteristics of the respondents (age, gender, source of information), categories before and after the application of the snowball throwing learning model on students' knowledge about the maturation of marriage age at SMPN 1 Mojo, Kediri Regency. Bivariate analysis using the wilcoxon signed rank test, which is a nonparametric test used to measure the significant difference between 2 groups of paired data on an ordinal or interval scale.

RESULTS

Based on the results of a survey conducted on 260 respondents, namely 130 experimental groups and 130 control groups, the results obtained for the characteristics of respondents, knowledge and attitude variables among respondents which were carried out for one month at SMPN 1 Mojo, Kediri Regency are as follows:

Responden Characteristic

Table 1 Characteristics of Experimental and Control Group Respondents for grades 8 and 9 at SMPN 1 Mojo, Kediri Regency

Responden Characteristic	Eksperimental group (Model Snowball Throwing)		Control Group (Lecture Method)	
	n	%	n	%
Age (years)				
13	14	10,8	8	6,2
14	59	45,4	58	44,6
15	57	43,8	64	49,2
Gender				
Male	37	28,5	64	
Female	93	71,5	66	49,2
Resources				50,8
Family	7	5,4	19	14,6
School	28	21,5	25	19,2
Print Media (booklet, leaflet, leaflet, flip sheet, poster)	10	7,7	9	6,9
Electronic Media (tv, radio, video, internet)	65	50	65	50,0
Healthcare Worker	20	15,4	12	9,2

Based on table 1, it can be seen that most of the proportion in the experimental group were respondents aged 14 years, namely 59 people (45.4%) and at least 13 years old, 14 people (10.8%), while in the control group most of the proportion was 64 people were aged 15 years (49.2%) and at least 13 years old, namely 8 people (6.2%).

Based on the source of information, the majority of respondents in the experimental group and control group were electronic media (TV, radio, video, internet), namely the same 50% or 65 respondents. Meanwhile, a small portion of the source of information from the experimental group was family, 7 respondents (5.4%) and the control group was print media (booklets, leaflets, leaflets, flip sheets, posters) with 9 respondents (6.9%)

The Effect of the Snowball Throwing Model on Knowledge

Table 2 Effect of the Snowball Throwing Learning Model on Knowledge about Maturing Age at Marriage (Pretest-Posttest Knowledge)

Group	Pretest-Posttest				p value
	Negative Ranks	Positif Ranks	Ties	Mean	
Eksperimental group (Model Snowball Throwing)	9	110	11	15,12-18,23	0,000
Group Kontrol (Lecture Method)	54	56	20	14,82-15,59	0,072

Based on the table 2 it is found that knowledge respondents in the experimental group from pretest to posttest (15 days after the snowball throwing learning model intervention) experienced an increase in score by 110. Statistical results using the Wilcoxon Test to get a p value of 0.000 or <0.05 then Ha is accepted and Ho is rejected, which means it exists

influence on knowledge before and after it is given snowball throwing learning model intervention. Whereas in the control group the knowledge respondents experienced the score increased by 56 people with a p value of 0.072 or >0.05 then H_a is rejected and H_o is accepted, which means no there is an influence on the respondent's prior knowledge and after the intervention of the lecture method about age maturation marriage. Average knowledge score from before and after application of the snowball throwing learning model about The maturation age at marriage has increased from 15.12 to 18.23, not higher than the control group with the application of the lecture method from 14.82 to 15.59.

DISCUSSION

Responden Characteristic

Based on the research results, it was found that the majority of respondents in the experimental group were 14 years old, 59 people (45%). At this stage, adolescents are in the middle stage of adolescence which gains independence and autonomy from parents, develops relationships with larger groups, forms close friendships and learns various things about relationships and sexuality (Yuliandra & Fahrizqi, 2019). The older a person gets, the more extensive their experience will be and they will be able to absorb knowledge or know-how more quickly than younger people, according to the opinion of Nurasiah et al (2020) that respondents who are more mature are quicker to understand and evaluate positively the information they get, including understand the meaning of early marriage and its impact on reproductive health.

In this study, the characteristics of respondents were mostly women compared to men, both in the experimental group and the control group. Early marriage occurs more often among women than men, where the prevalence of men marrying before the age of 19 is around 5%, while the prevalence of early marriage among women is 10.2% (Liesmayani et al., 2022). According to Hardianti & Nurwati (2020) the first factor that influences early marriage in teenage girls is local culture and customs. This culture occurs because their parents used to marry at a young age, so it also happens to their children, while customs occur if a man proposes marriage, then the parents cannot refuse even though the girl is still under age. If you look big (mature), then you have to get married immediately.

Based on the research results, it was found that the source of information for respondents related to health in the experimental group and control group was mostly electronic media (TV, radio, video, internet), namely 65 respondents (50%). This is in accordance with research by Haromaini et al (2023) that the majority of respondents received information about early marriage through electronic media, namely 63 respondents (59%). Electronic media is considered to tend to be easier to access so that many teenagers get information about health through electronic media.

The effect after implementing the snowball throwing learning model on students' knowledge about maturing marriage age in the experimental group at SMPN 1 Mojo, Kediri Regency can be seen from the increase in scores by 110 people with statistical results using the Wilcoxon test getting a p value of 0.000 or 0.05, which means there is no influence on knowledge before and after being given the lecture method intervention. These results are not in line with research conducted by Dinengsih & Hakim (2020) which stated that the statistical test results were 82 0.000 that there was an effect of giving lectures on increasing knowledge about adolescent reproductive health. Using the snowball throwing learning model can influence students' memory of the material explained by researchers or teachers because

psychologically students are ready to receive the information. The ball throwing activity carried out not only encourages students to think, write, ask or speak but also do physical activity. This can build students' memories when they study, so that memory for embedded learning material can improve students' learning outcomes (Siregar, 2020). Implementing the snowball throwing learning model makes students more active in asking questions and respecting friends who are presenting answers. This stage can train critical thinking skills in responding to friends' explanations responsively and agilely. This is in line with Jaya's (2022) research that the application of the snowball throwing learning model can increase students' activeness and thinking ability in learning compared to conventional learning models (lectures).

CONCLUSION

Most of the respondents in the experimental group were 14 years old and female and the source of information frequently used was electronic media. There is an influence before and after the implementation of the snowball throwing learning model on knowledge about maturing marriage age among students at SMPN 1 Mojo with a p value of 0.000. Future researchers can use the snowball throwing learning model to research more deeply into other factors of early marriage such as cultural and social factors in society.

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Kepok Banana A Superior Local Food To Prevent Prolong Labor

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ABSTRACT

Introduction : As much as 4.2% of complications in childbirth in Indonesia are prolonged labor. The occurrence of prolonged first stage at the Red and White Regional Hospital in Magelang In 2021 was 17.89%. Some prior research including giving massage, alternative energy source like Dates. This research choosing kepok bananas because of sucrose, glucose and fructose are the main energy and working faster, potassium increase muscles contraction, magnesium and sodium increase nerves sensitivity and muscles contraction, and saponins increase oxytocin activity. The study aimed to investigate the effectiveness consumption kepok banana to prevent prolonged labor. **Methodology :** Design used is *quasi experimental* by *pre post control group design*. Population are first stage of labor mother, through *purposive sampling* obtained 32 respondents divided into groups intervention (kapok banana) and control (dates). Comparative analysis using Mann Whitney. **Results :** There is significant difference between the two group ($p = 0.002$), median banana kepok (mean 24.5 minutes), while Dates (80 minutes). Kepok banana increase energy and contraction, an also better consumption acceptance. **Conclusion :** Kepok banana more effective to speed up the active phase of first stage of labor.

Keywords : Length of Active Phase of First Stage of Labor, Kepok bananas, dates

INTRODUCTION

Prolonged labor is one of the complications in childbirth that can result in maternal death. As much as 4.2 % of the total 23.3% of complications in mothers giving birth in Indonesia are prolonged labor events.(Riskesdas, 2018). Prolonged labor is related to Dystocia. Dystocia causes labor to be difficult, and the process is slow. The incidence of long stage I in the delivery room of the Merah Putih Regional Hospital, Magelang Regency in 2021 was 56 out of 313 deliveries or 17.89%. Various studies have been conducted to prevent the occurrence of long stage I, including by providing massage or acupressure to stimulate contractions, as well as research by providing alternative energy sources such as giving dates to speed up the process of labor stage I.(Mutiah, 2022) As in previous studies, this study also involved giving dates, but compared to giving kepok bananas. Kepok bananas were chosen because their energy content and several other nutrients are higher than other types of bananas. The carbohydrate content in kepok bananas, including sucrose, glucose, fructose, act as sources of energy. Meanwhile, other nutritional content that plays a role in contractions is potassium, magnesium and saponin. The fairly high potassium in kepok bananas functions in muscle contraction activity, including the muscles that make up the uterus. Magnesium and sodium affect nerve sensitivity and control muscle contractions. The content of plant sap in kepok bananas, one of which is Saponin, functions to increase

enzymes that stimulate the hormone oxytocin . With the additional nutrients contained in kepok bananas, it is expected to smooth the first stage of labor, thus avoiding a long first stage. (Pramardika, 2022)

RESEARCH METHODOLOGY

This study using a quasy experimental design (pre post control group design) involving 32 giving birth mother at the Merah Putih Regional Hospital who met the inclusion criteria with a purposive sampling technique. The research sample was divided into two groups, namely the treatment group given 150 grams of bananas and the control group given 70 grams of dates. The duration of labor and the patient's condition were recorded and analyzed to compare the differences between the two groups.

Observation data were recorded on a partograph sheet. The research data were analyzed using the Mann Whitney test, with the interpretation if the value of $p \leq \alpha$ (0.05) where the confidence level used was 95% using statistical software. This study did not conduct validity and reliability tests because the research instrument used a partograph that had been standardized by WHO. According to WHO, a partograph is a tool for recording information based on observation, anamnesis and examination of the mother in labor, which is very important as a basis for making clinical decisions during the first stage of labor (Yulianti, NT, et al, 2019).

Data analysis began with a normality test using Shapiro Wilk, it was found that the data had an abnormal distribution, followed by univariate analysis based on central tendency values (median, minimum and maximum) and in the final stage a difference test was carried out between two unpaired groups using the Mann Whitney test with a confidence level of 95%.

RESULTS

Descriptive Statistics

Table 1. Distribution of the duration of the first active phase of labor based on the characteristics of the mother giving birth.

		N	%
Age	Healthy reproduction	26	81,25
	Not healthy reproduction	6	18,75
Parity	Primipara	14	43,75
	Multipara	9	28,13

Most of the respondents were of healthy reproductive age as many as 26 mothers (81.25%), and most of the respondents were primiparas as many as 14 mothers (43.75%)

Table 2. Length of first active phase of labor
in mothers who were given kepok bananas and dates

Duration of First Stage of Labor Active Phase	Median	Maximum	Minimum
Given Kepok Banana	24.50	240	10
Given Dates	80	240	15

The duration of labor in the 1st stage of the active phase of mothers given kepok bananas is shorter than those given dates, seen based on the median value (kepok bananas 24.5 minutes and dates 80 minutes), the maximum value for both is the same (240 minutes) and the minimum value (kepok bananas 10 minutes and dates 15 minutes).

Primary Outcome Measures

Table 3. Differences in the length of active phase I labor in mothers who were given bananas and dates.

	Treatment Group	N	Mean Rank	Sum of Ranks
Duration of the first stage of labor, active phase	Given a banana	16	11.41	182.5
	Given dates	16	21.59	345.5
p value 0.002				

Based on statistical analysis using the Mann Whitney test, a significance value (p value) of 0.002 was obtained. With a confidence level of 95%, if the p value ≤ 0.05 , H_0 is rejected and H_a is accepted. So the research hypothesis is accepted that there is a difference between giving bananas and dates on the length of active phase I labor.

Subgroup Analysis

Table 4 Distribution of the duration of the first active phase of labor based on the characteristics of the mother giving birth.

Characteristics		Respondent Group	Duration of First Stage of Labor Active Phase			
			Fast	%	Long	%
Age	Healthy reproduction	Given kepok banana	11	91.7	1	8.3
	Not healthy reproduction		3	75	1	25
Parity	Primipara		9	81.8	2	18.2
	Multipara		5	100	0	0
Age	Healthy reproduction	Given dates	5	35.7	9	64.3
	Not healthy reproduction		2	100	0	0
Parity	Primipara		3	37.5	5	62.5
	Multipara		4	50	4	50

The majority of mothers of healthy reproductive age who were given kepok bananas experienced labor in the 1st stage of the active phase quickly, a total of 11 mothers (91.7%) and the majority of mothers of unhealthy reproductive age experienced labor in the 1st stage of the active phase for a long time, a total of 3 mothers (75 %). Most mothers of healthy reproductive age who were given dates experienced labor during the 1st active phase for a

long time, a total of 9 mothers (64.3%) and all mothers of unhealthy reproductive age experienced labor during the 1st active phase for a long time, a total of 2 mothers (100%) .

The majority of the primiparous mothers who were given kepok bananas experienced labor in the first stage of the active phase quickly, a total of 9 mothers (81.8%) and a small number of multiparous mothers experienced labor in the first stage of the active phase quickly, a total of 5 mothers (35.7%). Most of the primiparous mothers who were given dates experienced labor during the 1st active phase for a long time, a total of 5 mothers (62.5%) and multiparous mothers who experienced labor during the 1st active phase quickly and for a long time, a total of 4 mothers (50%)

DISCUSSION

Interpretation of Key Findings

This study evaluated the distribution of the duration of active phase I labor in mothers based on maternal characteristics and the types of food given, namely kepok bananas and dates. The results showed that healthy reproductive age mothers who consumed kapok bananas had a fast labor category (91.7 %), while those who consumed dates tended to have a longer labor (64.3%).

In the non-healthy reproductive age group, the percentage of fast labor after consuming banana kepok (75%) was also higher compared to the old category (25%). Other studies have shown a relationship between age and parity with the risk of non-advancing labor, with age less than 20 years or more than 35 years and high parity increasing the risk. This is in accordance with the theory put forward by Cunningham that at the age of less than 20 years the uterus and body have not grown to adult size, this makes it possible that if the mother gives birth at that age she will experience long or obstructed labor (Cunningham, 2014).

Furthermore, the duration of labor for mothers who consumed banana kepok was recorded with a median of 24.5 minutes, while those who consumed dates were 80 minutes. The Mann Whitney comparative test showed a significant difference between the two groups ($p = 0.002$), with shorter labor duration in those who consumed banana kepok (mean 11.41 minutes) compared to dates (mean 21.59 minutes). In line with previous research conducted by Hadiyanti (2018), it states that nutritional intake in mothers in labor is related to the progress of labor (Hadiyanti, 2018).

The nutritional content of bananas, such as glucose and minerals, contributes to the speed of labor, and the mother's acceptance of the type of food also has an effect. The results of the study showed that mothers were more accepting of kepok bananas than dates, which affected the exhaustion of food during the labor process. This finding emphasizes the importance of choosing the right food to support smooth labor. Kepok bananas are more acceptable to mothers in labor than dates, as evidenced by the absence of rejection from prospective respondents when offered kepok bananas, while when given dates there were 4 prospective respondents who refused because they did not like dates. As stated by Ramayulis in his book, the energy content of bananas comes from glucose, sucrose, and fructose making them easy to digest so that they provide energy faster than rice, one type of which is kepok bananas, the energy content of 100 grams of kepok bananas is 109 kcal (Ramayulis, 2015).

Comparison with Previous Studies

In line with previous research conducted by Hadiyanti (2018), it states that nutritional intake in mothers in labor is related to the progress of labor (Hadiyanti, 2018). Syarif (2021), the research shows that postpartum mothers who consume banana stem water at the predetermined dose determined to help accelerate the process of uterine involution compared to postpartum mothers who did not consume banana stem water.

Implications for Public Health

Kepok bananas are a source of nutrition that is widely available in tropical countries including Indonesia, thus providing hope for complementary care during labor that can increase calorie and mineral intake to increase the strength of the contractions, the mother's pushing power and repair of the body's systems. Kepok bananas can be consumed directly or processed but with processing techniques that do not interfere with the active content of the nutrients contained therein.

Limitations and Cautions

This study has limitations in the number of population so that the number of respondents who meet the inclusion and exclusion criteria is 32 mothers. Efforts made to minimize bias are through controlling interfering variables and conducting intensive observations to ensure that all respondents consume bananas or dates in accordance with standard operating procedures.

Recommendations for Future Research

Future research is expected to conduct research with a broader scope based on the number of respondents and consider confounding variables and moderator variables so that it can produce an effective intervention model to prevent prolonged labor.

CONCLUSION

Based on the results of the research and analysis that has been carried out, it can be concluded that:

1. Giving Kepok bananas to mothers in labor showed that the average duration of the first active phase of labor was 24.50 minutes for every 1 cm of cervical dilation, with the fastest time being 10 minutes and the longest being 240 minutes.
2. Giving dates resulted in an average duration of the first active phase of labor of 80 minutes for every 1 cm of cervical dilation, with the fastest time being 15 minutes and the longest being 240 minutes.
3. Analysis using the Mann Whitney test showed a p value of 0.002, which means there is a significant difference between giving kepok bananas and dates on the length of labor in the first active phase. The average length of labor in mothers who consumed kepok bananas (mean 11.41 minutes) was shorter than those who consumed dates (mean 21.59 minutes).

AUTHOR'S CONTRIBUTION STATEMENT

The main researcher is a student of the Magelang Midwifery Applied Bachelor's program, Poltekkes Kemenkes Semarang, with the assistance of 3 supervising lecturers. This research was carried out through an intensive coordination process that began with the investigation of research problems, mapping gaps analysis and compiling proposals, followed by the implementation of research, data processing, discussion and preparation of

research reports. The main right to acknowledge scientific work is owned by the student who conducted the research.

CONFLICTS OF INTEREST

To the best of our knowledge, the named authors have no conflict of interest, financial and otherwise in the research process or in the use of research results.

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Funding for this research comes from self-help funds, thus avoiding any conflict of interest from external parties, ensuring that the research process runs independently and fulfills the credibility element.

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Effect Of Combination Mirror Therapy And Bridging Exercise On Increasing Muscle Strength In Stroke Patients

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Introduction: A stroke occurs when the blood supply to part of the brain stops, causing loss of brain function. This lack of oxygen in the brain can result in clinical manifestations in the form of weakness/decreased muscle strength in some or all of the body's limbs. **Methods:** This research design is Quasy Experiment design with a pre-post-test with control groups design. The sample size was 25 respondents for one group, research instruments used mirrors, SOP Mirror Therapy, SOP Bridging Exercise, observation sheets and Manual Muscle Testing (MMT) muscle strength measurement sheets consisting of a scale of 0-5. **Results:** The results of the Wilcoxon statistical test in both groups showed that the intervention group was 0.000 ($p\text{-value} < 0.05$) and the control group was 0.000 ($p\text{-value} < 0.05$). The Mann Whitney-U test showed that the mean rank value was higher in the intervention group, 31.22 compared to 19.78 in the control group, with a significance value of 0.002 ($p\text{-value} < 0.05$). **Conclusion:** The combination of mirror therapy and bridging exercise has an effect on increasing muscle strength in post-stroke patients, and it is more effective in increasing muscle strength in stroke patients.

Keywords: Mirror Therapy, Bridging Exercise, Range Of Motion, Muscle Strength, Stroke Patients.

INTRODUCTION

Stroke is a non-communicable disease that is a significant global health challenge and is a major cause of disability and death worldwide. According to the WHO report ⁽¹⁾, around 15 million people experience stroke each year, with 5 million of them dying and another 5 million being permanently disabled. The impact of stroke is not only felt individually but also places a heavy burden on the global health system and economy, with a financial impact reaching 721 billion USD per year. This emphasizes the importance of international efforts to address the problem of stroke, especially in developing countries with limited health services ⁽²⁾. Epidemiologically, the stroke trend shows an alarming increase. A study by Feigin et al. ⁽³⁾, revealed that between 1990 and 2019, the global incidence of stroke increased by 70%, and the death rate from stroke increased by 43%. Although stroke is more common in the older population, the incidence of stroke in younger age groups is also increasing, especially those related to high blood pressure. ⁽⁴⁾, This indicates an urgent need to update the comprehensive stroke prevention and treatment approach.

According to Siswanti ⁽⁵⁾, strokes can be classified into two main types based on their cause. Ischemic strokes occur due to narrowing of the arteries that carry blood to the brain, resulting in greatly reduced blood flow. Ischemic strokes can be divided into thrombotic strokes, which occur due to the formation of blood clots in the arteries of the brain, and

embolic strokes, which are caused by blood clots carried from other parts of the body. Meanwhile, hemorrhagic strokes occur when blood vessels in the brain rupture, causing bleeding. Hemorrhagic strokes are usually caused by uncontrolled high blood pressure, as well as other conditions such as aneurysms and Arteriovenous Malformations (AVMs). Both types of strokes have different impacts on patients, with symptoms that require immediate and appropriate treatment.

Research on stroke rehabilitation has produced a variety of therapeutic methods to restore muscle function in patients. One therapy that has received attention is Mirror Therapy, which utilizes the mirror neuron system to stimulate the recovery of muscle strength in the affected extremity⁽⁶⁾. In addition, Madhoun et al.⁽⁷⁾, found that approximately 85% of stroke patients suffer from hemiplegia, which causes movement problems and immobility. This immobility results in muscle weakness and decreased joint flexibility, impacting the patient's daily activities. Several types of rehabilitation treatments, including Mirror Therapy, have been shown to be effective in improving the functional abilities of stroke patients. Bridging Exercise is also an effective exercise to improve muscle strength in stroke patients. Manitu et al.⁽⁸⁾, states that this exercise strengthens the muscles around the spine and pelvis, and can improve balance. By doing Bridging Exercise regularly, patients can improve body stability and mobility, which are important for the recovery of motor function. Although both therapies have been successful separately, no studies have investigated the combined effects of Mirror Therapy and Bridging Exercise.

The main issue addressed in this study is the lack of scientific evidence showing the synergistic effect of the combination of Mirror Therapy and Bridging Exercise on improving muscle strength after stroke. Currently, the existing literature focuses more on the benefits of individual therapies. At the same time, their combined effects have not been explored in depth (Madhoun et al.⁽⁷⁾). This gap is important to study because combining different rehabilitation methods can provide more significant results in stroke patient recovery. Mirror Therapy was first introduced by Ramachandran and Roger⁽⁹⁾. This therapy was originally developed to treat people who had undergone an amputation and were suffering from amputation-related pain. Over time, this therapy has also been applied to stroke patients with positive results, and understanding its potential to improve muscle strength continues to grow. This rehabilitation approach aligns with global health goals, including the Sustainable Development Goals (SDGs) which emphasize the importance of health and well-being for all people, especially in reducing disability due to chronic diseases such as stroke.

This study explores whether the combination of Mirror Therapy and Bridging Exercise can improve muscle strength in stroke patients better than if done separately. It is hoped that this study can fill the existing gap and offer a new approach to stroke rehabilitation that is more effective and holistic. The results of this study are expected to be the basis for health practitioners in developing better rehabilitation strategies, providing greater hope for stroke patients in achieving independence in daily life. This study seeks to answer important unanswered questions in stroke rehabilitation by presenting a comprehensive review of the current knowledge and identifying existing gaps. The researchers ensure to refer to relevant literature to support the arguments and ensure the accuracy of the information presented⁽¹⁰⁾.

Method

This study uses a Quasi Experiment research design type with a pre-test and post-test design with a control group. The population in this study were stroke patients registered at the Pajang Health Center, with a population of 221 respondents aged 40-65 years⁽¹¹⁾. The sampling technique used is nonprobability sampling type of purposive sampling, namely sample selection based on inclusion and exclusion criteria. Inclusion criteria include patients

who have normal blood pressure (below 140/90 mmHg)⁽¹²⁾, willing to participate in the study, and stroke patients who experienced mild to severe stroke. Exclusion criteria included patients with high blood pressure, decreased consciousness, or other health disorders that could interfere with the intervention process.

Based on the Slovin Formula calculation⁽¹³⁾, the minimum sample size for each group was 25 respondents. The research sample consisted of two groups: the intervention group given Mirror Therapy and Bridging Exercise, and the control group given routine treatment from the Health Center and Range of Motion (ROM). The intervention was given three times a week for one month. Muscle strength was evaluated using Manual Muscle Testing (MMT) before and after the intervention. Measurement of muscle strength using MMT which has been tested for reliability and validity, with a value of $r = 0.768 (> 0.05)$ ⁽¹⁴⁾. The instruments used in this study included mirrors, standard operating procedures for Mirror Therapy and Bridging Exercise⁽¹⁵⁾, data collection sheet, observation sheet, and muscle strength measurement sheet. The data collection observation sheet contains the characteristics of the respondents including age, occupation, gender, education level, type of stroke, and frequency of attacks.

Researchers collected data, and data analysis was performed using SPSS software to compare the results between the two groups. This study was conducted in May 2024, taking into account potential bias and limitations in generalizing the findings⁽¹⁶⁾.

Results

Table 1. Frequency Distribution of Respondent Characteristics

No.	Respondent Characteristics	Amount	Percentage (%)
1	Gender		
	Woman	20	40.0
	Man	30	60.0
2	Age Group		
	46-55 years	15	30.0
	56- 65 years	35	70.0
3	Education		
	SD	9	18.0
	JUNIOR HIGH SCHOOL	11	22.0
	SENIOR HIGH SCHOOL	20	40.0
	PT	10	20.0
5	Stroke Attack		
	First	23	46.0
	Second	18	36.0
	More than twice	9	18.0

The study results showed that the respondents' overall characteristics consisted of 30 male respondents (60.0%) and 20 female respondents (40.0%). In the age group, the majority of respondents were in the 56-65 age range as many as 35 people (70.0%), while 15 people (30.0%) were in the 46-55 age group. Based on education level, respondents with Elementary School (SD) education were 9 people (18.0%), Junior High School (SMP) were 11 people (22.0%), Senior High School (SMA) were 20 people (40.0%), and College (PT) were 10 people (20.0%). Regarding the frequency of stroke attacks, 23 people (46.0%) experienced stroke for the first time, 18 people (36.0%) experienced a second stroke, and 9 people (18.0%) experienced more than two stroke attacks.

Table 2. Pretest and Posttest Results in the Control and Intervention Groups

No.	Respondent Characteristics	Control Amount	Percentage (%)	Intervention Amount	Percentage (%)
1.	Muscle strength (pre test)				
	Good	0	00.0	0	00.0
	Currently	13	52.0	18	72.0
	Bad	12	48.0	7	28.0
2.	Muscle strength (post test)				4.0
	Good	6	24.0	16	64.0
	Currently	15	60.0	9	36.0
	Bad	4	16.0	0	00.0

The results showed that in the pre-test, the control group did not have good muscle strength (0 people, 0.0%), with 13 people (52.0%) in the moderate category and 12 people (48.0%) in the poor category. In the intervention group, none had good muscle strength (0 people, 0.0%), with 18 people (72.0%) in the moderate category and 7 people (28.0%) in the poor category. After the intervention (post-test), the control group recorded 6 people (24.0%) having good muscle strength, 15 people (60.0%) moderate, and 4 people (16.0%) poor. In contrast, the intervention group showed significant improvements, with 16 people (64.0%) having good muscle strength and 9 people (36.0%) moderate, with none experiencing poor muscle strength (0 people, 0.0%).

Table 3. Results of the Wilcoxon muscle strength test

Pretest and Posttest in Control Group

Control	Amount	Z	Sig. (2-tailed)
<i>Pretest</i>	25	-3,742	.000
<i>Posttest</i>	25		

The study showed control data with 25 respondents for each pretest and posttest. In the pretest, the Z value obtained was -3.742 with a significance (Sig.) of 0.000. The significance value <0.05, which indicates that there is a significant difference between the conditions before and after the intervention. This indicates that the intervention implemented successfully positively impacted the control group, with a significant increase in the measured variables. These data indicate that the intervention can increase circulation or muscle strength effectiveness as expected.

Table 4. Results of the Wilcoxon muscle strength test

Pretest and Posttest in Intervention Group

Intervention	Amount	Z	Sig. (2-tailed)
<i>Pretest</i>	25	-4,796	.000
<i>Posttest</i>	25		

The study results in the intervention group showed that in the pretest there were 25 respondents with a Z value of -4.796 and a significance (Sig.) of 0.000. A negative Z value indicates that the pretest score is 4.796 standard deviations below the average, while a significance value <0.05 indicates a very significant difference between the pretest and posttest. This indicates that the intervention implemented is effective in improving the measured variables.

Table 5. Results of the Man Whitney U test for the intervention and control groups

Group	Amount	Mean Rank	Sum of Ranks	Z	Sig. (2-tailed)
Intervention	25	31.22	780.50	-	0.002
Control	25	19.78	494.50	3,094	0.002

The table above shows that the average in the intervention group is higher than the control group, which is 31.22. The results of the Mann-Whitney U statistical test obtained a significance value of p-value $0.002 < 0.05$, which means that H_0 is rejected and H_a is accepted, so it can be concluded that there is an effect of the combination of Mirror Therapy and Bridging Exercise on increasing muscle strength in post-stroke patients.

Discussion

Interpretation of Key Findings

In this study, the researchers' findings revealed a significant increase in muscle strength in stroke patients after being given a combination of Mirror Therapy and Bridging Exercise compared to the control group who only received Range of Motion (ROM). This increase indicates that combining the two therapies increases the strength of the patient's extremity and pelvic muscles. These results are consistent with previous research by Simamora et al.⁽⁶⁾, who also found that Mirror Therapy significantly increased muscle strength in stroke patients. In addition, this study is also in line with the study of Manitu et al.⁽⁸⁾, which shows that Bridging Exercise significantly affects muscle strength and body balance in stroke patients. In particular, this study contributes to the existing evidence base by emphasizing the additional benefits of combining two therapies that have not been widely explored. The results of the Wilcoxon statistical test showed a p value = 0.000, $< \alpha$ 5% (two tail), which means H_0 is rejected and H_a is accepted. This shows a difference in muscle strength in stroke patients before and after being given a combination of Mirror Therapy and Bridging Exercise. Thus, it can be concluded that the administration of a combination of these two therapies affects increasing muscle strength in non-hemorrhagic stroke patients.

Comparison with Previous Studies

Comparing the researcher's results with previous research is important to provide a broader context. Findings from Daulay & Tanjung's research⁽¹⁷⁾, supports these results, which show that Bridging Exercise effectively improves muscle strength in stroke patients. Research by Manitu et al.⁽⁸⁾, also in line with these results, showed that Bridging Exercise improves muscle strength and body balance. In addition, the study by Simamora et al.⁽⁶⁾ also showed consistent results, where Mirror Therapy was proven to significantly increase muscle strength in stroke patients through activation of the mirror neuron system which plays a role in motor recovery. However, research conducted by Medeiros et al.⁽¹⁸⁾, showed different results, where Mirror Therapy did not show a significant effect on motor recovery in chronic stroke patients. Kabanga Research⁽¹⁹⁾ is also inconsistent with these results, as the study found that Bridging Exercise did not significantly improve walking balance and muscle strength in stroke patients. This is likely due to the primary focus of Bridging Exercise on proximal body

stabilization, without involving all sensory aspects needed for balance, such as visual, vestibular, and proprioceptive, which are important for body balance. This difference is likely due to individual variability, smaller sample size, or suboptimal duration of therapy, emphasizing the need for further research to understand how such therapy can be optimized in different populations.

Implications for Public Health

The implications of this study extend to the realm of public health, particularly in managing stroke patient rehabilitation. The improvement in muscle strength observed in the group receiving the combination of Mirror Therapy and Bridging Exercise suggests the potential for applying this therapy in stroke rehabilitation programs in health facilities. The implementation of this intervention could accelerate the recovery of stroke patients, reduce the burden of disability, and improve the quality of life of patients. This study's results align with the broader goals outlined in the Sustainable Development Goals (SDGs), particularly in efforts to improve global health welfare by reducing the number of disabilities due to chronic diseases such as stroke.

Limitations and Cautions

Although this study makes a significant contribution to understanding the effects of combined Mirror Therapy and Bridging Exercise on improving muscle strength in stroke patients, several limitations need to be acknowledged. These limitations include the limited sample size, which may affect the generalizability of the findings. In addition, potential bias may arise from uncontrolled external factors, such as medication use, previous therapy experience, and participants' physical activity levels. These limitations may have influenced the results and should be considered in interpreting the study results. Future research must address these limitations to further refine our understanding of stroke rehabilitation.

Recommendations for Future Research

Based on the insights gained from this study, future research should focus on identifying specific areas for further investigation, such as the effects of different types of rehabilitation therapies in combination with Mirror Therapy and Bridging Exercise. Addressing the limitations identified in this study, such as controlling for external variables and increasing the sample size, will contribute to a more comprehensive understanding of stroke rehabilitation. In addition, exploring factors that influence adherence to therapy may reveal new dimensions and nuances beyond our study's scope.

Conclusion

Based on the results of research and discussion on the Combination of Mirror Therapy and Bridging Exercise on Increasing Muscle Strength in Post-Stroke Patients at the Pajang Health Center in Surakarta City, the following conclusions were obtained:

1. The average age of post-stroke respondents was >50 years. The gender was mostly male⁽²⁰⁾. The level of education in this study was mostly high school (SMA) education.⁽²¹⁾, and the frequency of strokes experienced by most first stroke attacks.
2. The average muscle strength of respondents in the intervention group before treatment was mostly in the moderate muscle strength category, with 72.0% coverage, and the control group was in the moderate category, with 52.0% coverage. Meanwhile, muscle strength after treatment in the intervention group was mostly in the good muscle strength

category, with 64.0% coverage, and in the control group, it was in the moderate category, with 60.0% coverage.

3. Mirror Therapy and Bridging Exercise have a combined effect on increasing muscle strength in post-stroke patients ($p < 0.05$).

Author's Contribution Statement

1. Epi Damayanti Manik was the lead author responsible for the study design, data collection, and initial data analysis. Also drafted the initial manuscript and discussed the results and concluding.
2. Sugiyarto was the main supervisor, directing the research from start to finish. His contributions included developing the research design, reviewing the methodology, and providing critical input on interpreting data and research results. He also edited the final manuscript.
3. Akhmad Rifa'i focused on statistical analysis, selecting appropriate statistical tests, and ensuring the validity and reliability of the data. He also edited the methodology and results sections.
4. Siti Lestari contributed to the literature review, drafted the background and discussion, and provided guidance in drafting suggestions for further research. Also helped revise the manuscript according to reviewer input.

Conflict of Interest

The authors declare that no conflicts of interest could affect the objectivity and impartiality of this research. The authors have no financial or personal relationships with any parties that could influence the research results. This statement is made to ensure the integrity of the research and the credibility and trustworthiness of the findings presented in this article.

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Design of Booklet Media on Depression Prevention for Visitors at RSKJ Soeprapto, Bengkulu Province

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ABSTRACT

Introduction: In this study, we aimed to evaluate the effectiveness of booklet media as an educational method in enhancing the understanding of visitors to RSKJ Suepropto in Bengkulu city about depression prevention. Mental health is a vital element in every individual's life, encompassing the ability to adapt to oneself and the surrounding environment. Data from WHO shows that in 2019, about 1 in every 8 people worldwide lived with a mental disorder, with anxiety and depression being the most common. In Indonesia, the prevalence of emotional mental disorders with depressive symptoms for those aged 15 and above reached about 6.1% of the population, with 706,689 people experiencing depression. This fact highlights the importance of increasing awareness and addressing mental health in society.

Methods: This mixed methods study involved a combination of qualitative and quantitative approaches with a research and development (R&D) type of study conducted at RSKJ Soeprapto in Bengkulu Province. A total of 47 participants were enrolled, and data were collected through Simple Random Sampling technique. Ethical approval was obtained from the relevant ethics committee, and participants provided informed consent.

Results: The primary outcome of the study was the feasibility and reliability of the booklet media in providing information on depression prevention. Validation results showed that the booklet media was deemed very feasible by media experts with a score of 100% and by material experts with a score of 94.7%. Feasibility tests on 47 visitors indicated that the booklet media is very feasible and reliable for use in providing information on depression prevention. Statistical analyses revealed significant findings supporting the effectiveness of the booklet media.

Conclusion: In conclusion, our study contributes to the understanding of depression prevention by demonstrating the effectiveness of booklet media as an educational tool. This research provides insights into the broader implications of using educational media in mental health awareness. Future studies should address the long-term impact of such educational tools, ultimately advancing knowledge in the field of international health.

KEYWORDS: Depression; Anxiety; Booklet Media; Mental Health Awareness

INTRODUCTION

According to the World Health Organization (WHO), mental health refers to an individual's ability to adapt to themselves and their general environment. It involves experiencing happiness, joy, living freely, exhibiting normal social behavior, and effectively coping with life's realities.

According to the Indonesian Mental Health Law No. 18 of 2014, mental health is defined as a condition in which an individual can develop physically, mentally, spiritually, and socially. In this state, the individual is aware of their abilities, can manage stress, work productively, and contribute to their community.

WHO identifies depression as a mental disorder characterized by symptoms such as low mood, loss of interest, feelings of guilt, sleep or appetite disturbances, fatigue, and decreased concentration. If left untreated, depression can become chronic and significantly impact an individual's daily responsibilities. In severe cases, depression can even lead to suicide. In 2019, 1 in every 8 people, or 970 million people worldwide, lived with a mental disorder, with anxiety and depression being the most common. A total of 301 million people lived with anxiety disorders, including 58 million children and adolescents, while 280 million people lived with depression, including 23 million children and adolescents (KEMENKES, 2019).

In Indonesia, approximately 6.1% of the population aged 15 and above experience emotional mental disorders with depressive symptoms. According to the 2018 National Riskesdas Report, around 706,689 people in Indonesia suffer from depression, including 5,144 individuals in Bengkulu. These facts highlight that mental health is a critical and urgent issue in Indonesia, requiring attention and action from the government, society, and individuals.

The concept of mental health efforts in Indonesia involves promotive, preventive, curative, and rehabilitative approaches. Promotive efforts aim to maintain and enhance the mental health of the community, eliminate stigma and discrimination, and increase understanding and acceptance of mental health. Therefore, it is essential to implement promotive efforts in various environments, including families, educational institutions, workplaces, healthcare facilities, mass media, religious institutions, as well as correctional facilities and detention centers.

Furthermore, preventive mental health efforts aim to prevent the occurrence of mental health problems, reduce the risk of mental disorders in the general population or individuals, and prevent the emergence of psychosocial problems in family and institutional environments. Meanwhile, rehabilitative mental health efforts aim to control disabilities, restore social and occupational functions, and prepare individuals with mental disorders to be independent in society. These rehabilitative efforts encompass psychiatric, psychosocial, and social aspects and can be carried out within families, communities, and social institutions.

In Bengkulu City, there is a healthcare facility that provides mental health services, namely Rumah Sakit Khusus Jiwa (RSKJ) Suprpto. RSKJ Suprpto is a type C hospital that serves both inpatient and outpatient clients with various mental disorders, including schizophrenia, depression, bipolar disorder, psychosis, and dementia. In 2022, the number of inpatients at RSKJ Suprpto reached 1,589 individuals, encompassing various age groups and genders. Additionally, RSKJ Suprpto is actively involved in preventive, promotive, curative, and rehabilitative activities related to mental health, such as counseling, group therapy, occupational therapy, and art therapy.

When mental disorders occur, daily activities can be disrupted if not properly addressed. However, the lack of public knowledge about this issue and the reluctance to discuss and seek help can worsen the situation. Therefore, efforts must be made to tackle this problem, one of which is through promotive and preventive approaches using effective information dissemination media.

A booklet is an effective medium for conveying health messages. It is a small book designed to be as attractive as possible, containing both images and text. Its small size makes it easy to carry around. The advantage of a booklet is that it provides clear, detailed, and

engaging information supported by illustrations. Compared to leaflets, booklets are more effective in increasing motivation and reading interest among the public. Therefore, I chose a booklet as the educational medium for my research proposal, and its benefit is that it can be widely distributed to visitors at RSKJ Suprpto without incurring significant costs.

METHOD

This research design employs a mixed methods study, combining both qualitative and quantitative research. This type of study falls under the category of Research and Development (R&D). According to Sugiyono (2011), research and development is a method used to produce specific products and test their effectiveness.

RESULTS

Summary Table of Informants

Question		Conclusion
Booklet Media		Some respondents are aware of booklet media
Color Selection		Some respondents prefer using bright colors, while others believe the color choice should be tailored to the booklet's purpose
Number of Pages		Almost all respondents prefer booklets with a thin number of pages, adjusted to the content.
Booklet Design		Almost all respondents favor booklets with designs that include images aligned with the material to facilitate interpretation.
Knowledge about Depression		The majority of respondents are aware of what depression is
Knowledge about Depression Prevention		Most respondents mention that healing is one of the ways to prevent depression

The table contains the summarized responses from informants in the qualitative research conducted by the researcher.

Frequency Distribution Table of Media Aspect Assessments

No	Evaluated Aspect	Suitable (Σ)	percentage (%)	Not Suitable (Σ)	percentage (%)
1.	Color suitability	45	95,75%	2	2,05%
2.	Text color suitability	37	78,72%	10	21,28%
3.	Background color suitability	38	80,85%	9	19,15%
4.	Font selection suitability	47	100%	0	0
5.	Text size suitability	47	100%	0	0
6.	Image suitability	43	91,49%	4	8,51
7.	Ease of accessing media	41	87,23%	6	12,77%
8.	Ease of accessing media	39	82,98%	8	17,02%
9.	Accuracy of images with explanation	38	80,85%	9	19,15%

No	Evaluated Aspect	Suitable (Σ)	Percentage (%)	Not Suitable (Σ)	Percentage (%)
10.	Booklet attractiveness	40	85,11%	7	14,89%
11.	Clarity of language used	45	95,75%	2	2,05%
12.	Suitability of content in booklet	47	100%	0	0
13.	Ease of conveying information	47	100%	0	0
14.	Ease of understanding material <u>materi</u>	38	80,85%	9	19,15%

In the frequency distribution table of the aspect assessments above, it was found that there are four aspects with the highest scores, namely the suitability of font selection, text size suitability, the suitability of content in the booklet, and the ease of conveying information, all of which received 100% indicating they are highly suitable. On the other hand, the aspects of background color suitability, accuracy of images with explanations, and ease of understanding the material had 19.15% indicating they are not suitable.

Explanation:

S = Respondent Score

R = $S_{\max} - S_{\min}$

S_{\min} = Lowest Score

K = $1 + 3.3 \log N$

S_{\max} = Highest Score

P Suitable = Class Interval Length

$(S_{\min} + p) \leq S \leq S_{\max}$

$(38 + 1.192) \leq 47 \leq 47$

$39.192 \leq 47 \leq 47$

Media Feasibility Test Results Table

Criteria	Suitable (Σ)	Percentage (%)
Suitable and Reliable	10	100%
Not Suitable and Unreliable	0	0%

The table explains the score calculations from the 47 respondents above, indicating that the booklet media is deemed suitable and reliable for providing information on depression prevention to visitors at RSKJ Soeprapto, Bengkulu Province.

Conclusion

The process of designing the booklet on depression prevention for visitors at RSKJ Soeprapto, Bengkulu Province, has been successfully completed according to the researcher's plan. Therefore, it is important to summarize several points as conclusions. In this study, it can be concluded that:

Visitors at RSKJ Soeprapto, Bengkulu Province, favor the booklet media that features bright and attractive colors, images tailored to informative needs, pages that are not too thick, and easily understandable content.

After undergoing a validity test by media and material experts, the booklet on depression prevention was deemed highly suitable.

The depression prevention booklet for hospital visitors was declared highly suitable after media trials were conducted with 47 respondents at RSKJ Soeprapto, Bengkulu Province.

Suggestions

1. It is recommended to continue the research by examining the impact of the depression prevention booklet on hospital visitors in enhancing their knowledge.
2. It is hoped that this research can serve as a guide in designing educational media aimed at teenagers to promote health.
3. It is expected to contribute to providing an understanding of the importance of knowing the depression prevention measures that hospital visitors can take.

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Analysis Of Neonatal Emergency Measures With Overcoming Intervention Using Ball Chair And Giving Lemon Suanggi Therapy

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ABSTRACT

Neonatal healthcare begins before a baby is born. The growth and development of babies during the neonatal period is the most critical period because it can cause morbidity and mortality in infants. In the working area of the Health Office of North Minahasa Regency and Minahasa Regency, there are 13 health centers that implement emergency services known as Poned (Basic Neonatal Emergency Obstetric Services). There has been an increase in emergency neonatal cases, causing anxiety and discomfort among health workers. Currently there is no Standard Operating Procedure (SOP) for Neonates, and not all health workers, especially nurses, have attended Neonatal Emergency Training. The purpose of this study was to determine the stress level of health nurses by using the existing Ball Chair Application and administering Lemon Suanggi aromatherapy. The research methodology involved qualitative research presented descriptively through in-depth interviews using open-ended questions, observing the implementation of emergency measures by providing Ball Chairs and applying Lemon Suanggi aromatherapy to health nurses during emergency procedures. The findings of the study showed the Implementation of Neonatal Emergency Measures by using the application 'Coping using the Ball Chair and providing Lemon Suanggi aromatherapy can reduce stress among nurses, although not all nursing staff have participated in neonatal emergency training. In conclusion, the stress level of health nurses performing neonatal emergency care can be reduced through the use of Ball Chair and Lemon Suanggi aromatherapy.

Keywords: Actions, emergency care, Nurses

INTRODUCTION

Maternal and neonatal health services are one of the elements that determine health status. Neonatal health services begin before the baby is born, through health services provided to pregnant women, especially, the growth and development of the baby in the neonatal period. Emergency actions to prevent neonatal death, namely babies aged 0-28 days, need special attention in the implementation of the actions given, and the readiness of health workers who become professional helpers must be considered as well as possible to prevent neonatal death.

Data obtained from the North Minahasa District Health Office, the number of infant deaths in 2021 was 257 with the cause of asphyxia 56 (22%) babies, LBW 59 (25%) babies, pneumonia 12 (5%) babies, congenital abnormalities 23 (10%) and other causes 112 (50%). The most common cause of neonatal death is asphyxia or other newborn problems so that nurses and midwives must have adequate abilities and skills regarding emergency measures,

namely newborn resuscitation and handling of sick neonates, which are very important in efforts to reduce the Infant Mortality Rate.

From the preliminary study conducted at the health centers in the working area of the Minahasa Utara and Minahasa Regency Health Offices, it was directly observed that the Health Centers implementing Poned in Minahasa Utara and Minahasa Regency had implemented emergency measures or what is called Poned (Basic Obstetric Neonatal Emergency Services), but had not used the Overcoming Application using a ball chair and received Lemon suanggi aromatherapy so that many health workers, especially nurses, had not maximized emergency measures, because they were still afraid, stressed by emergency situations without any Neonatal SOP (Standard Operational Procedure), on the grounds that the neonatal emergency SOP was not clear, and only the maternal SOP had been implemented, this was because there were still health workers who had not all attended emergency training on Maternal and Neonatal.

The results of interviews with 7 (seven) Heads of Health Centers that have been poned in North Minahasa Regency and Minahasa Regency and several health workers, namely Nurses, stated that they are very low on self-confidence and feel afraid, uncomfortable, and sometimes stressed with emergency work that must be handled immediately every day. The most common cases are Asthma.

Thus, the implementation of emergency measures for Neonatal in 7 (seven) health centers in the working area of the Minahasa Utara and Minahasa Regency Health Offices has not been carried out comprehensively, this is a problem that seems simple, however, the impact will be a high risk of death in infants, and it needs to be a serious concern for health centers and the Minahasa Utara and Minahasa Regency Health Offices, this problem must be researched considering the infant mortality rate (IMR) in 2021 in Minahasa Utara and Minahasa Regencies amounted to 426 infants who died due to asphyxia 57 (23%) infants, LBW 51 (21%) infants, pneumonia 10 (4%) infants, congenital abnormalities 21 (9%) and other causes 107 (43%), and many health care workers nurses are very uncomfortable, stressed with emergency work almost every day there are emergency cases in their workplace.

RESEARCH METHODS

This study uses a research design with a qualitative approach presented in a descriptive explorative manner. The approach to data collection time is cross-sectional. The sample of this study was 7 health workers nurses and 7 heads of health centers. The data used in this study were primary data, namely in-depth interviews. Data collection through in-depth interviews conducted with key informants, namely 7 health workers nurses and triangulation informants conducted with 7 heads of health centers with a background in medicine. Data analysis is processed according to characteristics with content analysis, namely data collection, data reduction, verification presented in descriptive form, then conclusions are drawn.

RESEARCH RESULTS AND DISCUSSION

The results of the study showed that the number of main informants was 7 health workers nurses with an average age of 36 years called IU1, IU2, IU3 IU4, IU5, IU6, IU7 health workers' last education status was D.III Nursing, D.IV Nursing. For triangulation informants, there were 7 people as heads of health centers called IT1, IT2, IT3, IT4, IT5, IT6, IT7 with an average age of 50 years, the last education was S1 Medicine.

1.Reducing stress levels in nurses by using a Ball Chair.

The information to be obtained from in-depth interviews about neonatal emergency measures to reduce stress in nurses using Ball Chairs is, How to prepare oneself in carrying out emergency measures, obstacles/problems encountered, readiness in work, how the level of stress of nurses can be seen from the results of in-depth interviews with the main informants of health workers, nurses and triangulation informants of the head of the health center.

Based on in-depth interviews with key informants, namely health workers and nurses, all of them said that the readiness in carrying out emergency actions for Neonatal, lack of confidence, fear, feeling worried that the Neonatal SOP (standard operating procedure) was not yet clear. All of the above can be seen in box 1 below:

Box 1

".....We are not confident in carrying out emergency procedures on Neonatal because not everyone has received training on these procedures" (IU1)

".....Feeling worried because the SOP for Neonatal Emergency is not clear in our place" (IU2)

".....We are afraid of the high stress in carrying out emergency procedures on Neonatal" (IU3)

".....Before taking action we were overly stressed" (IU4)

".....Concerns increased because I had never attended neonatal emergency training" (IU5)

".....I thought that in carrying out the action there was no problem but after we faced it the fear was very high" (IU6)

".....Having not done the work, we face a lack of confidence first" (IU7)

We always face feelings of anxiety, fear and worry when carrying out emergency measures on Neonatal (IU1, IU2, IU3, IU4, IU5, IU6, IU7)

From the description above, it can be explained that all the main informants, namely health workers and nurses, in carrying out emergency actions on Neonatal patients feel less confident, afraid and worried, because the neonatal SOP is not yet clear, and not all of them have been given training on handling neonatal emergencies.

A different statement delivered by the triangulation informant, namely the head of the health center, that the nursing health workers are still willing to carry out emergency actions on

Neonatal, there are no problems and obstacles in carrying out emergency work. This can be seen in box 2 below:

Box 2

“All nursing staff are always willing to carry out their duties in handling emergency cases at the health center (IT1)

“.....Where all nurses can work according to their respective duties there are no problems” (IT2)

“.....Nurses can work according to their performance even though there is no SOP” (IT3)

“.....They can all carry out emergency actions as usual without any fear and without any feelings of stress” (IT4)

“.....Their work can be completed well without any complaints of fear and lack of confidence” (IT5)

“.....Emergency actions for Neonatal went well according to established standards” (IT6)

“.....Health workers, namely nurses, are always ready to work without any problems, everything runs smoothly” (IT7).

Neonatal emergency actions went well without any problems and obstacles, all nurses were willing to carry out their duties. (IT1,IT2,IT3,IT4,IT5,IT6,IT7)

From the description above, it can be explained that all triangulation informants stated that the implementation of neonatal emergency measures could be carried out well, there were no problems for nurses, and there was no fear or worry about the work they were doing.

From the above, it can be concluded that health workers, nurses and heads of health centers differ in providing explanations about the implementation of neonatal emergencies before being given a Ball Chair.

In this variable, it can be concluded that overall regarding reducing stress levels in nurses, there are differences of opinion, differences of perception, and differences of response, for that reason, it is necessary to provide Ball Chair innovation with the aim of reducing stress levels in nurses so that they feel calm, relaxed, and remain enthusiastic in providing emergency measures.

Re-evaluating the readiness of nursing health workers in dealing with emergency actions in their respective places, including by providing Ball Chairs to reduce stress levels so that they feel comfortable and calm in carrying out emergency actions at the Poned Health Center.

According to Syamsudin 2021, Discomfort in carrying out emergency work can affect the implementation of nursing actions that should be carried out very carefully. Providing a Ball Chair can provide a feeling of calm, relaxation, calm, resting quietly while thinking about the actions to be taken next, and can reduce stress levels. Management of providing a Ball Chair

by providing a comfortable and conducive place, nurses are welcome to rest using the Ball Chair while providing Lemon suanggi aromatherapy as a room cooler.

2. Health Care Nurses with Lemon Suanggi Aromatherapy

The information that is expected to be obtained from in-depth interviews about the provision of Aromatherapy is how to prepare oneself, in the implementation of emergency measures, obstacles and problems encountered, how to be prepared to face emergency measures can be seen from the results of in-depth interviews with the main informant, the health worker, the nurse, and the triangulation informant, the head of the health center.

Based on in-depth interviews with key informants, namely health workers, nurses, some said that readiness in carrying out emergency actions in Neonatal, lack of confidence, fear, feeling worried that Neonatal SOP (standard operating procedures) were not clear, but when given a Ball Chair, stress levels decreased compared to before being given a Ball Chair as a tool to provide a feeling of comfort and calm, Ball Chair is a seat that can provide peace, relaxation without any burden, can continue work while thinking about the next action with a feeling of safety and comfort, a place to rest for a moment to be able to continue risky work, but nurses need to be given facilities to rest for a moment, All of the above can be seen in box 3 below:

Box 3

".....It's quite calm after being given a ball chair as a tool to rest for a moment while moving the body in circles or to the left and right" (IU1)

".....We feel safe and not worried or afraid in providing emergency measures for neonates because we can rest a little by using the Ball Chair" (IU2)

".....After being given the Ball Chair, I felt a bit calmer, but sometimes I felt a little scared" (IU3)

".....After we were given a ball chair and lemon aromatherapy, we felt a little calmer" (IU4)

".....Nowadays it has reduced a bit but sometimes there is a feeling of worry" (IU5)

".....However, we still have feelings of lack of confidence" (IU6)

".....Our work is an emergency, that worry is always in our hearts" (IU7)

Some nurses feel calm and comfortable, but some are still worried and lack confidence (IU1, IU2, IU3, IU4, IU5, IU6, IU7)

From the description above, it can be explained that some of the main informants, namely health workers, nurses, felt calm and comfortable, while some still felt worried and afraid about providing neonatal emergency care.

The same statement was conveyed by the triangulation informant, namely the head of the health center, that after being given a ball chair, some nurses felt comfortable and some felt that they had not carried out their duties optimally.

In relation to the provision of Lemon suanggi aromatherapy, it can help health care workers nurses to be calm and active as usual, prevent feelings of stress and can work in a cool

atmosphere with the aroma of Lemon Suanggi as the local wisdom of the Minahasa culture in North Sulawesi, so that it can reduce stress levels in work, everything can be done and how to use aromatherapy is starting from entering the administration room to the action room, aromatherapy has been given to reduce stress levels. Reducing stress levels with unclear neonatal SOP rules can be given Lemon suanggi aromatherapy continuously and avoid a tense atmosphere at work so that you can work optimally.

The same statement was conveyed by the triangulation informant, namely the head of the health center, that all health workers nurses after being given the aroma therapy of Suanggi lemon can reduce stress and provide calm in doing work. This can be seen in box 4 below:

Box 4

".....We noticed that after the aroma therapy with Lemon Suanggi, the health workers and nurses looked calm and pleasant, their facial expressions were somewhat calm, (IT1)

".....All the nurses felt happy because someone paid attention to their existence, (IT2)

".... Calmer, less anxious, and able to carry out emergency actions" (IT3)

"They can work well without any burden (IT4)

"....The nurse after being given Lemon Suanggi therapy looked happy while smelling the aroma of Lemon Suanggi....(IT5)

"....The aroma of Lemon Suanggi therapy provides a pleasant feeling so that all health workers can serve patients well (IT6)

".....All is well and comfortable while smelling the aroma of Lemon Suanggi as the local wisdom of the Minahasan people (IT7)

".....By giving Lemon Suanggi aroma therapy, all nurses in carrying out emergency actions can work calmly., (IT1,IT2,IT3,IT4,IT5,IT6,IT7)

The statement above is in line with the triangulation informant, namely the Head of the Health Center, who said that the health workers who carried out neonatal emergency actions worked calmly following the rules.

From the description above, it can be concluded that after being given Suanggi lemon aroma therapy, the nursing health workers felt somewhat calmer and did not appear to have any workload.

According to Suwandi's research (2020), it states that the implementation of neonatal emergency measures sometimes causes feelings of worry and fear, so it is necessary to provide support and motivation or any aromatherapy that can reduce stress levels in workers.

Conclusion.

Based on the results of the study on Analysis of the Implementation of Neonatal Emergency Actions with the Intervention of the Overcoming Application using a ball chair and the

Provision of Lemon Suanggi Aroma Therapy as an Innovation to Reduce Stress in Nurses at the Poned Health Center, North Minahasa Regency and Minahasa Regency. can be concluded as follows:

1. By providing a Ball Chair, stress levels in health care workers and nurses can be reduced when carrying out emergency procedures for Neonatal patients.
2. By administering Lemon Suanggi aroma therapy, stress levels in health care workers and nurses can be reduced when carrying out emergency procedures for neonatal patients.

Suggestion

1. For Head of Health Center

For health workers, nurses can be given rewards by providing additional facilities such as Ball Chairs as encouragement in dealing with Neonatal emergency actions, and given the opportunity to participate in emergency training.

2. For Rspondents

It is expected to use the Ball Chair and Lemon Suanggi aroma therapy in carrying out emergency actions optimally because it is an aid in providing services to patients without being burdened and reducing stress levels.

Author Contribution Statement.

In this study, each author plays a role according to the tasks that have been scheduled according to their field of expertise, where there are several authors according to their field of expertise in this study who make designs for an ergonomic Ball Chair that can be used by respondents to provide a sense of comfort and calm in carrying out emergency actions for Neonatal, and other authors make Lemon Suanggi Aromatherapy (Fresh Mamogi).

Conflict of Interest

This research has no individual or group interests purely conducting research in accordance with the rules set by the Directorate General of Health of the Ministry of Health of the Republic of Indonesia, and the research product has been released and received a trademark certificate permit from the Ministry of Industry, Head of the Center for Improvement of Domestic Products, Certificate No. 11745/TKDN/IK/X/2024.

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Non-Pharmacological Nursing Management for the Prevention of Constipation in Patients with Cerebrovascular Accident (CVA)

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ABSTRACT

Introduction: Cerebrovascular Accident (CVA) or stroke is a neurological disorder caused by an obstruction of blood flow to the brain, either due to a blockage or a ruptured blood vessel. One common issue faced by stroke patients is constipation, which is caused by disruptions in the nervous and digestive systems. To address constipation in stroke patients, non-pharmacological therapies can be applied as they do not cause side effects. **Methods:** This study uses a Systematic Literature Review method with data sources from indexed databases such as app.dimensions.ai and Google Scholar. The search was conducted in May 2024 using the keyword "Non-pharmacological interventions for treating constipation in stroke patients," applying the "AND" operator in each database search. The research flow diagram follows the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) method. The search in app.dimensions.ai and Google Scholar yielded 70.237 articles from 2024, in both English and Indonesian. After applying inclusion and exclusion criteria, 8 relevant articles were found. **Results:** . The results of the study highlight several non-pharmacological interventions for constipation in stroke patients, including: 1) Abdominal massage, 2) Acupressure, 3) Acupuncture therapy, 4) Mobilization, and 5) Rectal stimulation. **Conclusion:** This study suggests that these interventions can be implemented as independent nursing practices to manage constipation in stroke patients.

KEYWORDS: nursing, non-pharmacologi, Constipation, Cerebrovascular Accident (CVA)

INTRODUCTION

Stroke is a neurological disorder characterized by a blockage of blood vessels. Clots form in the brain, disrupting blood flow, blocking arteries, and causing blood vessels to rupture, leading to bleeding. The rupture of blood vessels leading to the brain during a stroke causes sudden death of brain cells due to a lack of oxygen (1).

Stroke is a major and growing global health challenge. Worldwide, stroke is the leading cause of physical disability in adults and the second leading cause of death in middle- and high-income countries. In these countries, the overall incidence of ischemic and hemorrhagic stroke has increased over the past decade to 85–94 per 100,000, but is much higher (1,151–1,216 per 100,000) in individuals aged >75 years (2). Additionally, 85% of all stroke-related deaths occur in low-income countries, which also account for 87% of the disability-adjusted life years due to stroke (3).

Stroke is the leading cause of death and disability in adults over 50 years of age worldwide. Patients with acute and subacute ischemic stroke are at risk for many complications, including urinary tract infections (15.5%), pneumonia (8.8%), and constipation (7.0%). Constipation is a common complaint in stroke patients. It is caused by the disruption of the connection between the nervous system and the digestive system, resulting from the blockage of brain blood vessels by a thrombus or embolus.(4)

Unmanaged constipation can affect the quality of life. Therefore, it is important to identify and evaluate early constipation in the elderly for appropriate bowel management programs

and to plan interventions for bowel elimination (5). Constipation management includes both non-pharmacological and pharmacological approaches, such as conventional laxatives or newer medications with better efficacy. Therapeutic management should be tailored to the underlying pathophysiology.(6)

Non-pharmacological therapies, like abdominal massage, can be performed without causing side effects. This therapy, applied directly to the abdominal wall, can help stimulate intestinal peristalsis, strengthen abdominal muscles, and enhance contractions of the intestines and rectum, thus improving digestion.(7) Acupressure interventions increase bowel movement frequency, promoting functional Qi activity and restoring gastrointestinal function. Visceral mobilization, a safe and non-invasive therapy, can be part of a neurological rehabilitation program to relieve constipation symptoms. Digital rectal stimulation stimulates peristaltic movement and bowel evacuation.(5)

METHOD

The research method used in this study is the Systematic Literature Review (SLR). SLR is a methodological review used to synthesize a collection of existing literature in a particular field. The advantage of SLR is its transparency in data collection and synthesis, resulting in higher levels of objectivity and reproducibility.

Articles that meet the criteria will then be included in the analysis if they contain non-pharmacological interventions for treating constipation in stroke patients. The search sources come from the app.dimensions.ai indexed database. The search was conducted in Mei 2024 using the keyword “Non-pharmacological interventions for treating constipation in stroke patients.” Searches were performed in the database using the keywords with "AND" applied to each database.

In the study selection phase, two sets of criteria were used: inclusion criteria and exclusion criteria. Some of the inclusion criteria applied include:

1. Articles relevant to the analysis of non-pharmacological interventions for constipation in stroke patients.
2. Articles with full text available in English and Indonesian.
3. Articles published within the last five years.

The exclusion criteria used in the article selection process are:

1. Articles published before 2020.
2. Articles unrelated to the fields of Health Sciences, Nursing, Public Health, or Clinical Sciences.
3. Non-article publications.

All titles or abstracts of articles were independently selected, followed by a check for duplicate articles. The results of the article search and selection process will be presented in a flow diagram. The flow diagram used is the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 method, which has been proven effective in summarizing the study selection process, as explained by Wibowo & Putri (2021). The PRISMA guidelines assist in the stages of planning article searches, selecting relevant articles, and systematically analyzing research results. By using the PRISMA guidelines, this study is conducted with more structure and transparency, allowing researchers to more effectively identify non-pharmacological interventions for constipation in stroke patients and produce more accurate analyses. Further information about the search results can be found in Figure 1.

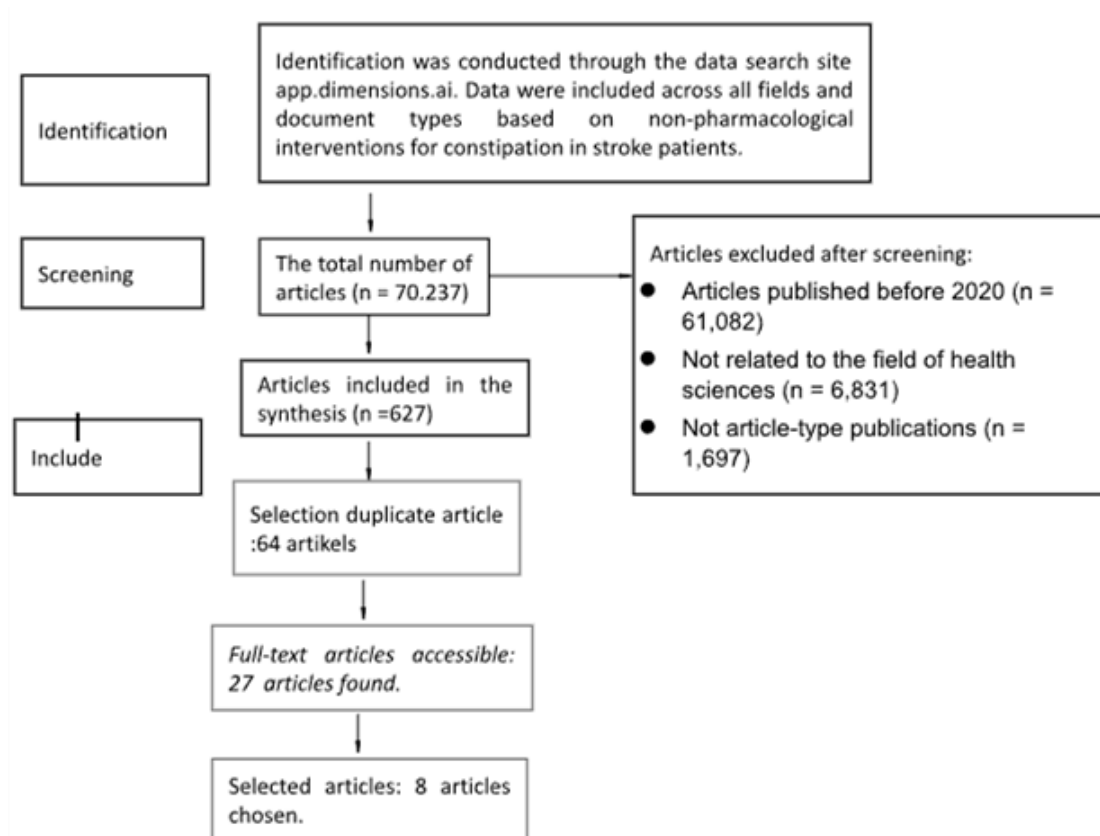


Figure 1. Flow diagram of the search and study selection results

RESULTS

Search results from the indexed database app.dimensions.ai identified a total of 70.237 articles. Of these, 61,082 articles were published before 2020. A total of 6,831 were unrelated to the field of health sciences, 1,697 were not published in the form of articles, and 2,660 were included in synthesis. A selection of duplicate articles found 627. A total of 27 full-text articles were accessible. Following this, a final selection process was carried out based on eligibility criteria, including both inclusion and exclusion criteria. As a result, the researchers successfully selected 8 articles that met the critical appraisal standards and were included in the review for this study. The results of the search and critical appraisal of these eight articles will be presented in the matrix of review results. The analysis results can be seen in Table 1.

Table 1. Matrix of article review results

Authors	Title	Location	Subject	Method	Result
Nieh, H. C., Wu, P. O., Ou, S. F., Li, H. P., & Chen, J. P. (2023)	Effect of acupressure on alleviating constipation among inpatients with stroke	Tiongkok	128 patient stroke	Randomized controlled trial	Acupressure based on traditional Chinese medicine can help relieve constipation

Authors	Title	Location	Subject	Method	Result
	during the acute phase: A randomized controlled trial.				and reduce the use of laxatives in stroke inpatients
Fekri, Z., Aghebati, N., Sadeghi, T., & taghi Farzadfard, M. (2021)	The effects of abdominal" I LOV U" massage along with life style training on constipation and distension in the elderly with stroke	Iran	68 patient stroke	Randomized controlled trial	Abdominal massage combined with lifestyle training can improve constipation and distension, as well as increase food intake tolerance in elderly stroke patients
Mohamed, W. A., Ali, J. S., & Gamal, J. A. (2023)	Effect of abdominal massage technique on constipation for post stroke patients: As a preventive measure	Mesir	60 patient stroke	Quasi-experimental research design	Abdominal massage can significantly reduce the occurrence of constipation in post-stroke patients.
Du, J., Liu, H., Xu, J., Lu, C. M., Zhou, J. F., Wu, P. H., ... & Li, X. W. (2020).	Post-stroke constipation treated with acupoint embedding therapy: a multi-center randomized controlled trial	China	210 patient stroke	Randomized controlled trial	Acupuncture therapy enhances spontaneous bowel movements, improves stool consistency and difficulty in defecation, and strengthens the quality of life for post-stroke constipation patients
Neto, H. P.,	Visceral	Brasil	30 patient	Randomize	Visceral

Authors	Title	Location	Subject	Method	Result
& Borges, R. A. (2020).	mobilization and functional constipation in stroke survivors: a randomized, controlled, double-blind, clinical trial		stroke	controlled, double-blind, longitudinal clinical trial	mobilization can be part of a neurological rehabilitation program to improve constipation symptoms and static balance in stroke patients.
Simarmata, J. M., & Maulina, R. (2023).	The effect of abdominal massage on constipation in stroke patients at grand med lubuk pakam hospital in 2023.	Indonesia	18 patient stroke	Kuantitatif, one group pretest-posttest.	There is an effect of abdominal massage on constipation in stroke patients before and after the abdominal massage intervention
Sianturi, N. R. S., Tanjung, D., & Ritarwan, K. (2022).	The Effectiveness of Abdominal Massage in the Prevention of Constipation in Stroke Patients	Indonesia	56 patient stroke	Quasi experimental	There is an effect of abdominal massage on the prevention of constipation in stroke patients
Ma, S., Fan, X., He, Y., Li, C., Qu, D., & Man, Y. (2023).	Effectiveness and safety of digital rectal stimulation and abdominal massage for neurogenic bowel dysfunction in stroke patients: a randomized controlled trial protocol.	China	40 patient stroke	Randomized controlled parallel-group clinical trial design	Digital rectal stimulation and abdominal massage are effective for neurogenic bowel dysfunction in stroke patients

Descriptive Statistics

The search was conducted in May 2024 using the keyword "Non-pharmacological interventions for treating constipation in stroke patients," applying the "AND" operator in each database search. The research flow diagram follows the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) method. The search in app.dimensions.ai and Google Scholar yielded 70.237 articles from 2024, in both English and Indonesian. After applying inclusion and exclusion criteria, 8 relevant articles were found.

DISCUSSION

The search results conducted from the indexed database app.dimensions.ai regarding non-pharmacological interventions for constipation in stroke patients from 2020 to 2024 are as follows:

1. Acupressure

Auricular Acupressure (AA) is a non-invasive therapy rooted in Traditional Chinese Medicine (TCM) that involves applying pressure to specific acupuncture points in the ear using Vaccaria seeds or magnetic pellets. AA offers several advantages compared to other therapies, including affordability, painlessness, and high patient acceptance. Under medical supervision, patients can easily complete the treatment procedure. Each organ in the body has a reflex point on the outer ear, and stimulating these acupuncture points aims to restore the balance between yin and yang, harmonize the flow of vital energy (qi) and blood, and alleviate various ailments in the body. The vagus nerve plays an important regulatory role in controlling smooth muscle contractions and gland secretions in the intestines (8).

2. Abdominal Massage

Constipation is characterized by a slowdown in the expulsion of fecal matter from the rectum, resulting in hard, dry stools that are smaller in volume than normal. The application of abdominal massage therapy can reduce constipation. This therapy stimulates intestinal peristalsis and strengthens the abdominal muscles, which aids the digestive system (6).

3. Acupuncture Therapy

One form of acupuncture therapy is acupoint therapy, which is a method based on traditional acupuncture. Acupoints have long-lasting stimulation effects on acupuncture points for approximately 30 days. Stimulating these acupuncture points can enhance contractility and the stimulation of smooth muscle in the intestines, as well as improve intestinal peristalsis (9).

4. Visceral Mobilization

Visceral mobilization can reduce excessive visceral nociceptive input, decreasing the likelihood of central nervous system stimulation changes due to increased afferent signals. Mobilization techniques create afferent signals related to constipation treatment. Visceral mobilization leads to increased bowel mobility, reduces adverse effects on nervous system stimulation through sensory afferents, restores the balance of the autonomic nervous system, and improves bowel function. Visceral mobilization can enhance the function of neurologically impaired patients with chronic constipation (6).

5. Digital Rectal Stimulation

Digital rectal stimulation (rectal touch) is a technique that involves inserting a finger into the rectum. Gently touching (stimulating) the rectal walls can help stimulate bowel movements. It aids in the expulsion of stool from the intestines. By using the digital rectal stimulation technique, the intestines can be trained to have bowel movements at specific times (10).

CONCLUSION

Based on the analytical results of the published research on non-pharmacological interventions for constipation in stroke patients from the indexed database app.dimensions.ai, a total of 66,642 articles were identified. After the final selection process, the researchers successfully selected 8 articles for review. The results of the Systematic Literature Review on non-pharmacological interventions for constipation in stroke patients can be summarized as follows: 1) Acupressure, 2) Abdominal massage, 3) Acupuncture therapy, 4) Visceral mobilization, and 5) Digital rectal stimulation. It is recommended that the findings of this study be used as one of the complementary nursing interventions involving the patient's family to address constipation issues in stroke patients (9), (7), (11), (12), (6), (7), (8).

AUTHOR'S CONTRIBUTION STATEMENT

In this research with the main author, the contributions of the authors include drafting the proposal, conducting data research, analyzing data, writing reports, preparing the manuscript, and publishing the journal.

CONFLICTS OF INTEREST

The authors have stated that there are no conflicts of interest that could affect the impartiality of the research. In conducting this research, there are no financial or personal relationships with entities that might unduly influence the objectivity of the research results.

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Study Experimental: The Effect of Palm Leaf Extract (*Elaeis guineensis* Jacq) on Burn Wound Healing in Male White Rats (*Rattus norvegicus*)

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Abstract

Background: Burn injuries often result in serious tissue damage, requiring specialized treatment to prevent further complications. Palm leaf extract (*Elaeis guineensis* Jacq) is known to contain bioactive compounds with potential wound healing properties due to its anti-inflammatory and antioxidant effects. This study aims to evaluate the effect of palm leaf extract on burn wound healing in male white rats (*Rattus norvegicus*) and tissue regeneration.

Methods: This research employed a **post-test only control group** experimental design with five groups of rats, including a negative control, a positive control, and three treatment groups receiving palm leaf extract in gel form at concentrations of 1%, 1,5 %, and 2 %. Burn wounds were aseptically induced on the rats' backs, and wound healing was observed over a 21-day period. Wound diameter was measured every three days, and burn tissue samples were analyzed using Hematoxylin and Eosin (H & E) staining to assess tissue regeneration.

Results: The groups receiving palm leaf extract showed a significant reduction in wound diameter compared to the negative control group, with the highest concentration demonstrating the most pronounced effect. Histological results revealed better tissue regeneration in the treatment groups, characterized by improved epidermal and dermal structure and reduced inflammation. **Conclusion:** Palm leaf extract has been shown to effectively accelerate burn wound healing in male white rats. Its potential as a natural wound healing agent can be further explored, offering a natural alternative for burn wound treatment.

Keywords: Palm leaf extract, Wound healing, H & E, Burn wound, Skin Rat

Introduction

Burn injuries are a critical public health issue, accounting for a significant number of hospitalizations and long-term health complications globally. According to the World Health Organization (WHO), approximately 180,000 deaths occur annually due to burn injuries, with millions of individuals affected by severe burns requiring medical attention (WHO, 2021). The healing process for burn wounds is intricate and multifactorial, influenced by the extent of the injury, the patient's overall health, and the presence of infections. Burn wounds can lead to complications such as scarring, contractures, and psychological trauma, necessitating effective and efficient treatment strategies (Gonzalez et al., 2017).

Traditional burn care typically relies on synthetic medications and advanced wound dressings, which can sometimes result in adverse effects or inadequate healing (Eisenbud,

2009). As a result, there has been an increasing interest in exploring alternative therapeutic options that utilize natural products. Plant-derived compounds have shown promise in promoting wound healing due to their anti-inflammatory, antioxidant, and antimicrobial properties (Jain et al., 2020). These compounds can facilitate tissue repair and regeneration, offering a safer and potentially more effective approach to burn treatment.

Among the many medicinal plants studied for their wound healing properties, *Elaeis guineensis* Jacq., or oil palm, has emerged as a candidate of interest. Research indicates that palm leaves are rich in bioactive compounds, including flavonoids, tannins, and saponins, which have demonstrated various pharmacological effects (Chukwuma et al., 2021). These compounds have been associated with enhanced tissue regeneration, reduced inflammation, and improved overall healing outcomes in various wound models.

Several studies have demonstrated the wound healing efficacy of different plant extracts. For instance, Okwuosa et al. (2020) showed that *Moringa oleifera* leaf extract significantly accelerated wound healing in diabetic rats, underscoring the potential of natural products in wound management. Similarly, Okwu et al. (2019) reported that *Aloe vera* gel not only promoted wound healing in rats but also improved skin integrity, suggesting that herbal remedies can be viable alternatives to conventional treatments. However, despite these encouraging findings, there is a lack of comprehensive research focusing specifically on the effects of palm leaf extract on burn wounds.

The objective of this study is to evaluate the effectiveness of palm leaf extract (*Elaeis guineensis* Jacq) in gel form on burn wound healing in male white rats (*Rattus norvegicus*). This study will examine wound healing rates, including the assessment of wound diameter reduction over time, as well as histological analysis of tissue regeneration. By investigating the potential therapeutic benefits of palm leaf extract, this research aims to contribute to the development of natural alternatives for the treatment of burn wounds.

METHODS

Study Design

This research employed a post-test only control group experimental design. The study was conducted in compliance with ethical standards for animal research, and approval was obtained from the Ethics Committee of Health Polytechnic Palembang.

Subjects

A total of 25 male white rats (*Rattus norvegicus*) weighing between 200 to 250 grams were used in this study. The rats were obtained from [source], housed in standard laboratory conditions with a 12-hour light/dark cycle, and given free access to food and water. The animals were acclimatized for one week before the experiments commenced.

Group Allocation

The rats were randomly divided into five groups, each consisting of five rats:

1. **Negative Control Group:** No treatment applied.
2. **Positive Control Group:** Treated with standard burn ointment (e.g., silver sulfadiazine).

3. **Treatment Group 1:** Received 1% palm leaf extract in gel form.
4. **Treatment Group 2:** Received 1.5% palm leaf extract in gel form.
5. **Treatment Group 3:** Received 2% palm leaf extract in gel form.

Preparation of Palm Leaf Extract

Fresh palm leaves (*Elaeis guineensis* Jacq.) were collected and thoroughly washed to remove contaminants. The leaves were then dried in the shade at room temperature. After drying, the leaves were ground into a fine powder. The extract was prepared using a maceration method, where 100 grams of powdered leaves were soaked in 500 mL of ethanol for 72 hours, with occasional shaking. The mixture was then filtered using Whatman filter paper, and the solvent was evaporated using a rotary evaporator to yield the concentrated palm leaf extract. The extract was formulated into a gel using a suitable gel base, ensuring uniform distribution of the active compounds.

Induction of Burn Wounds

Burn wounds were aseptically induced on the dorsal surface of each rat using a standardized method. A cylindrical metal rod (2 cm in diameter) was heated to 80°C and applied to the skin of the rats for 10 seconds, creating a full-thickness burn wound. After the procedure, the animals were monitored for any signs of distress.

Treatment Administration

Following the induction of burn wounds, treatment commenced. The palm leaf extract gel and the positive control ointment were applied topically to the respective groups once daily for 21 days. The negative control group received no treatment.

Wound Measurement

The diameter of the burn wounds was measured using a digital caliper at baseline (day 1) and every three days thereafter (days 5, 10, 15, and 21). The wound area was calculated using the formula for the area of a circle: $\text{Area} = \pi \times (\text{Diameter}/2)^2$

Histological Analysis

At the end of the 21-day treatment period, all rats were euthanized via [specify method, e.g., carbon dioxide asphyxiation]. Skin samples surrounding the burn wound were collected and fixed in 10% neutral buffered formalin (NBF) for histological examination. Tissues were then processed, embedded in paraffin, and sectioned at 5 micrometers. The sections were stained with Hematoxylin and Eosin (H & E) for histological evaluation, focusing on parameters such as epidermal and dermal structure, inflammation, and tissue regeneration.

Data Analysis

Data were analyzed using statistical software SPSS. Descriptive statistics were calculated, and comparisons between groups were performed using Analysis of Variance (ANOVA)

followed by post-hoc tests where appropriate. A p-value of <0.05 was considered statistically significant.

$$\% \text{ Rendemen} = \frac{\text{Jumlah ekstrak kental}}{\text{jumlah simplisia}} \times 100\%$$

2. Formula Emulgel Base

Material	Formula Base (%b/b)			Remark
	FI	FII	FIII	
Ekstrak leaf	1%	1,5%	2%	Aktif ingredient
Carbopol 940	1,5	1,5		Gelling agent
Paraffin Liq	5	5		Emolien (Pelembut)
Span 80	15	15		Surfaktan
Tween 80	40	40		Surfaktan
Propilenglicol	5	5		Humectan
Metilparaben	0,18	0,18		Preservative
Propilparaben	0,02	0,02		Preservative
Etanol 96%	6	6		Cosurfaktan
TEA	qs	qs		Emulgator
Aquadest	100	100	100	Development

Preparation of Gel Base

The gel base is prepared by dispersing Carbopol 940 in hot water using a magnetic stirrer until a homogeneous gel is formed. Once the gel is formed, triethanolamine (TEA) is added gradually to neutralize the pH of the gel base until it reaches a range of pH 6 - 6.5. Subsequently, the gel base is mixed with the emulsion using an Ultra Turrax at a speed of 400 rpm for 20 minutes, resulting in a homogeneous emulgel base.

Burn Wound Design

The method for creating burn wounds on the test subjects, male white rats (*Rattus norvegicus*), was adapted from the studies conducted by Prasongko, Lailiyah, and Muzayyidin (2020) and Suriawanto, Setyawati, and Narwan (2021). Prior to the creation of burn wounds, the test subjects were acclimatized to their new environment for 7 days, maintaining a room temperature of 25-28°C and housed according to the number of treatments. Anesthesia was administered using ketamine. The fur on the back of the rats was shaved clean to expose the skin, followed by disinfection using 70% alcohol. A circular plate with a diameter of 2.2 cm was heated on a hot plate to a temperature of 750°C. The heated

plate was then applied to the shaved and disinfected skin of the rats for 10 seconds to induce second-degree burns.

Burn Wound Observation Process

The observation of the burn wound healing process commenced one day after the treatment was applied, with intervals of two days. The results of the observations were documented in tabular form. Monitoring continued for a total of 21 days, during which the diameter of the burn zone was measured using a ruler calibrated to 0.00 cm. Healing of the burn wounds was indicated by the convergence and closure of the wound

Results

Extraction Yield

The extraction of palm leaf (*Elaeis guineensis* Jacq.) resulted in a concentrated extract obtained from 500 grams of dried and finely blended leaves. The extraction process, which involved maceration with 96% ethanol followed by vacuum distillation using a rotary evaporator, yielded 72.6478 grams of concentrated extract. The extraction efficiency (rendemen) calculated was 14.5295%.

Wound Healing Measurement

The burn wounds were induced on male white rats, and the healing process was monitored over a 21-day period. The average diameter of the burn wounds was measured every three days for each group.

Group	Day 1 (cm)	Day 5 (cm)	Day 10 (cm)	Day 15 (cm)	Day 21 (cm)
Group I (Negative Control)	0.90	0.72	0.46	0.08	0.00
Group II (Positive Control)	0.90	0.56	0.36	0.00	0.00
Group III (1% Extract)	0.90	0.44	0.20	0.00	0.00
Group IV (1.5% Extract)	0.90	0.40	0.18	0.00	0.00
Group V (2% Extract)	0.90	0.38	0.10	0.00	0.00

Statistical Analysis

The average diameter of the burn wounds for each group was analyzed using the Paired Sample T-Test to determine the significance of the differences between pre-treatment and post-treatment measurements. Following this, the area under the curve (AUC) for the average wound diameter was calculated up to day 21.

The statistical analysis was conducted using SPSS version 25 with a 95% confidence

Tabel 1. Persentase of Wound Healing Groups 1 s/d 5

	H-0	H3	H6	H9	H12	H15	H18	H21
Group								
1 Positif	100	100,86	102,51	84,84	56,66	46,65	38,85	25,67
2 Negatif	100	97,75	97,83	97,45	95,23	93,52	79,85	78,35
3 Treated 1	100	100,95	94,13	73,12	62,84	39,57	29,38	24,36
4 Treated 2	100	102,49	94,16	64,46	43,46	40,76	30,28	25,08
5 Treated 3	100	105,14	102,09	89,66	58,39	52,36	30,81	21,74

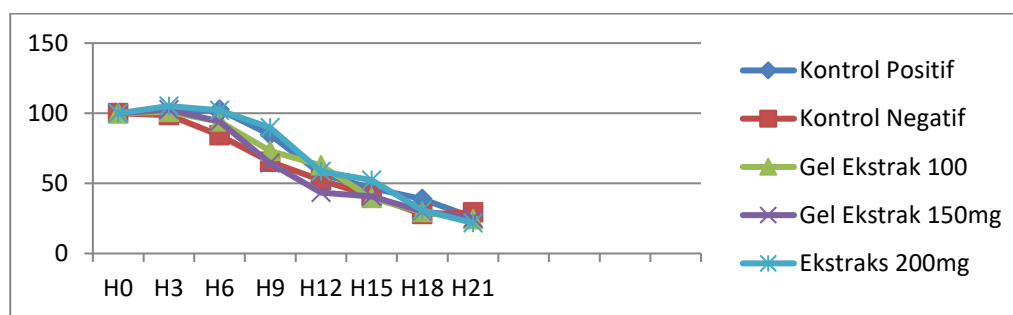


Figure 1. Graphs average AUC0-21 Persentase Wound healing of Treatment

Tabel 2. Persentase AUC₀₋₂₁ of All Groups

Groups	Average AUC ₀₋₂₁ ± SD
Control positive	1738,815 ± 31,14
Control Negative	4563,415 ± 8,50
Extract 1%	1691,01 ± 31,63
Extract 1,5%	1627,95 ± 32,26
Extract 2%	1645,76 ± 33,51



DISCUSSION

Burn Wound Healing

Burn wound healing is a complex biological process that involves the phases of hemostasis, inflammation, proliferation, and tissue remodeling. This study aims to evaluate the effects of palm leaf extract (*Elaeis guineensis* Jacq) on burn wound healing in male white rats (*Rattus norvegicus*), focusing on the changes in the percentage of wound healing over time. The results in Table 1 indicate that the positive control group experienced a significant reduction in wound diameter, with a healing percentage reaching 25.67% on day 21 after the initial treatment. Although this reduction appears effective, it can be interpreted as a normal response to treatment, which may be influenced by various factors, including the possibility of infection or inadequate optimal nutrition in the last days of observation. These findings are consistent with literature stating that deeper and larger burns require a longer time to heal and are more susceptible to complications (Schmidt & Lindholm, 2018).

Conversely, the negative control group demonstrated slow and insignificant wound healing, with a healing percentage reaching only 78.35% on day 21. The inability of this group to show substantial progress in healing underscores the importance of adequate treatment, indicating that burns without treatment can lead to an increased risk of infection and further complications.

The treatment group exhibited more promising results. Treatment group 1, which was administered palm leaf extract at a concentration of 1%, showed a reduction in wound diameter from 100% to 24.36% by day 21, indicating effectiveness in accelerating the healing process. This treatment can be understood through the synergistic action of bioactive compounds in the extract, including flavonoids and saponins, which have been shown to possess anti-inflammatory and antimicrobial properties (Jansen & van der Molen, 2015). These properties may help reduce inflammation and accelerate tissue regeneration, which is critical in wound healing.

Table 2 presents the average AUC0-21 values measured across various treatment groups in this study. The findings revealed a significant difference in AUC0-21 values between the

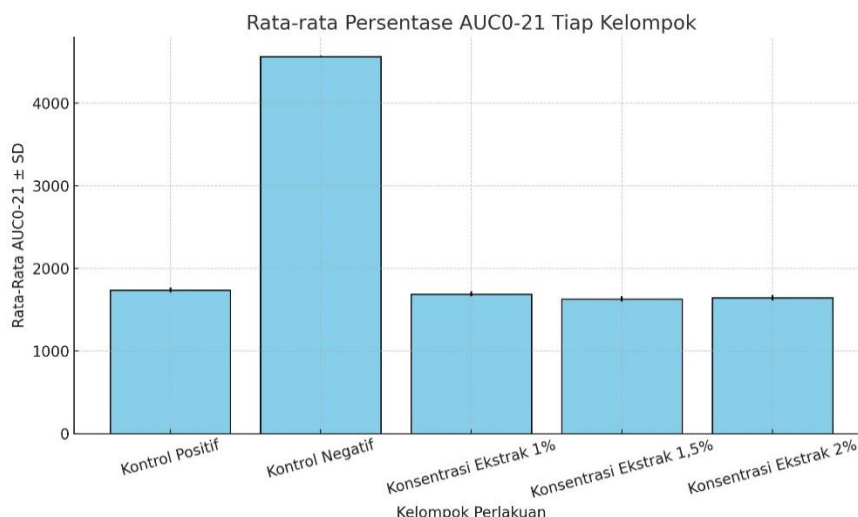
positive control and negative control groups. The positive control had an average AUC0-21 value of 1738.815 ± 31.14 , while the negative control exhibited a much higher value of 4563.415 ± 8.50 . This indicates that treatment with more active compounds (positive control) yielded a better response compared to the untreated condition (negative control), reflecting the potential to inhibit undesirable processes in wound healing (Jahan et al., 2020).

The group receiving treatment with a 1% extract concentration showed an AUC0-21 value of 1691.01 ± 31.63 , which was not significantly different from the positive control. However, when the extract concentration was increased to 1.5% and 2%, the AUC0-21 values decreased to 1627.95 ± 32.26 and 1645.76 ± 33.51 , respectively. This may suggest that higher doses do not always yield better results, and there is a possibility of toxicity or inhibition effects caused

The results of this study align with research conducted by Rahman et al. (2020), which evaluated the effects of *Moringa oleifera* leaf extract on wound healing in the same animal model. In that study, the group treated with the extract demonstrated a significant improvement in wound healing compared to the negative control group, with a more rapid reduction in wound diameter over the same time period. These findings support the hypothesis that bioactive compounds in plant extracts can accelerate the wound healing process.

However, the study by Singh et al. (2019), which investigated the effects of Aloe vera extract on burn healing, showed results that were not consistent. In that study, although the group treated with the extract demonstrated better healing than the control group, the effects were not comparable to those observed in the treatment groups of this study. The higher healing percentage reported in this study suggests that palm leaf

Treatment groups 2 and 3 also showed good results, although with greater variability. Treatment group 2, with a higher extract concentration, demonstrated a healing percentage of 25.08% on day 21, while treatment group 3, with a concentration



Furthermore, histopathological analysis conducted on burn tissue can provide deeper insights into the mechanisms by which palm leaf extract accelerates healing. Improvements in epidermal recovery and a reduction in inflammation in the treatment groups may provide stronger evidence regarding the effectiveness of this extract. Further research is needed to understand the specific mechanisms underlying these effects, as well as the potential use of palm leaf extract in clinical burn treatment.

Overall, the results of this study support the hypothesis that palm leaf extract has therapeutic potential as an agent in burn healing. Further research and clinical studies will be crucial to confirm these findings and develop optimal treatment formulations based on palm leaf extract.

Conclusion

This study demonstrates that the extract of palm leaves (*Elaeis guineensis* Jacq) has potential as a therapeutic agent in the process of burn wound healing. The results indicate that this extract can accelerate wound healing, particularly at a concentration of 1%, which resulted in a significant reduction in wound diameter. Additionally, histopathological analysis showed improved epidermal recovery and reduced inflammation, reinforcing the effectiveness of this extract. These findings support the hypothesis that the bioactive compounds in palm leaf extract contribute to the wound healing process. Further research more studies are needed to explore the specific.

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Adolescent Diabetes Mellitus: Research Trends and Behavioral Risk Factors Explored Through Bibliometric Analysis

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ABSTRACT

Introduction: This study reviews the current research landscape and future directions regarding behavioral risk factors for diabetes mellitus in adolescents. With the growing number of studies, a quantitative approach is crucial for identifying themes and gaps in research.

Methods: A bibliometric and content analysis was conducted, examining 3,833 bibliographic entries from Scopus database. Findings were visualized using VOSviewer and Tableau Public, and content analysis was based on co-occurrence results.

Results: There has been a significant increase in publications and citations related to behavioral risk factors, focusing on topics like sleep, mental health, anxiety, COVID-19, education, and non-communicable diseases. Emerging interests include stress, comorbidity, and lifestyle factors. Future research should assess the long-term effectiveness of interventions aimed at boosting physical activity and improving dietary knowledge among adolescents, highlighting the potential of extended programs to induce lasting behavioral changes.

Conclusion: This study offers valuable insights into the behavioral risk factors associated with adolescent diabetes mellitus and highlights critical areas for future research. Addressing these gaps with improved methodologies can enhance strategies to mitigate these risks effectively.

INTRODUCTION

Diabetes mellitus is a degenerative disease caused by a complex metabolic disorder caused by high blood sugar levels that impairs the production and function of insufficient or unusable amounts of insulin. The disease leads to an increased risk of cardiovascular disease, retinopathy, and nephropathy and requires health care and monitoring to help control blood sugar to prevent complications (1–3). The International Diabetes Federation (IDF) declared diabetes mellitus as a global health emergency, with more than 537 million sufferers worldwide in 2021, equivalent to 10.5% of the world's population. Diabetes mellitus is responsible for 1.5 million deaths annually worldwide, mainly in lower-middle-income countries, and is projected to increase to 784 million by 2045 (4–6). As a degenerative disease, diabetes mellitus has led to a global incidence of pediatric diabetes of 39.37%, with 227,580 new cases reported in 2019 and 41,600 cases of diabetes mellitus type 2, which also

has the potential to increase the risk of other serious health conditions, such as complications causing cardiovascular disease, stroke, chronic kidney disease, and infection, including hypertension, dyslipidemia, microalbuminuria, and cardiovascular disease to the risk of premature death.

The projected increase in diabetes mellitus prevalence reaches 60%, in line with the increase in obesity and unhealthy lifestyle changes, potentially affecting more than 1.31 billion people. In addition, diabetes mellitus increases the global health financing burden to reach \$966 billion (6–12)

The Global Burden of Disease Study identified 1 in 10 people, or >541 million people worldwide, who have impaired glucose tolerance with the risk of developing diabetes mellitus type 2, including children, adolescents and adults (7). Diabetes mellitus type 2 and its comorbidities risk reducing life expectancy, increasing global disability and global mortality in the productive age group 20-69 years or the equivalent of 1 death every 5 seconds, totaling 6.7 million deaths in 2019-2021, with the number of cases and Disability Adjusted Life Years (DALYs) in young women <30 years higher than in men (7). The prevalence of diabetes mellitus in Asia is known to be 30% higher than in Australia, with risk factors for diabetes mellitus involving multiple complex aspects, including genetic, lifestyle, and environmental components (13). This population has a genetic predisposition of lower insulin secretion combined with an unhealthy lifestyle, especially in Asian Indians, who have a chance of developing diabetes mellitus risk at a younger age compared to populations in Western countries. The Southeast Asian region is known to be home to 16.8% of people with diabetes mellitus worldwide, as the region has the third highest rate of undiagnosed diabetes, reaching 51.2%, and the proportion of pregnancies with hyperglycemia is the highest at 25.9%(6). The projected prevalence of diabetes mellitus in Indonesia in 2045 will reach 16.09% or equivalent to 40.7 million cases, followed by an increase in mortality due to diabetes mellitus complications such as stroke and kidney disease. Genetic factors, age, lifestyle that causes obesity, lack of physical activity, and high consumption of sugary foods and drinks are factors that contribute to the projected increase (14–16). Risk factors for diabetes mellitus type 2 have evolved, namely non-modifiable factors (age, gender, race/ethnicity, family history of diabetes mellitus (genetic) and maternal history (giving birth to a baby weighing >4.000 grams or a history of low birth weight (LBW < 2500 grams)) and modifiable factors (hypertension, obesity leading to insulin resistance, smoking, unhealthy diet, uncontrolled diet, high energy intake with low physical activity, and increased consumption of processed or fast food leading to high obesity, physical inactivity, hypertension, dyslipidemia, daily sugar consumption, prediabetes, prediabetes, and diabetes); Daily sugar consumption, prediabetes or impaired glucose tolerance, smoking habits, sleep patterns, stress to accessibility of health or exercise facilities and neighborhood economic factors contribute to increased risk, as they limit access to healthy food choices and opportunities for physical activity (2,17,26–29,18–25)

Previous studies indicate that the prevalence of undiagnosed prediabetes among adolescents aged 12 to 19 years globally ranges from 3.3% to 14.3%, while the prevalence for type 2 diabetes mellitus is between 0.1% and 2.2% (30). Furthermore, research based on the Global Burden of Diseases (GBD) classification highlights that genetic factors exhibit the strongest

correlation with non-genetic influences, which encompass environmental risks such as air pollution, behavioral factors like alcohol consumption, metabolic issues linked to obesity, and treatment-related aspects including the use of simvastatin in individuals with rheumatoid arthritis. These findings underscore the critical importance of early identification of diabetes mellitus risk to mitigate the likelihood of onset, reduce the severity of complications, and enable timely interventions for affected individuals (31).

The growing research on risk factors for diabetes mellitus in adolescents requires a thorough assessment mapping to determine the potential development of future research directions. Analysis through research using bibliometric analysis is considered appropriate to evaluate the status of research and identify future avenues. However, the limited application of bibliometric analysis in studying risk factors for diabetes mellitus in adolescents underscores the need for increased focus on this domain. Utilizing bibliometric analysis allows researchers to uncover the development of diabetes mellitus risk factors and provide input in the development of strategies to prevent the increase in the incidence of adolescent diabetes mellitus, assisting in the development of targeted strategies to address this pressing public health issue.

Our study sought to provide a comprehensive overview of the current availability of research on risk factors for Diabetes mellitus in adolescents, answering important questions to shed light on the current state and progress of developing efforts to prevent and reduce the risk of severity of diabetes mellitus complications in adolescents in the community. By integrating bibliometric analysis and content elaboration, we aim to point out potential avenues for future investigation and provide invaluable insights for researchers and practitioners in the field of non-communicable diseases, especially diabetes mellitus in adolescents. To achieve this, we have formulated three specific research questions (RQs):"

RQ1. What are the main themes and research topics regarding risk factors for diabetes mellitus in adolescents?

RQ2. What are the emerging research areas in diabetes mellitus research in adolescents?

RQ3. What are the current initiatives and prospective directions in the exploration of risk factors for diabetes mellitus in adolescents?

By addressing the above questions, this study seeks to provide an explicit and comprehensive overview of the development of diabetes mellitus risk factor research in adolescents. Furthermore, through the integration of bibliometric analysis and content elaboration, we sought to identify potential areas for future research and provide valuable insights for researchers and practitioners in discovering developments related to diabetes mellitus risk factors in adolescents using a multifaceted approach. Combining these methods allows for a more in-depth understanding of existing knowledge and paves the way for further exploration in this important area of study.

METHOD

We chose to exclusively utilize the Scopus database for our literature search due to its recognized comprehensive coverage, aiming to mitigate potential variations in data and field

tags that could arise from using multiple databases. Additionally, the Scopus database offers a greater number of publications and citations (32–34). We believe that this would offer ample data for comprehending the scientific terrain, identifying research focal points, and pertinent information (33,35). Figure 1 delineates the sequential data collection steps, encompassing the topic determination to the incorporation of bibliography data for bibliometric analysis

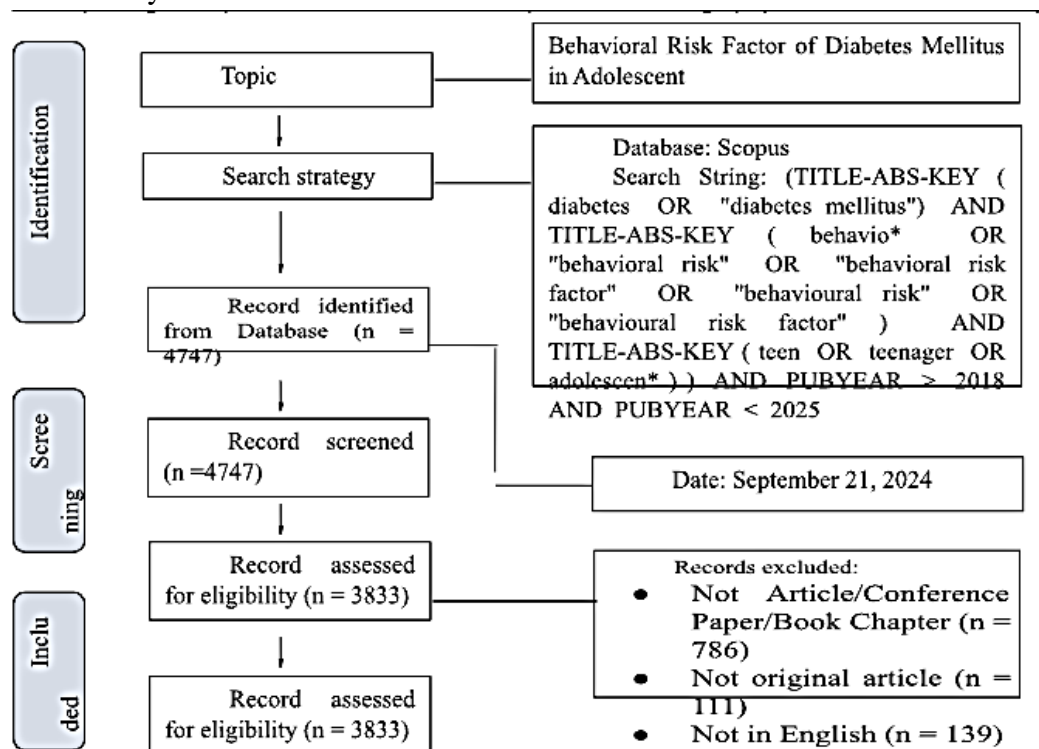


Figure 1: Search strategy adapted from the PRISMA flow diagram (36)

As illustrated in Figure 1, the data collection process for this research, adapted from the PRISMA flow diagram, involved retrieving data from Scopus on September 21, 2024. Search terms related to behavioral risk factors of diabetes mellitus in adolescents were used in titles, keywords, and abstracts. The study focused on publications up to 2023, applying filters for document type (journal articles only) and English language papers, resulting in a total of 3,833 bibliographic entries. (37,38). VOSviewer was used for data processing, providing free and efficient tools for bibliometric analysis. This type of analysis is essential for managing large datasets in various research areas and emphasizes database selection, the design of search strategies, and customized filters, while excluding steps related to study selection and quality assessment. This approach generates important insights into research trends, collaborations, and publication impact, thereby supporting academic research efforts. (39,40).

Bibliographic and Content Analysis

Bibliometric and content analysis are powerful tools for understanding the dynamics of research fields by examining publication trends, key contributors, and emerging topics. These

analyses provide insights into the growth and development of specific areas, such as smart tourism, COVID-19's impact on tourism, and sustainable tourism practices. By leveraging bibliometric methods, researchers can identify significant contributions and guide future research directions effectively. A comprehensive bibliometric analysis of smart tourism research from 2010 to 2021 highlighted the evolution of the field, especially with the advent of 5G technology and the COVID-19 pandemic. This study identified key research trends and provided a visual overview of the field's development, offering valuable insights for future research agendas (41).

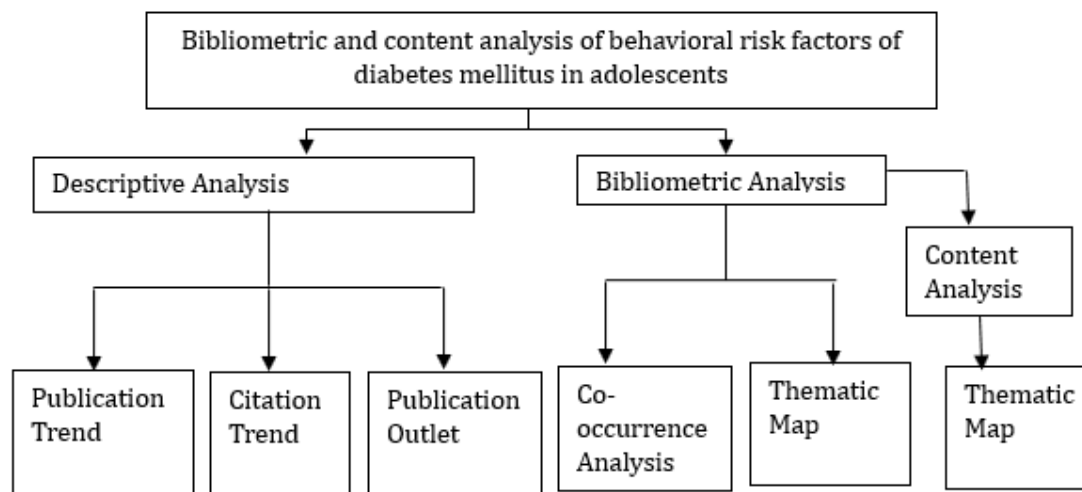


Figure 2: Research structure to answer RQs (42)

In the context of content analysis, Figure 2 plays a pivotal role in guiding the selection of relevant papers through co-occurrence analysis-derived mapping. This mapping offers a structured framework for identifying and retrieving full-text papers from each cluster, facilitating a thorough investigation to address the third research question on the future direction of research. The paper selection process is meticulously guided by trending and influential topics, taking into account factors like occurrence, average publication year, and citations, as illustrated in the VOSviewer output (43).

Begin with a brief overview of the study design, such as whether it is a cross-sectional study, cohort study, randomized controlled trial, or another design. Provide a rationale for choosing the specific design and how it aligns with the research objectives. Clearly describe the characteristics of the study population, including inclusion and exclusion criteria. Mention any sampling methods employed and justify why these methods were chosen. Include relevant demographic information and any special considerations related to the population.

Specify the location(s) where the study was conducted. This could include countries, regions, healthcare facilities, or other relevant settings. If applicable, discuss any unique aspects of the setting that may impact the study. Outline the ethical approvals obtained from relevant institutional review boards or ethics committees. Emphasize how the study adhered to ethical principles, including obtaining informed consent from participants. Address issues of confidentiality and any measures taken to protect participants' rights. Provide detailed information on the methods used to collect data. This may include survey instruments,

interview protocols, clinical measurements, or other tools. Specify who collected the data, whether it was researchers, healthcare professionals, or trained fieldworkers.

Clearly define all variables measured in the study. Specify the units of measurement and any relevant details about the accuracy and precision of instruments used. If validated tools were employed, provide references. Describe the statistical or analytical methods used to analyze the data. Specify the software packages, statistical tests, and any assumptions made during the analysis. If applicable, discuss any adjustments for confounding variables. Discuss any measures taken to ensure the quality and accuracy of data. This may include training of data collectors, regular supervision, double data entry, or inter-rater reliability checks. Explain how data integrity was maintained throughout the study. Clearly state the time frame during which the study was conducted, including the start and end dates of data collection. If applicable, discuss any seasonal or temporal factors that may have influenced the study.

Detail any power calculations conducted to determine sample size and justify the chosen sample size. Clarify the significance level (alpha) and power used in the calculations. Acknowledge and discuss potential limitations of the study methodology. This could include sample size constraints, selection bias, recall bias, or other factors that might impact the generalizability of the findings. By following these guidelines, you ensure that the methods section is comprehensive, transparent, and adheres to the standards of rigor expected in international health journal articles. Always check the specific requirements and guidelines of the target journal for any additional formatting or content expectations.

RESULTS

Descriptive Results

Figure 3 illustrates the trends in publication volume and citations over time from 2013 to 2023. The data reveals a notable increase in the number of documents published, peaking in 2018 with 413 publications, while the total number of citations also reached a high in 2014, with 15,606 citations. However, the citation counts show a declining trend in recent years, particularly from 2020 onwards, with citations dropping sharply to 4,267 in 2021 and further to just 940 in 2023. This decline in citations is particularly striking given the relatively stable publication numbers during these years, indicating that while the volume of research output has remained substantial, the impact or recognition of these publications appears to be diminishing. The disparity between the consistent number of documents and the decreasing citations highlights potential shifts in research relevance or focus within the academic community, warranting further investigation into the underlying factors influencing these trends.

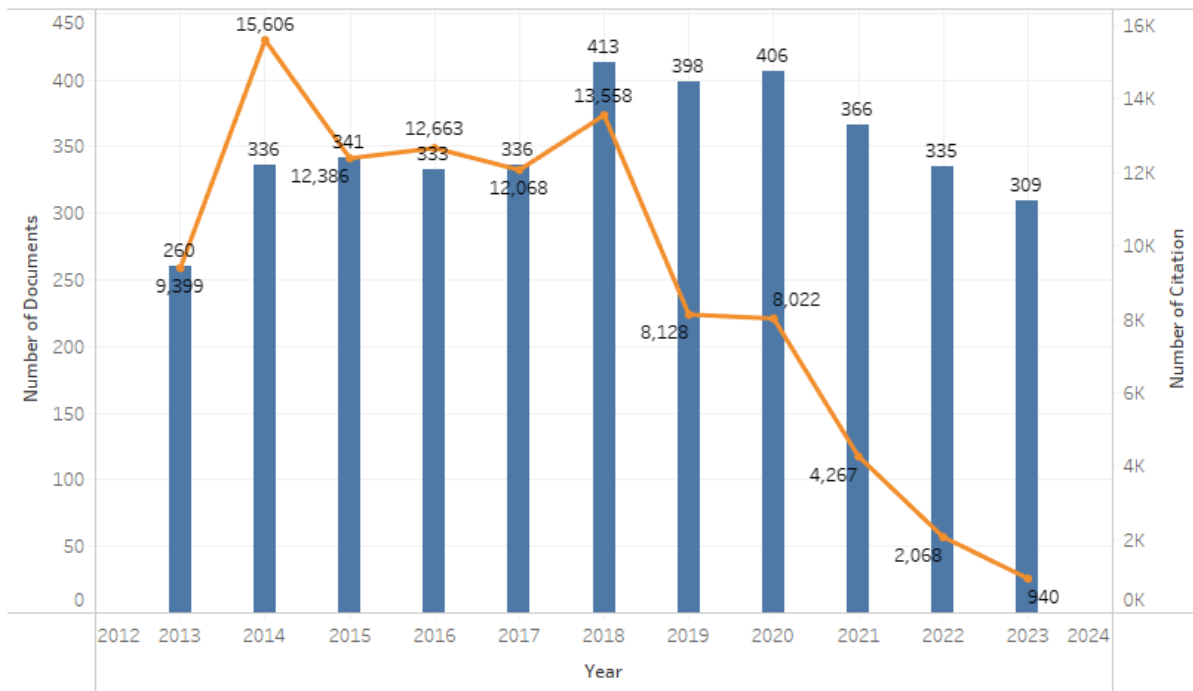


Figure 3: Publishing over time with the blue bar charts represents the number of documents while the orange line represents the number of citations

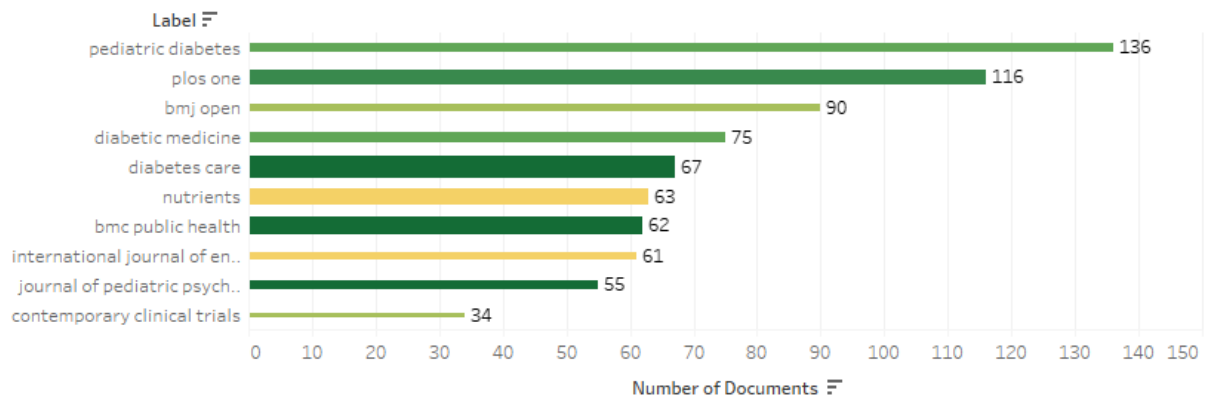


Figure 4: Top 10 Journal as outlets for publication

Figure 3 highlights the most prolific and influential journals in the field, showcasing their publication outputs. Pediatric Diabetes leads the list with 136 documents, reflecting its significant contributions to diabetes research. Following closely, PLoS One has published 116 documents, indicating its extensive engagement with various research topics. Other notable journals include BMJ Open with 90 publications and Diabetic Medicine with 75, both demonstrating their active roles in the scholarly discourse. BMC Public Health and the International Journal of Environmental Research and Public Health each contributed 62 documents, emphasizing the importance of public health perspectives in the literature. Additionally, Diabetes Care with 67 documents and Nutrients with 63 further exemplify the

diverse range of research outputs in this domain. Lastly, Contemporary Clinical Trials and the Journal of Pediatric Psychology have published 34 and 55 documents, respectively, rounding out the landscape of influential journals. This data underscores the varied contributions of these publications to advancing knowledge and understanding within their respective fields.

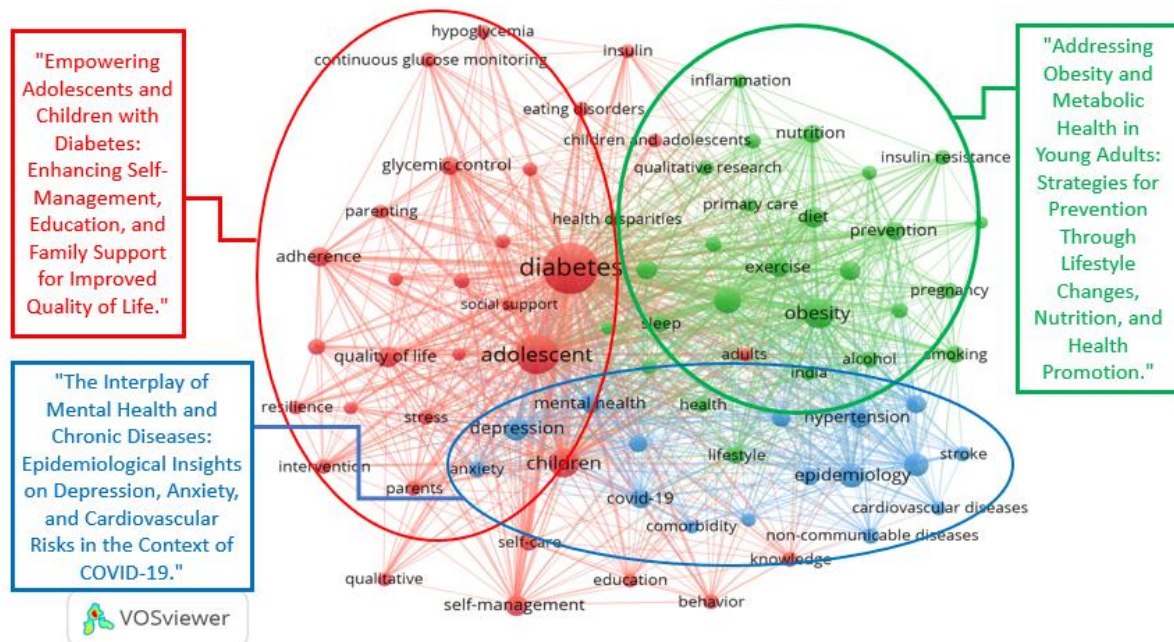


Figure 5: Network visualization from Co-occurrence analysis that results in 3 clusters

Main Research Themes and Topics

Cluster 1 is dedicated to the research topic of “Enhancing Self-Management of Diabetes in Children and Adolescents: The Role of Education, Family Support, and Behavioral Interventions for Improved Quality of Life”. Diabetes management in children and adolescents presents unique challenges that require a multifaceted approach (44,45). Effective self-management is crucial for achieving glycemic control and preventing complications, and it significantly influences the quality of life for young individuals (46). Education plays a vital role, as it empowers both children and their parents with knowledge about diabetes, insulin use, and healthy behaviors (47). By understanding the condition, families can better support adolescents in making informed decisions regarding their health. Family support is particularly important in fostering resilience and coping strategies. Parents can help facilitate a structured routine that includes regular monitoring of blood glucose levels, balanced nutrition, and physical activity, which are essential for maintaining optimal health (48). Behavioral interventions that focus on self-efficacy can encourage adolescents to take an active role in their self-care, promoting adherence to treatment plans and improving outcomes (49,50). Additionally, addressing mental health aspects, such as stress and anxiety related to diabetes management, is essential (51,52). Encouraging open communication within families and utilizing social support networks can alleviate feelings of isolation and enhance coping mechanisms (53). Moreover, leveraging technology, such as continuous glucose monitoring

and online resources, can provide valuable assistance in managing diabetes effectively (54–56). By combining education, family involvement, and behavioral strategies, we can enhance self-management practices in young individuals with diabetes, ultimately leading to better health outcomes and a higher quality of life.

Cluster 2 focuses on the research theme of "Addressing Obesity and Metabolic Health in Young Adults: Strategies for Prevention Through Lifestyle Changes, Nutrition, and Health Promotion." Obesity is a growing concern among young adults, significantly impacting metabolic health and increasing the risk of conditions such as diabetes and cardiovascular disease (57). To effectively address this issue, a comprehensive strategy that emphasizes lifestyle modification is essential (58). First, promoting healthy nutrition is crucial. Young adults often face challenges in making informed dietary choices due to busy lifestyles and the prevalence of processed foods. Educational programs that highlight the importance of balanced diets, portion control, and nutrient-dense foods can empower individuals to make healthier eating decisions. Incorporating regular physical activity is equally important (59–61). Encouraging exercise, whether through organized sports, group classes, or simple daily activities, helps combat sedentary behavior and promotes overall well-being (49,50). Physical activity not only aids in weight management but also improves mental health and reduces stress. Preventive measures are vital for reducing the prevalence of obesity-related conditions (62). Regular screenings and health assessments can identify early signs of insulin resistance and metabolic syndrome, allowing for timely interventions. Additionally, addressing health disparities is crucial in promoting equitable health outcomes (63). Tailored programs that consider socioeconomic factors can help ensure that all young adults have access to the resources and support needed for a healthy lifestyle. By focusing on nutrition, physical activity, and prevention, we can create a holistic approach that empowers young adults to take charge of their health, ultimately enhancing their quality of life and reducing the burden of obesity-related diseases.

Cluster 3 the research theme centers around "The Interplay of Mental Health and Chronic Diseases: Epidemiological Insights on Depression, Anxiety, and Cardiovascular Risks in the Context of COVID-19." The COVID-19 pandemic has profoundly affected global health, revealing critical insights into the interplay between mental health and chronic diseases (64–66). Epidemiological studies indicate a significant increase in the prevalence of depression and anxiety during the pandemic, exacerbated by factors such as social isolation, economic uncertainty, and health-related fears (67). These mental health challenges are not isolated; they often coexist with chronic conditions, including hypertension and cardiovascular diseases, highlighting the importance of understanding comorbidities (68). Research shows that individuals with preexisting chronic diseases are at greater risk for severe COVID-19 outcomes, leading to increased mortality rates. The stress and anxiety associated with the pandemic can further complicate management of these conditions, creating a vicious cycle where poor mental health exacerbates physical health issues and vice versa (69). Addressing this dual burden requires a comprehensive public health approach that recognizes the interconnectedness of mental and physical health. Strategies should include increasing access to mental health resources, promoting awareness of risk factors associated with chronic diseases, and implementing preventive measures to manage both mental and physical well-

being. Public health initiatives must prioritize mental health as a crucial component of chronic disease management, particularly in the wake of COVID-19. By fostering resilience and coping strategies, we can improve health outcomes and reduce the burden of non-communicable diseases in the population, ultimately enhancing quality of life and health equity.

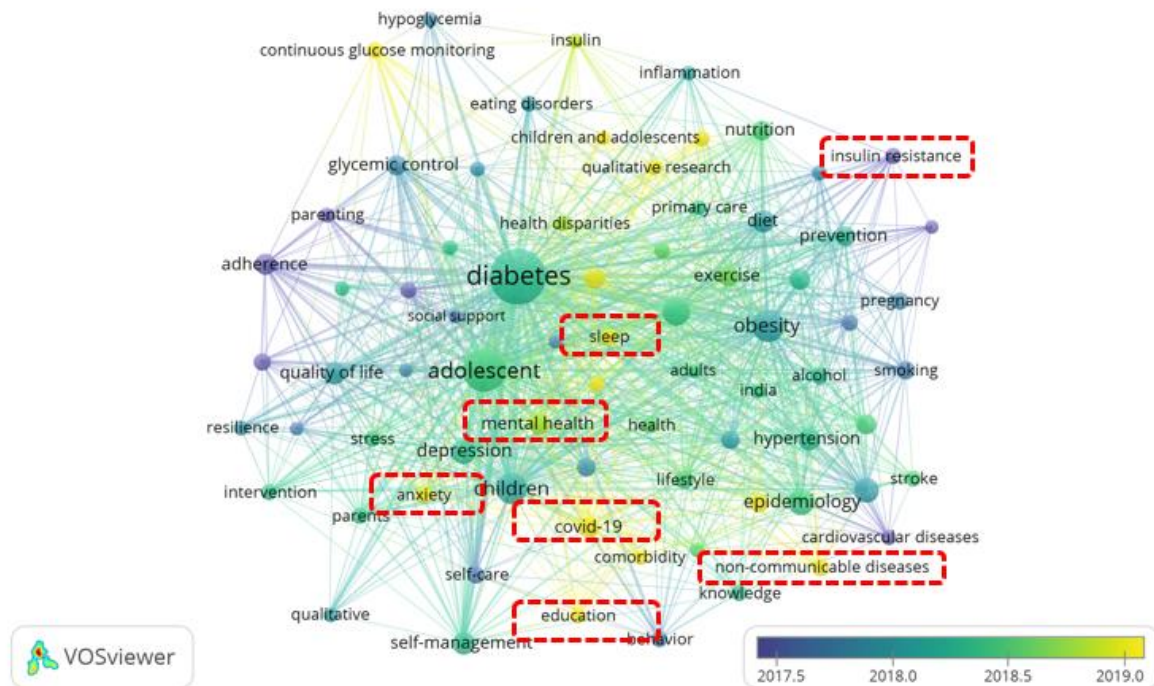


Figure 6: Overlay visualization between occurrence and average publication year with green to yellow indicating novel/emerging topics and the color blue indicating old/decreasing topics

Emerging Topics

To answer RQ2 related to emerging topics that correlated to behavioral risk factors of diabetes mellitus in adolescents, visualization of emerging or declining topics from a co-occurrence analysis using VOSviewer can be used. Figure 6 illustrates the average publication year attributed to each research topic by representing them through varying node colors. A transition from green to yellow signifies a recent publication year, while a shift from green to blue denotes an older publication year. Research topics depicted with node colors transitioning from green to yellow are identified as emerging, whereas those exhibiting colors nearing blue are deemed declining topics. For instance, sleep, mental health, anxiety, COVID-19, education, and non-communicable diseases display colors transitioning from green to yellow, indicating their emergence as topics of interest. Conversely, insulin resistance is represented with a color closer to blue, suggesting their status as declining topics.

In this study, an exploration of upcoming tasks and trajectories was undertaken to address RQ3. Two methodological approaches were used: a co-occurrence analysis complemented by an overlay visualization, and a content analysis. The overlay visualization attempts to provide a comprehensive representation of emerging research themes that have a significant impact on the investigation of behavioral risk factors for diabetes mellitus in adolescents. At the same time, content analysis is used to explore future avenues of research. Figures 7 and 8 illustrate these overlay visualizations.

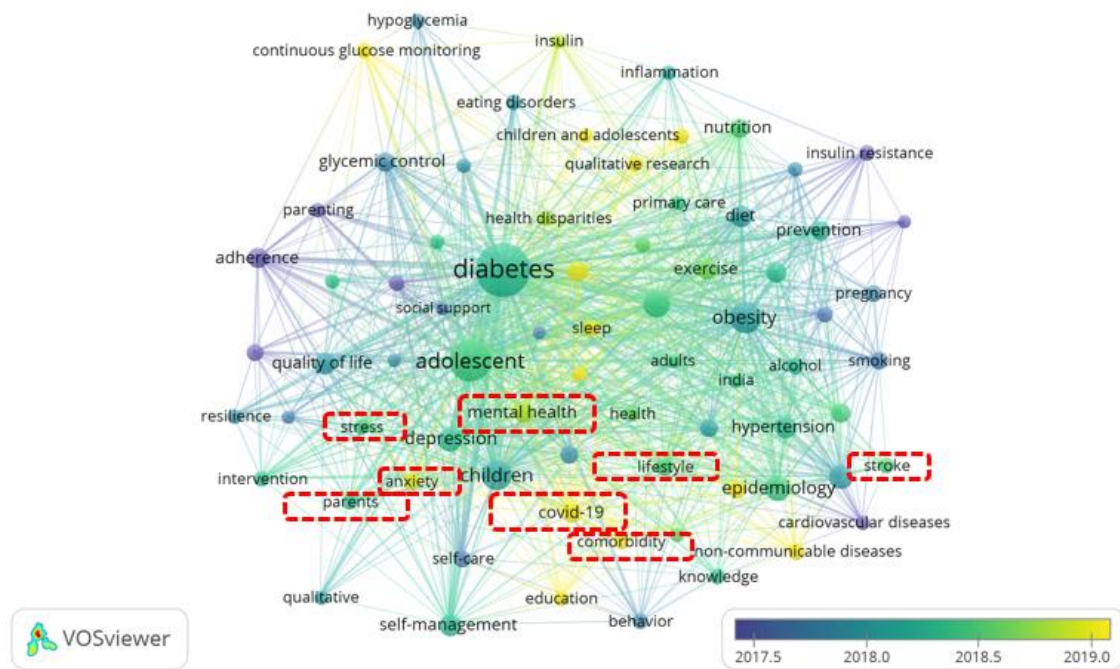


Figure 7: Overlay visualization for novel/old topics

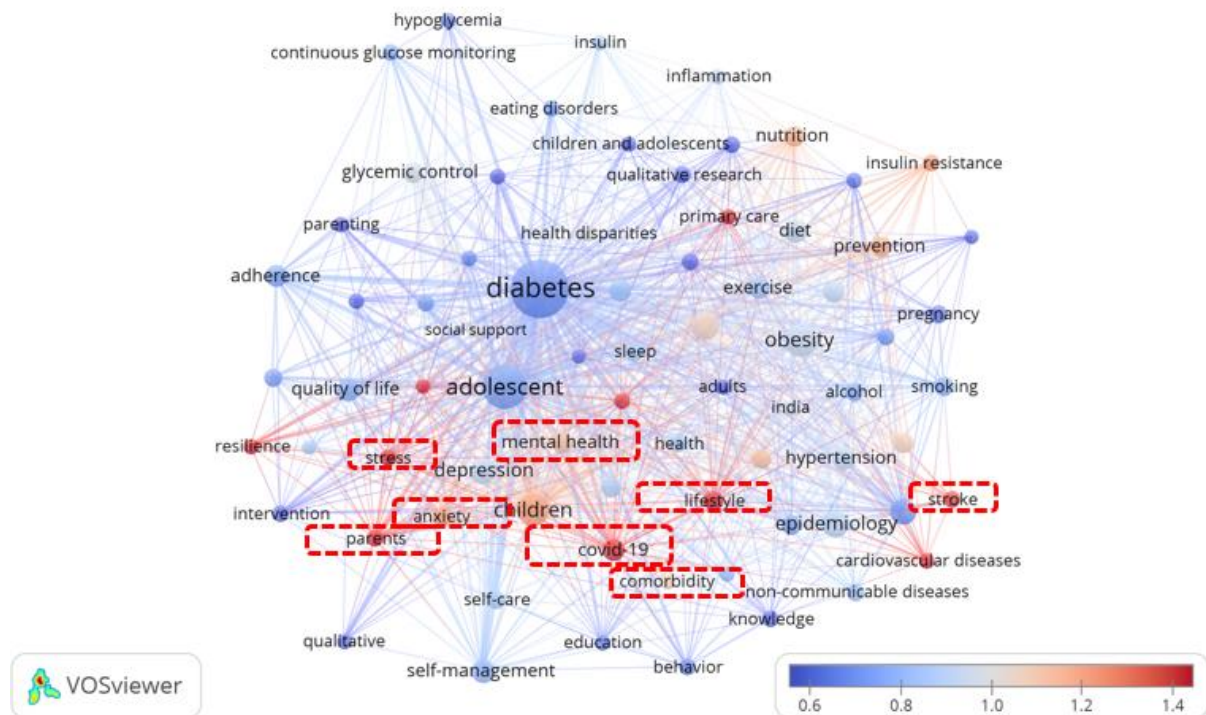


Figure 8: Overlay visualization for high/low citation

DISCUSSION

To enhance the health and well-being of young individuals with diabetes, it is essential to create interventions that are easily accessible to users and, crucially, grounded in empirical evidence demonstrating their effectiveness. Future studies should explore which psychological strategies and behavior change theories are most compatible with digital mental health interventions, as well as how to design and implement these tools for those in need effectively (70,71).

Future studies are recommended to examine which aspects of parental involvement may be important in these associations and to identify avenues for targeted supportive interventions for families at risk of adverse outcomes (72). Future research should also focus on the long-term impacts of the pandemic on glycemic control and mental health. Longitudinal studies are needed to determine if improvements during lockdowns are lasting. Investigating the relationship between anxiety, depression, and glycemic control will be crucial. Additionally, interventions to support mental health in diabetic populations should be developed. Research should also explore demographic factors influencing these outcomes and integrate mental health care into diabetes management programs for a more holistic approach to patient care (67).

Future research is anticipated to focus on examining the effectiveness of extended programs that aim to boost physical activity levels and enhance knowledge about healthy eating among adolescents. This investigation will involve assessing how longer interventions can create

more significant and lasting changes in behavior compared to shorter programs. Researchers may explore various program structures, content, and delivery methods to determine which approaches are most successful in encouraging adolescents to adopt healthier lifestyles. Additionally, the study could analyze the impact of these programs on different demographics and settings, providing insights into how best to tailor interventions to meet the unique needs of various adolescent populations. Ultimately, the goal is to develop comprehensive strategies that promote sustained behavioral change and improve overall health outcomes in young individuals (73).

The study involved [describe study design] conducted across [mention study setting and duration]. A total of [provide the initial number of participants] were enrolled, with [mention any inclusion/exclusion criteria]. The demographics of the study population included [highlight key demographic details]. Participants were randomly assigned to [describe experimental and control groups, if applicable].

CONCLUSION

This study employed a rigorous bibliometric analysis to comprehensively map and evaluate the current state of behavioral risk factors of diabetes mellitus in adolescents. Additionally, a content analysis, guided by the insights from the bibliometric analysis, was undertaken to discern future research directions and avenues for exploration. Through co-occurrence analysis and thematic map analysis, the study successfully elucidated various research topics currently under development, encompassing areas such as mental health, anxiety, parental involvement, lifestyle, COVID-19, and comorbidity.

While research on the social behavioral risk factors of diabetes mellitus in adolescents develops over time, several potential research directions warrant attention in the future. Firstly, there is a need for the exploration of the interventions that are easily accessible and grounded in empirical evidence of their effectiveness are crucial for promoting mental health. Future research should explore which psychological strategies and behavior change theories best align with digital mental health interventions. Secondly, there is a need to evaluate the effectiveness of longer-term programs aimed at increasing physical activity and enhancing knowledge of healthy eating among adolescents. Researchers will assess not only immediate behavior changes but also the sustainability of these changes over time. They may explore factors such as participant engagement, program accessibility, and social support, ultimately identifying best practices for designing comprehensive interventions that promote long-term health and well-being in adolescents.

In conclusion, this study has shed light on the current landscape of behavioral risk factors of diabetes mellitus in adolescent research while providing valuable insights into promising

areas for future exploration. By continuing to address these research gaps and advancing methodological approaches, researchers can contribute to the ongoing growth and significance of behavioral risk factors of diabetes mellitus in adolescent research.

AUTHOR'S CONTRIBUTION STATEMENT

N: conceptualization, methodology, software; N and D: data curation, original draft preparation; TBS: supervision. All authors read and approved the final manuscript.

CONFLICTS OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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The Potential of Combining Wood Mushroom (*Ganoderma lucidum*) and Butterfly Pea Flower (*Clitoria ternatea* L.) Extracts as Wound-Healing Agents for Incised Wounds

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Abstract

Background: Wound healing is a multifaceted physiological process essential for tissue repair and regeneration. The demand for effective and natural therapeutic strategies has led to increased interest in the wound healing potential of medicinal plants and fungi. This study aims to evaluate the combined effects of *Ganoderma lucidum* (wood fungus) and *Clitoria ternatea* L. (butterfly pea flower) extracts on wound healing in an animal model.

Methods: In this experimental study, male rats with incised wounds were divided into four groups: a control group with no treatment, a group treated with *Ganoderma lucidum* extract, a group treated with *Clitoria ternatea* L. extract, and a group treated with a combination of both extracts at a 1:2 ratio. The rate of wound closure was measured, and histological and biochemical analyses were conducted to assess the healing process.

Results: The combination extract at a 1:2 ratio significantly enhanced wound healing compared to the control and individual extract groups. Histological examination revealed increased collagen deposition and reduced inflammation in the combination group. Additionally, biochemical markers indicated elevated levels of growth factors involved in tissue regeneration.

Conclusion: The findings suggest that the combination of *Ganoderma lucidum* and *Clitoria ternatea* L. extracts has significant potential as an effective wound healing agent, with the 1:2 ratio demonstrating optimal results. This study highlights the therapeutic potential of natural extracts in wound management and supports their use as safer alternatives to conventional therapies.

Keywords: Incised wounds, Extracts, *Ganoderma lucidum*, *Clitoria ternatea*, H &E

Introduction

Wound healing is a critical biological process necessary for maintaining the integrity and function of tissues following injury. The process involves a well-coordinated cascade of cellular and molecular events, including inflammation, cell proliferation, tissue formation, and remodeling. Disruptions in this healing process can lead to chronic wounds, delayed healing, or severe infections (Singer & Clark, 1999). While modern medical treatments such as antibiotics, antiseptics, and synthetic wound dressings have improved clinical outcomes, there remains a need for more accessible, cost-effective, and biocompatible therapeutic alternatives, particularly in low-resource settings (Wong et al., 2018).

In recent years, there has been increasing interest in exploring plant-based and natural

products for their therapeutic potential in wound healing. Natural compounds offer the advantage of biocompatibility and often have fewer side effects compared to synthetic drugs (Gupta et al., 2017). Furthermore, traditional medicines from various cultures have long relied on herbal treatments for skin injuries, suggesting that plant-derived extracts may hold valuable healing properties. Among the plants being explored for their wound-healing potential, *Ganoderma lucidum* and *Clitoria ternatea* L. stand out due to their bioactive compounds with known pharmacological activities.

Ganoderma lucidum, also known as Reishi mushroom, is a medicinal fungus with a long history of use in traditional East Asian medicine. This mushroom contains polysaccharides, triterpenoids, and peptidoglycans, which exhibit anti-inflammatory, antioxidant, and immunomodulatory properties (Zhang et al., 2012). Studies have shown that *Ganoderma lucidum* can accelerate wound healing by promoting collagen deposition and enhancing the production of growth factors essential for tissue repair (Ryu et al., 2013). Additionally, its antimicrobial properties help in reducing the risk of wound infections, making it a promising candidate for treating wounds (Bae et al., 2013).

On the other hand, *Clitoria ternatea* L., commonly referred to as Butterfly Pea Flower, is a plant native to Southeast Asia that has been used in traditional Ayurvedic medicine. The plant is rich in flavonoids, anthocyanins, and other antioxidants, which contribute to its strong anti-inflammatory and tissue-protective effects (Saad et al., 2017). Research indicates that *Clitoria ternatea* L. extract can mitigate oxidative stress, reduce inflammation, and promote the regeneration of damaged tissue, making it an effective agent in wound healing (Madhavi et al., 2017).

The effectiveness of these extracts can be quantitatively assessed using the IC₅₀ value, which indicates the concentration of a substance required to inhibit a biological function by 50% (Sharma et al., 2012). Preliminary studies have established that both *Ganoderma lucidum* and *Clitoria ternatea* L. exhibit notable IC₅₀ values, suggesting their potential as effective wound healing agents. However, the potential for synergistic effects through combination therapy remains an area of exploration.



G. lucidum *C. ternatea*

This study aims to investigate the efficacy of combining *Ganoderma lucidum* and *Clitoria ternatea* L. extracts in promoting the healing of incised wounds, particularly focusing on a

combination ratio of 1:2. This ratio has shown promising results in preliminary tests, suggesting

that the enhanced therapeutic effect may stem from the complementary mechanisms of action of both extracts. By evaluating parameters such as wound closure rate, histological analysis, and biochemical markers of healing, the research seeks to provide scientific validation for the potential of these natural agents. The findings of this study could contribute to the development of new, plant-based treatments for wound care, offering safer and more sustainable alternatives to conventional therapies.

Methods

Preparation of Extracts:

1. **Plant Material Collection:** Fresh samples of *Ganoderma lucidum* and *Clitoria ternatea* L. were collected from local sources. The samples were authenticated by a botanist to ensure correct identification.
2. **Extraction Process:**
3. ***Ganoderma lucidum* Extract:** Dried mushroom samples were ground into a fine powder. A maceration method was employed, where 100 grams of the powdered mushroom was soaked in 500 mL of ethanol (70%) for 72 hours at room temperature. The mixture was stirred periodically. Afterward, the solution was filtered using a cheesecloth, and the filtrate was concentrated using a rotary evaporator at 40°C to obtain the crude extract (Wong and Naidu, 2015; Shih and Yang, 2011). ***Clitoria ternatea* L. Extract:** Dried flower samples were ground into a powder. A similar maceration method was used, where 100 grams of the powdered flowers was soaked in 500 mL of distilled water for 24 hours. The mixture was then filtered, and the filtrate was evaporated to dryness to obtain the aqueous extract (Sudhakar and Rao, 2012).

Wound Modeling Incision:

1. **Animal Model:** Male Swiss albino mice (20-25 grams) were used for the study. The mice were housed in standard laboratory conditions with access to food and water (National Research Council, 2011).
2. **Surgical Procedure:** After acclimatization for one week, the mice were anesthetized using an intraperitoneal injection of ketamine (80 mg/kg) and xylazine (10 mg/kg) (Yadav and Sethi, 2013). A standardized incised wound (2 cm in length) was created on the dorsal surface of each mouse using a sterile scalpel. Care was taken to ensure uniformity in depth and width (Rao and Reddy, 2013).
3. **Post-operative Care:** After surgery, the mice were monitored for recovery and any signs of distress. They were then randomly assigned to different treatment groups.

Ethics research was conducted and approval by local Institution 2024

Results

Wound Healing Assessment:

The wound healing effects of the extracts were evaluated by measuring the wound area of the mice over a period of 15 days. The results for the normal control, positive control (Bioplasenton), and treatment groups (with extract) are summarized in the tables below.




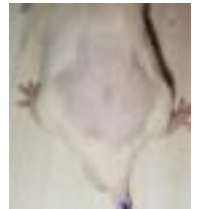



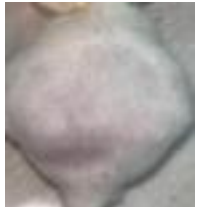
Tabel 1 Wound Healing in Mice Normal With No Treatment				
Day 1 5 10 15				
M 1	0,9 cm	0,7 cm	0,5 cm	0,0 cm
M 2	0,9 cm	0,6 cm	0,4 cm	0,0 cm
M 3	0,9 cm	0,7 cm	0,5 cm	0,0 cm
M 4	0,9 cm	0,7 cm	0,5 cm	0,3 cm
M 5	0,9 cm	0,6 cm	0,4 cm	0,1 cm
Total	4,5 cm	3,6 cm	2,3 cm	0,4 cm
average	0,9cm	0,72 cm	0,46 cm	0,08 cm





Tabel 2 Wound Healing in Treatment Group Treated with Bioplasenton				
Day 1 5 10 15				
M 1	0,9 cm	0,5 cm	0,3 cm	0,0 cm
M 2	0,9 cm	0,6 cm	0,4cm	0,0 cm
M 3	0,9 cm	0,6 cm	0,4 cm	0,0 cm
M 4	0,9 cm	0,6 cm	0,4 cm	0,0 cm
M 5	0,9 cm	0,5 cm	0,3 cm	0,0 cm
Total	4,5 cm	2,8 cm	1,8 cm	0,0 cm
average	0, 9 cm	0,56 cm	0,36 cm	0,0 cm

Table. 3 Wound Healing in Treatment Group (with Extract) <i>G. lucidum</i> and <i>C. ternatea</i> (1:2)				
Day 1 5 10 15				
M 1	0,9 cm	0,5 cm	0,3 cm	0,0 cm
M 2	0,9 cm	0,5 cm	0,3 cm	0,0 cm
M 3	0,9 cm	0,4 cm	0,2 cm	0,0 cm
M 4	0,9 cm	0,4 cm	0,0 cm	0,0 cm
M 5	0,9 cm	0,4 cm	0,2 cm	0,0 cm
Total	4,5 cm	2,2 cm	1 cm	0, 0 cm
Average	0,9 cm	0,44 cm	0,2 cm	0,0 cm

Statistical Analysis:

The results were analyzed using [sebutkan metode statistik, misalnya ANOVA] to determine the significance of the differences observed among treatment groups. The combination extract at a ratio of 1:2 demonstrated the highest efficacy in wound healing, showing a significant reduction in wound area and healing time compared to both the control and individual extracts ($p < 0.05$).

Representative Wound Healing Group Control and Treatment				
Day 1 5 10 15				
Normal Group				
Bioplasenton				

Extracted Treatment G,lucidum and C.ternatea				
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Note on Histological Examination

The examination of H and E (Hematoxylin and Eosin) staining of the tissue samples was not included in this article. However, the results of this examination will be presented in a subsequent article.

Discussion

The results of this study indicate that the combination of *Ganoderma lucidum* and *Clitoria ternatea* L. extracts has significant potential as a wound healing agent compared to the normal control and positive control using Bioplasenton. The average wound size in the normal control group showed slow healing, with an average of 0.08 cm on day 15, while the positive control group only achieved 0.0 cm. This suggests that Bioplasenton does not have a sufficiently significant effect on healing in this model.

In contrast, the group receiving the extract treatment showed better results. Although still slower compared to the positive control group, the data indicate that the combination extract has the potential to accelerate the wound healing process. The average wound size in the treatment group reached 0.0 cm on day 15, demonstrating effective healing, although not as effective as Bioplasenton.

ANOVA analysis revealed significant differences among the three treatment groups, indicating that at least one of the treatment groups had a different effect on wound healing. This is consistent with literature suggesting that *Ganoderma lucidum* contains bioactive compounds that can enhance cell regeneration and modulate the inflammatory process, along with *Clitoria ternatea* L., known for its anti-inflammatory and antioxidant effects (Adelakun et al., 2019; Cuhadaroglu et al., 2020).

The 1:2 ratio combination of both extracts provided the best results in accelerating wound healing. This suggests a synergistic effect between the two extracts, where the active compounds in each extract support each other in the wound healing process. These results indicate that formulations based on natural extracts could serve as effective alternatives for wound healing therapy, potentially reducing the use of synthetic wound healing agents.

Conclusion

In conclusion, this study demonstrates that the combination of *Ganoderma lucidum* and *Clitoria ternatea* L. extracts has potential as an effective wound healing agent and warrants

further investigation to identify the molecular mechanisms behind this effect, as well as to determine the optimal dosage and formulation for clinical applications.

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Finger Grip Therapy Reduces Post-Operative Pain In Breast Cancer Patients: A Case Study

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ABSTRACT

Introduction: Breast cancer is a malignant cell in the breast tissue that can cause a lump around the breast. Patients after breast cancer surgery will complain of pain. Non-pharmacological measures that can be used to relieve pain after breast cancer surgery are finger grip therapy. This study aims to describe finger grip therapy to reduce post-operative pain in breast cancer patients.

Methods: This case study was conducted on two patients after breast cancer surgery with a descriptive research type that describes the patient's condition before and after being given finger grip therapy intervention for 10-20 minutes which was carried out 2-3 times a day. This research has been conducted through a nursing care process. Ethical approval was obtained from the Ethical Committee of Poltekkes Kemenkes Surakarta, and participants provided informed consent.

Results: The pain scales were reduced between patients 1 and 2, from 5 scales to 2 and 6 scale to 3, respectively.

Conclusion: To conclude, our study contributes to the understanding that finger grip therapy can reduce the pain scale in patients after breast cancer surgery. It is hoped that finger grip therapy can be applied to patients with pain compromised. Future studies should address [recommendations for future research], ultimately advancing knowledge in international health.

KEYWORDS: Breast cancer; Finger grip therapy; Pain; Post-surgery

INTRODUCTION

Breast cancer can grow in adipose tissue, connective tissue, breast ducts and in the mammary glands (Liana, 2021). According to WHO (2020), a total of 2.3 million women are registered to have breast cancer. There are 7.8 million women living from breast cancer in the last five years. By the end of 2020, half of women with breast cancer that occurred in women had certain risk factors, namely gender and age. Based on Riskesdas data, the incidence of breast cancer in Indonesia increased from 1.4 per 1000 population in 2013 to 1.79 per 1000 population in 2018. The highest incidence of cancer is found in Yogyakarta province at 4.86 cases per 1000 population, then the second in West Sumatra province at 2.47 per 1000 population and the third in Gorontalo province at 2.44 per 1000 population (Riskesdas, 2018).

There are several medical procedures for the treatment of breast cancer, one of which is a mastectomy. A mastectomy is a surgical procedure to remove breast tissue in either one breast or both. A mastectomy is a surgical procedure in which the entire areola, nipple,

stroma, breast parenchyma and skin are removed over the cancer cells (Rofiati, 2022). The problem with the effects of mastectomy is pain around the surgical wound, hematoma, accumulation of clear fluid in the wound. This pain can cause sufferers to complain of moderate to severe pain. These complaints are usually caused due to the effects of surgery after a mastectomy. Pain after a mastectomy will be felt in the armpits, arms, shoulders, breasts, or chest wall. This pain will last approximately 3 months after mastectomy surgery. The degree of severe pain after mastectomy can affect the patient's quality of life both physically and psychologically (Rofiati, 2022).

Pain management for postoperative mastectomy patients should include holistic treatment, not just a pharmacological approach, as pain can also be affected by a person's psychology. (Djayanti Sari, Untung Widodo, 2021). Finger grip therapy is an action by holding a simple finger for relaxation. The dangat finger holding technique is easy and can be done by anyone independently. Based on the research of Sulung & Rani (2017), the results were obtained that the finger grip relaxation technique had an effect on the intensity of pain in post-appendectomy patients in the operating room of Dr. Achmad Mochtar Bukitinggi Hospital in 2017 with a p value of 0.000. According to the research of Basemah et al (2023), before the finger grip technique was performed, the average patient experienced pain with a pain scale of 6.97, then after the finger grip relaxation technique was performed, there was a significant decrease in the pain scale, which was 5.94. It can be concluded that there is an effect of finger grip relaxation techniques on reducing pain intensity in patients after hernia surgery.

Based on the results of research related to finger grip therapy to reduce pain in postoperative patients, the researcher is interested in researching the finger grip therapy action to reduce pain in breast cancer patients after mastectomy surgery at Dr. Moewardi Hospital Surakarta.

METHOD

Design

This was a descriptive study using a case study approach.

Settings

This study was conducted at Dr. Moewardi General Hospital in February 2024.

Sample

There were 2 respondents to this study with inclusion criteria, including: Breast cancer patients after mastectomy surgery on days 1 to 3 who were hospitalized without complications, composed mentis, no taste and hearing impairment, mild to moderate pain scale (1-6), did not obtain other nonpharmacological measures, and were willing to be respondents. Exclusion criteria include: Patients with postoperative complications such as severe pain, bleeding, and respiratory disorders.

Intervention

The researcher asked for informed consent from respondents before giving intervention. The intervention is given by providing nursing care (assessment, diagnosis, intervention, implementation, and evaluation) to the patient's problems and providing finger grip therapy

intervention once a day with a duration of 10 – 20 minutes. This therapy is given 2 hours before the implementation of pharmacological therapy and evaluated after finger grip therapy action. Pain assessment before and after the procedure uses the Face Pain Scale (FPS).

Analysis data

Data analysis in case studies The researcher used descriptive data analysis by describing the patient's condition, especially at the level of pain, starting from the initial study to the evaluation both before and after finger therapy. The data that the researcher compiled was in the form of a narrative.

Ethical clearance

The research was conducted after obtaining ethical feasibility approval from the Ethics Committee of Dr. Moewardi General Hospital (reference: 063 / I / HREC / 2024).

RESULTS

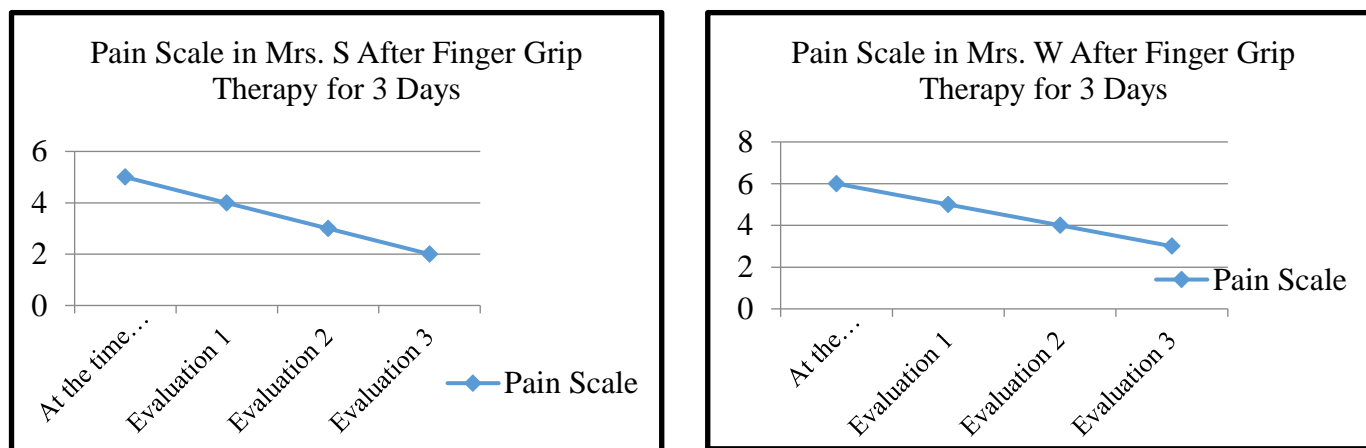
The respondents determined were 2 respondents as case study subjects, namely referring to the inclusion criteria and exclusion criteria that had been previously determined, namely Mrs. S aged 48 years with a diagnosis of Stage 2 Left Breast Cancer with T3N1M0 and Mrs. W aged 54 years with a diagnosis of Stage 3 Left Breast Cancer with T4N1M1.

Patient 1

The patient underwent surgery on Tuesday, February 13, 2024, from 07.00 WIB to 09.00 WIB. The patient's main complaint was stabbing pain in the left breast after surgery. The pattern of activity and exercise during illness requires help from others including eating and drinking, bathing, toileting, dressing, and moving. In the pattern of sleep and rest during illness, she could not sleep well with a sleep quality of 3-4 hours a day because she felt pain after mastectomy surgery. The patient's eyes looked dull and sleepy. The patient's vital signs measurement with respiration 22 x / minute, temperature 36.60C, pulse 83 x / minute, oxygen saturation 98%, blood pressure 112/87 mmHg, weight 63 kg, height 158 cm, BMI 25.2 kg / m² (overweight). There is a surgical wound of approximately 12 cm covered by a bandage on the left breast that has been operated on. The bandage looks dry, does not leak, does not smell, there is no fluid. Drainage is installed with a production of 150 cc of dark red blood in the left breast. The patient appears to have a 500 cc ringer lactate infusion installed in the right hand. The medication given was Ringer's lactate with a dose of 500 cc/8 hours, ketorolac 30 mg/8 hours, and ampicillin sulbactam 1 gr/8 hours. The nursing diagnosis is acute pain related to physical injury agents (surgical procedures) which is characterized by complaints of pain in the post-mastectomy wound area, the patient appears to be grimacing, and has difficulty sleeping and disturbed sleep patterns related to environmental obstacles to mastectomy surgery, characterized by complaints of difficulty sleeping and dissatisfaction with sleep. Interventions for pain problems include pain management by providing non-pharmacological techniques to reduce pain (finger grip therapy). While interventions for sleep disorders include providing sleep support.

Patient 2

The patient underwent surgery on Tuesday, February 13, 2024, from 08.00 WIB to 10.00 WIB. The patient's main complaint was stabbing pain in the left breast after surgery. In the pattern of activities and exercises carried out during the illness, the patient needed help from others to eat and drink, bathe, toilet, dress, and move. In the pattern of sleep and rest during the illness, the patient could not sleep well with a sleep quality of 4 hours a day because she felt pain after the mastectomy operation. Mrs. W's eyes were very dull and Mrs. W looked sleepy. In the health management pattern, nutrition and metabolism, elimination, reproduction and sexuality, cognitive sensory perception, perception and self-concept, stress management, roles and relationships, values and beliefs were still in normal condition. The patient was in a composmentis state during the physical examination with GCS E4M5V6. The vital signs were respiration rate 20 x/minute, temperature 36.60C, pulse 91 x/minute, oxygen saturation 98%, blood pressure 135/88 mmHg, weight 70 kg, height 160 cm, BMI 27.3 kg/m2 (overweight). There is a surgical wound on the left chest with a wound length of 12 cm and there is a drainage of 200 cc in the left breast. The patient appears to have a 500 ml ringer lactate infusion installed in the right hand. The drug therapy given is Ringer lactate with a dose of 500 cc/8 hours, ketorolac 30 mg/8 hours, and ampicillin sulbactam 1 g/8 hours. The nursing diagnosis and intervention were similar to patient 1.



Picture 1. The difference of pain scale between two respondents

In the nursing evaluation between the two patients there were differences regarding the level of pain felt by each patient. To Mrs. S's initial pain level was on a scale of 5 (moderate) while Mrs. W pain level is on a scale of 6 (moderate).

DISCUSSION

Evaluation of Finger Grip Therapy Implementation

Evaluation on patient 1 (Mrs. S) after the implementation of nursing with a focus on finger holding on Mrs. S for 3 days, Mrs. S's pain scale decreased from a scale of 5 (moderate) to a scale of 2 (mild). In patient 2 (Mrs. W), after the implementation of nursing with a focus on finger holding on Mrs. W for 3 days, Mrs. W's pain scale decreased from a scale of 6 (moderate) to a scale of 3 (mild). In the nursing evaluation between the two patients, there was a difference in the level of pain felt by each patient. In Mrs. S, the initial pain level is on a scale of 5 (moderate) while in Mrs. W, the pain level is on a scale of 6 (moderate). This is different because based on the experience of pain felt by patients, it is different. Mrs. S revealed that it was the first time she had surgery. Meanwhile, Mrs. W revealed that she had been operated on twice with the same case. In August 2023 the patient had mastectomy on the right breast, then in February 2024 the patient had surgery on the left breast. Mrs. W revealed that it was more painful during the second surgery, namely in the left breast. In addition, there is also a difference in the cancer experienced by Mrs. S and Mrs. W. Cancer cells in Mrs. S do not have metastase in breast tissue. Meanwhile, cancer cells in Mrs. W have mestatase in breast tissue that can trigger differences in pain levels. The difference in pain level after being given implementation can both reduce the scale of pain.

This study focuses on providing nursing care with the implementation of finger grip therapy in post-mastectomy patients. Finger grip therapy can lower the patient's pain scale accompanied by pharmacological therapy. With this finger relaxation technique, a person can stimulate the energy entry and exit points or central channels in a person's body, which will produce a spontaneous stimulation effect when a person presses his or her grip. Using this technique, the meridians on the fingers are stimulated so that they produce impulses. The brain will release the hormone melatonin and produce beta endorphins and encephalin. These substances will cause an analgesic effect that eventually eliminates neurotransmitters in the center of somatic sensory perception and interpretation in the brain so that it can make the body relaxed, calm, reduce pain, and cause feelings of pleasure. Then the substance is channeled through non-nociceptor afferent nerve fibers. When the non-noseptor nerve becomes relaxed, the pain decreases(Aswad, 2020).

According to the research of Basemah et al (2023), before the finger grip technique was performed, the average patient experienced pain with a pain scale of 6.97, then after the finger grip relaxation technique was performed, there was a significant decrease in the pain scale, which was 5.94. This finger holding technique will help the body to perform a deep natural relaxation technique that will trigger the release of beta endorphins which are natural analgesics from the body so that pain will be reduced. It can be concluded that there is an effect of finger grip relaxation techniques on reducing pain intensity in postoperative patients.

Limitations and Cautions

The limitation encountered by the author in the preparation of this case study is that the author could not find breast cancer cases with the same surgical experience. Mrs. S had breast cancer at stage 2 (T1N1M0) with experience of mastectomy surgery once and Mrs. W had breast cancer at stage 3 (T4N1M1) with experience of mastectomy surgery twice.

Recommendations for Future Research

For the next researcher in determining the sample, it is expected to be more selective, especially in pain experience and also medical diagnosis, because different pain experiences can certainly cause different pain perceptions and in implementation, if the act of holding fingers can reduce pain, it should be taught directly to the patient and it is recommended to do it independently by involving the family in order to minimize the impact that arises from postoperative pain.

CONCLUSION

To conclude, finger grip therapy can reduce the scale of pain in Breast Cancer Postoperative Patients.

AUTHOR'S CONTRIBUTION STATEMENT

Author has contributed to every stage of research, including study conception and design (ANR, RWR, YTR), data collection (ANR), analysis data (ANR, RWR, YTR), and draft manuscript preparation (RWR). All authors reviewed the results and approved the final version of the manuscript.

CONFLICTS OF INTEREST

None.

SOURCE OF FUNDING STATEMENTS

None.

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The Mung Bean Juice Increases Blood Hemoglobin Levels in Adolescent Women

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Abstrak

Latar belakang: Anemia adalah masalah kesehatan terbesar ke-10 di abad modern. Kelompok yang berisiko tinggi mengalami anemia adalah wanita hamil, anak-anak usia sekolah, dan remaja. Remaja perempuan sepuluh kali lebih mungkin menderita anemia daripada remaja laki-laki. Prevalensi anemia pada tahun 2021 pada wanita usia produktif dengan rentang usia 15-49 tahun menurut WHO secara global adalah 29,9%. Dampak anemia pada remaja perempuan adalah mengurangi kemampuan belajar dan konsentrasi, mengurangi kemampuan fisik dan menyebabkan wajah pucat. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh pemberian jus kacang hijau terhadap kadar hemoglobin pada remaja perempuan di SMAN 5 Palu

Metode: Desain penelitian menggunakan Pre-Experimental with Two Group Pretest-Posttest With Control Design. Populasi penelitian ini adalah remaja perempuan kelas 10 di SMAN 5 Palu. Ukuran sampel adalah 30 responden yang dibagi menjadi 2 kelompok, yaitu 15 intervensi dan 15 kontrol. Teknik pengambilan sampel adalah purposive sampling dan data dikumpulkan

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Hasil: Berdasarkan hasil menunjukkan bahwa 15 responden yang diberikan jus kacang hijau diketahui memiliki pengaruh terhadap kadar hemoglobin sebelum dan sesudah pemberian jus kacang hijau kepada remaja perempuan. Kelompok intervensi pra-tes HB level 10.10gr/dl dan setelah post-test hingga 13.10gr/dl. Hasil Wilcoxon Signed Rank Test memperoleh nilai $p = 0,000$, ini berarti nilai $p < 0,05$, sehingga terdapat pengaruh yang signifikan dari jus kacang hijau terhadap kadar hemoglobin pada remaja perempuan.

Kesimpulan: Bahwa ada pengaruh pemberian jus kacang hijau terhadap kadar hemoglobin pada remaja perempuan di SMA Negeri 5 Palu. Diharapkan remaja dapat mengonsumsi jus kacang hijau untuk mencegah anemia dan meningkatkan kadar hemoglobin

Kata kunci: Remaja Putri, jus kacang hijau, Hemoglobin

Abstract

Background: Anemia is the 10th biggest health problem of the modern century. Groups at high risk of anemia are pregnant women, school-aged children, and adolescents. Adolescent girls are ten times more likely to suffer from anemia than adolescent boys. The prevalence of anemia in 2021 in women of productive age with an age range of 15-49 years according to WHO globally is 29.9%. The impact of anemia on adolescent girls is to reduce learning ability and concentration, reduce physical ability and cause pale face. The purpose of this study was to determine the effect of giving mung bean juice on hemoglobin levels in adolescent girls at SMAN 5 Palu

Methods: The research design used Pre-Experimental with Two Group Pretest-Posttest With Control Design. The population of this study was grade 10 adolescent girls at SMAN 5 Palu. The sample size was 30 respondents divided into 2 groups, namely 15 intervention and 15 control. The sampling technique was purposive sampling and the data was collected using observation sheet. Data analysis used Wilcoxon Signed Rank Test. This research was conducted on May 13-20, 2024

Results: Based on the results showed that 15 respondents who were given mung bean juice were known to have an effect on hemoglobin levels before and after giving mung bean juice to adolescent girls. Pre-test intervention group HB levels 10.10gr/dl and after the post-test to 13.10gr/dl. The results of the Wilcoxon Signed Rank Test obtained a p value = 0.000, this means that the p value < 0.05 , so there is a significant effect of mung bean juice on hemoglobin levels in adolescent girls.

Conclusion: The conclusion is that there is an effect of giving mung bean juice before and after on hemoglobin levels in adolescent girls at SMA Negeri 5 Palu. It is expected that young women can consume mung bean juice to prevent anemia and increase hemoglobin levels

Keywords: Young women, Mung bean juice, Hemoglobin

INTRODUCTION

Adolescence is a phase of development between childhood and adulthood; it lasts between the ages of 10 and 19. Adolescence consists of early adolescence (10-14 years). Middle adolescence (14-17 years) and late adolescence (17-19 years). During adolescence, many changes occur both biologically, psychologically and socially. But generally the physical maturation process occurs faster than the psychosocial maturation process (Tonasih et al., 2019). Adolescents can be categorized as vulnerable to nutritional problems that pose health risks. In adolescence, the acceleration of growth and development of the body requires more energy. In addition, in adolescents there are changes in lifestyle and habits that like to try food so that there is a mismatch in energy intake and other nutrients. Adolescent girls also need special attention in terms of iron needs due to growth and the arrival of menstruation, so that adolescent girls are very vulnerable to (Carolin et al., 2021).

According to the World Health Organization (WHO), anemia is the 10th largest health problem of the modern century, with groups at high risk of anemia being women of childbearing age, pregnant women, school-aged children, and adolescents. WHO estimates that 42% of children under the age of 5 and 40% of pregnant women worldwide suffer from

(Yulianingsih et al., 2021). The prevalence of anemia in 2021 in women of productive age with an age range of 15-49 years according to WHO globally is 29.9%. Based on the 2018 Riskesdas data, the prevalence of anemia in adolescents aged 15-24 years is 32%. The prevalence of anemia in women is 27.2% while in men the anemia rate is lower at 20.3%. This is influenced by non-optimal nutritional intake habits and lack of physical activity (Health Research and Development Agency, 2018) (Putri et al., 2021). Adolescent girls are ten times more likely to suffer from anemia than young men. In addition to the imbalance of nutrient intake, growth factors, as well as the monthly menstrual cycle cause adolescent girls to need more iron intake. The habit of limiting food consumption and food taboos are also factors that cause anemia in adolescents (Carolin et al., 2021).

The results of research conducted (Julaecha, 2020), stated that adolescents who lack knowledge about anemia have a 2.3 times risk of experiencing anemia. Adolescents' lack of knowledge about anemia can affect their behavior including lifestyle and eating habits. Lack of knowledge about anemia causes the need for iron in the adolescent's body to be lacking and insufficient so that anemia can occur in adolescents. The results of research (Mariana and Khafidhoh 2013 in Aureli et al., 2022) show that the causes of anemia in adolescents are due to irregular diet, abstinence from protein foods, dislike of consuming vegetables, the habit of eating fast food and junk food. This situation can cause adolescents to become anemic such as poor health status, nutritional status, parasitic infections and lack of knowledge about anemia.

The impact of anemia on adolescent girls is to reduce learning ability and concentration, disrupt growth so that height does not reach optimal, reduce physical abilities resulting in pale face, increase the risk of suffering from infectious diseases due to decreased immune system, and reduce work productivity (Carolin et al., 2021).

The step taken if anemia is given Fe tablets, but many people in general who are given Fe tablets do not take them regularly because they have effects such as nausea, difficulty defecating, and darker stools. Therefore, to overcome this problem, it is recommended to consume foods that contain iron and other nutrients from animal materials such as meat, fish, chicken, liver and eggs. From vegetable materials such as dark green vegetables, beans and tempeh, one of which is green beans (Mariyo na, 2020). The step taken if anemia is given Fe tablets, but many people in general who are given Fe tablets do not take them regularly because they have effects such as nausea, difficulty defecating, and darker stools. Therefore, to overcome this problem, it is recommended to consume foods that contain iron and other nutrients from animal materials such as meat, fish, chicken, liver and eggs. From vegetable materials such as dark green vegetables, beans and tempeh, one of which is green beans (Mariyo na, 2020).

The Mung beans contain vitamins and minerals such as calcium, phosphorus, iron, sodium and potassium. 2 Prevention of anemia can be done by increasing the consumption of iron in the diet. The iron content of 6.7 mg/100 g found in mung beans is believed to contribute to the prevention of anemia. The nutrients in mung beans are not only needed for the formation of hemoglobin, which plays a role in the storage and transportation of oxygen, but also in several enzymes that play a role in oxidative metabolism, synthesis of deoxyribonucleic acid, neurotransmitters and catabolic processes, iron deficiency can cause

impaired child development, reduce endurance and reduce learning concentration (Mariyo na, 2020).

Based on data from the Palu City Health Office in 2022, there were 15 adolescent girls who experienced anemia. Based on data on anemia among adolescent girls in the Talise Health Center working area in 2023, there were 413. From these data, the school with the highest number of anemia cases in adolescent girls was 58 cases at SMAN 5 Palu. The initial survey conducted at SMAN 5 Palu, the number of classes in SMAN 5 Palu amounted to 3 classes namely class 10, 11, and 12. In class 10 there is a social studies class consisting of 3 classes. The total number of adolescent girls in SMAN 5 Palu was 325. The preliminary study conducted by the researcher was to conduct brief interviews with 2 respondents related to anemia. Some symptoms of anemia experienced by adolescent girls such as 5L (weak, lethargic, tired, and lunglai). The researcher also conducted a conjunctival examination to 1 informant and had a pale conjunctival color. Based on the above problems, researchers are interested in conducting research on “The Effect of Giving Green Mung Beans Juice on Hemoglobin Levels in Adolescent Girls at SMAN 5 Palu”.

METHODS

This study used Pre-Experimental Design research design with Two Group Pretest-Posttest With Control Design. The place of research was conducted at SMAN 5 Palu This research was conducted on May 13-20, 2024. The population in this study was class 10 adolescent girls at SMAN 5 Palu totaling 30 people who were calculated using the Lemeshow formula. The sample in this study were female adolescents at SMAN 5 Palu who fit the inclusion and exclusion criteria that have been set. The sampling technique used purposive sampling.

Primary data were collected through interviews and distribution of observation sheets, while secondary data were obtained from various sources including related institutions. Data processing involved editing, coding, processing and cleaning. This study used univariate and bivariate data analysis techniques to determine the frequency distribution and impact of independent variables on the dependent. Narratives and tables were used to present the data. Research ethics were maintained by providing informed consent to respondents, maintaining anonymity, and guaranteeing the confidentiality of the information collected.

RESULTS

a. Results and Discussion

This research was conducted at SMA Negeri 5 Palu City which is located on Martadinata Street, Tondo Village, Mantikulore District, Palu City Regency, Central Sulawesi Province SMA Negeri 5 Palu City was established on June 20, 1991 with A Accreditation.

Students of SMA Negeri 5 Palu totaled 606 people consisting of class X numbered 250 people, class XI numbered 225 people and class XII numbered 131 people. There are 61 teachers at SMA Negeri 5 Palu. The extracurricular development activities of SMA Negeri 5 Palu students are academic and non-academic which consist of scouts, youth red cross (PMR), football, volleyball, table tennis and choir.

b. Research results

This study with Ethics Number: 000439/KEKP POLTEKKES KEMENKES PALU/2024, dated April 08, 2024 by the Ethics Commission of the Poltekkes Kemenkes Palu. The results of this study were obtained from primary data collection conducted in May 2024, then the researchers processed and presented the data that had been obtained using univariate analysis and bivariate analysis manually and computerized in the form of frequency distribution tables. Univariate and bivariate analysis was used to determine the effect of giving mung bean juice on hemoglobin levels in adolescent girls at SMA Negeri 5 Palu, Central Sulawesi as follows: Tables and descriptions are presented in univariate analysis of the effect of mung bean juice on increasing hemoglobin levels in adolescent girls at SMA Negeri 5 Palu. Table 1. Frequency Distribution of Respondents by Age in Adolescent Girls at SMAN 5 Palu 2024.

Characteristics (Year)		F	%
Age	15	11	36.7
	16	19	63.3
Class 10	Merdeka 3	16	53.3
	Merdeka 4	14	46.7
Total		30	100

Source: *Primary Data 2024*

From the explanation of table 1 shows that the most respondents are 16 years old with 19 respondents (63.3%) and the most independent class 3 respondents are 16 respondents (53.3%).

Tabel 2: The average value of Hemoglobin Levels in Adolescent Girls at SMAN 5 Palu in 2024.

Kadar HB Intervensi	Min	Max	Mean	SD
Pretest	10.10	14.90	11.60	1.386
Posttest	13.10	15.90	13.60	1.050
Kadar HB Kontrol				
Pretest	10.00	14.90	12.60	1.877
Posttest	10.00	13.90	12.20	1.176

Source: *Primary Data 2024*

The hemoglobin level before treatment was 11.60 g/dl, while after treatment it was 13.60 g/dl. This increase shows that there is a positive effect of the treatment given. This data can be clearly seen in the table above, which presents the changes in hemoglobin levels before and after treatment in detail. From the table, we can see a significant increase in hemoglobin levels, indicating the effectiveness of the treatment. The lowest hemoglobin level of the adolescent girls was 10.10 g/dl before receiving mung bean juice, and increased to 13.10 g/dl after the treatment. The highest pretest and posttest hemoglobin levels were 14.90 gr/dl and 15.90 gr/dl, respectively.

The data normality test must be carried out in accordance with the parameters to identify the Bivariate Analysis that performs the data normality test before the Bivariate Analysis itself.

Tabel 3: Analysis of the Effect of Giving Green Bean Juice on Increasing Hemoglobin Levels in Adolescent Girls at SMAN 5 Palu 2024

	Intervensi	Kontrol
	Pretest	Pretest
	Posttest	Posttest
Z	-3.606 ^b	-0.447 ^c
Asymp. Sig. (2-tailed)	0.000	0.665

Source: *Primary Data 2024*

It can be concluded that there is an effect on hemoglobin levels before and after being given mung bean juice based on Table 4.4 which displays the results of the Wilcoxon test in the intervention group. Z count is -3.606 and Asymp. sign. (2-tailed) of $0.000 < 0.05$ so that H_0 is rejected.

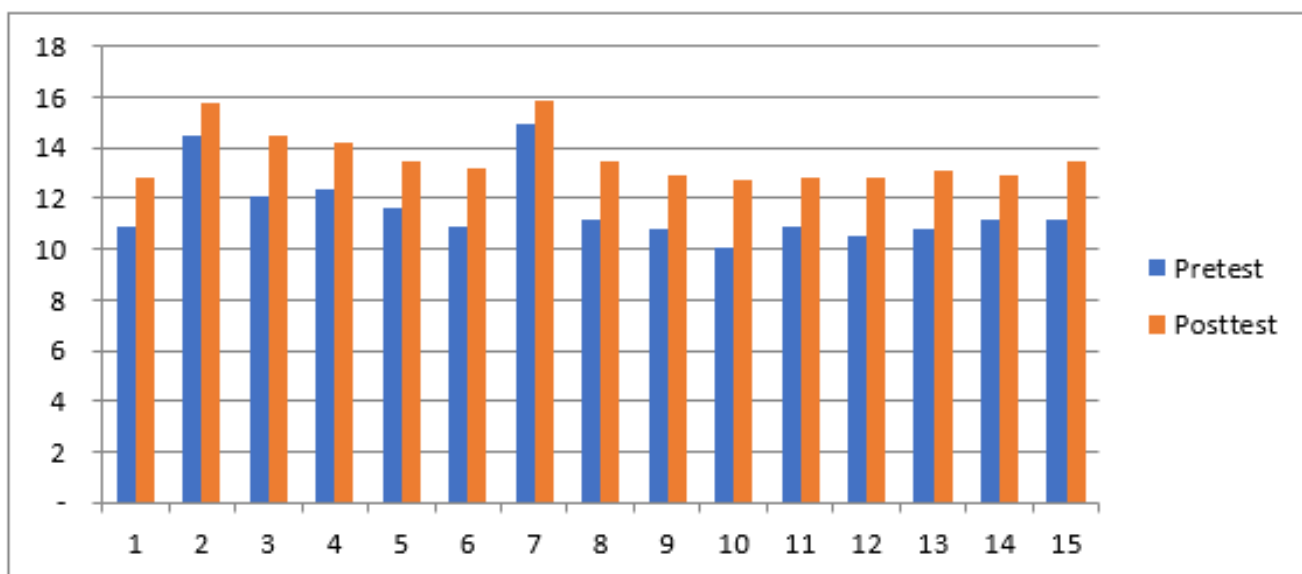


Figure 1 Graph of the increase in hemoglobin levels in the intervention group pretest posttest of adolescent girls at SMAN 5 Palu in 2024 given mung bean juice.

In Figure 1. shows the graphical data of the difference between pretest and posttest obtained an increase in hemoglobin in adolescent girls at SMAN 5 Palu in 2024.

Table of the increase in hemoglobin levels in the control group before and after adolescent girls at SMAN 5 Palu in 2024 were given mung bean juice.

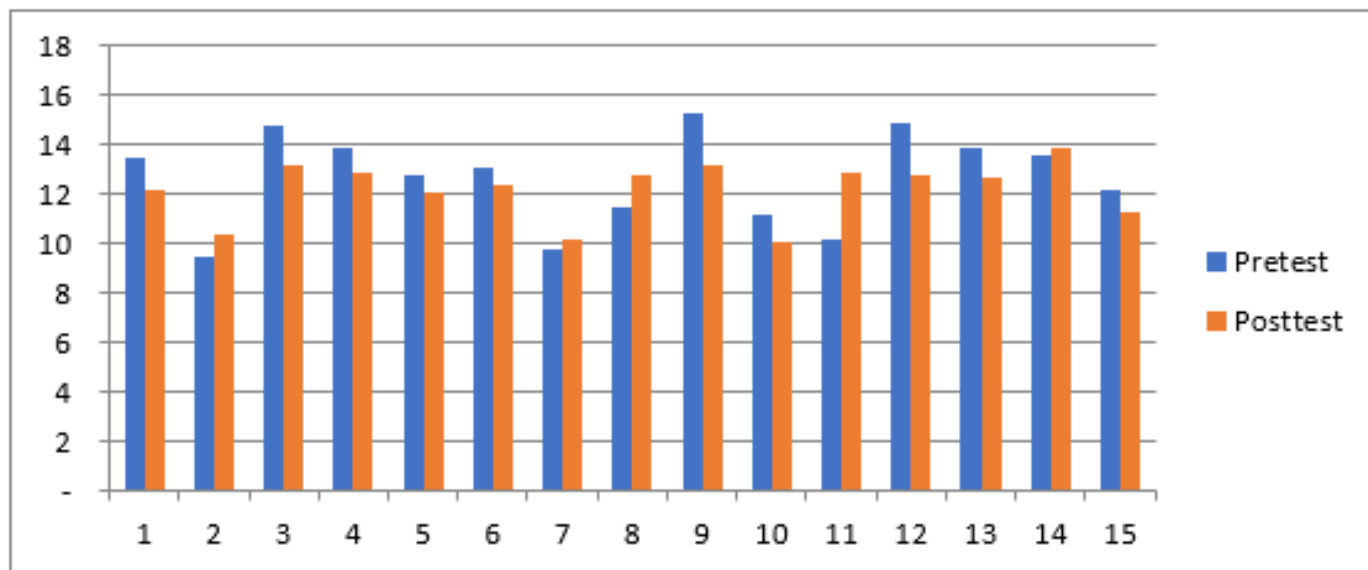


Figure 2 shows the graphical data of the difference between pretest and posttest in the control group, there was no increase in hemoglobin levels in adolescent girls at SMAN 5 Palu in 2024.

DISCUSSIONS

Prior to the administration of mung bean juice, the hemoglobin levels of the intervention group were mostly in the low hemoglobin category, according to the findings of the univariate analysis. Based on the researcher's suspicion, the low hemoglobin levels in the participants were caused by factors that affect adolescent hemoglobin levels. These factors include poor food intake, such as adolescents dieting to maintain an ideal body shape and being picky about food, as well as poor to unhealthy eating habits, plus rarely eating fruit and drinking more iced tea and coffee (Mayulu et al., 2023).

This is due to the fact that adolescent girls need more iron because they are in a period of growth and also experience menstruation every month. An imbalance in nutrient intake can also lead to teenage anemia. Due to the many dietary restrictions and limitations on food intake, adolescent girls are usually quite self-conscious about their body shape. Many iron reserves are released when malnutrition occurs. Anemia may develop faster in such a situation (Andriani et al., 2021). There is a difference in hemoglobin levels of adolescent girls before treatment, which is mostly low and after treatment increases. Mung beans have the benefit of providing additional iron intake which gives an increase in blood hemoglobin levels. The body needs vitamins and minerals found in mung beans (Astawan, 2009). Iron is one of the minerals contained in mung beans. Mung beans contain 6.7 mg of iron per 100 g. The main component of hemoglobin production is iron, a micromineral (Rositawaty, 2009).

Hemoglobin levels in adolescent girls after mung bean juice administration at SMAN 5 Palu.

Univariate analysis of hemoglobin levels showed that, both before and after the test of the intervention group, there was a significant difference in hemoglobin levels in the control group. Hemoglobin levels in adolescent girls at SMAN 5 Palu did not change, either before or after the test. The average hemoglobin level of the control group (posttest) was 10.26 g%, and after 10.98 g% according to Mariyona (2020). While the intervention group before being given mung bean juice was 10.24%; however, this number increased to 14.05% after the intervention group consumed mung bean juice.

The accordance Alviah's research in 2017, where hemoglobin levels in the 250 cc dose group before and after the administration of mung bean juice showed a p value of 0.0001 which indicates a variation in hemoglobin levels. The results of the 250 cc dose group showed an average increase in hemoglobin levels of 0.84 ± 0.02 gr/dl before and after the administration of mung bean juice. As shown by the difference in hemoglobin levels before and after the intervention, adolescents who previously had low hemoglobin levels experienced an increase after the intervention involving mung bean juice consumption. After the intervention, their hemoglobin levels were lower, indicating the problem of hemoglobin deficiency that could affect their health and their performance in various.

Adolescents whose bodies lack the complete nutritional value of mung beans can get their hemoglobin levels higher by drinking mung bean juice which helps hemopoiesis the process of forming leukocytes, erythrocytes, platelets, and red blood cells due to the high completeness level of mung beans. This helps avoid anemia. One of the food elements that can help people fight the effects of reduced hemoglobin is mung bean (*Phaseolus radiatus* L.), which contains all the nutrients needed in the development of red blood cells.

Effect of Green Mung Beans Juice on Increasing Hemoglobin Levels in Adolescent Girls

The Mung bean juice is proven to have an impact on the hemoglobin levels of adolescent girls at SMAN 5 Palu, this is shown from statistical tests that produce a p-value of $0.00 < \alpha < 0.05$. The Mung bean juice is proven to have an effect on increasing blood hemoglobin levels in young women, (Carolin et al, 2021) where $p=0.0001$. The blood levels of adolescent girls with anemia can be increased by mung bean juice. Samples whose Hb levels were low (<12 g/dl) had an average increase of 1.14 g/dl, according to research by Rahmadita (2019). According to Rahmadita (2019), the use of mung bean juice raised hemoglobin levels 64.1% higher than those who did not get it, and the results of the Linear Regression test presented that the juice had a significant effect ($p < 0.05$). Giving mung bean juice to adolescent girls with anemia is proven to increase their hemoglobin levels, according to Mariyona's 2019 research findings. Ike's 2019 research revealed that the incidence of anemia in adolescents is determined by age, and adolescents with anemia who drink mung bean juice can increase their Hb levels but reduce their Hb levels. According to Yuviska and Armiyanti (2019),

adolescent girls tend to pay attention to their body shape, which limits their iron intake from animal sources such as poultry, meat, eggs, and fish.

Research findings Per Faridah (2017), the average Hb levels in the intervention group differed by 0.53 according to the Wilcoxon test results. The average Hb levels of the Control Group differed from each other by 0.03 at the same time. With a p value of 0.005, it can be observed that the p value is smaller than α . Therefore, we can conclude that mung beans have an impact on increasing Hb levels in adolescent girls (Sulastri et al., 2021).

The Mung beans are a food with the chemicals needed to develop blood cells to counteract the effects of decreased hemoglobin. Due to its highly complete phytochemical composition, mung beans can help produce red blood cells and overcome anemia, and help hematopoiesis. Mung beans with mineral and vitamin content where minerals such as potassium, phosphorus, calcium, iron, and salt are found in mung beans (Ahmad *et al.*, 2019).

CONCLUSION

Based on the study, adolescent girls at SMA Negeri 5 Palu who were given mung bean juice had significantly higher hemoglobin levels. Due to factors such as unbalanced food intake, most of the adolescents had low hemoglobin levels before the intervention. After mung bean juice was administered, hemoglobin levels increased significantly, suggesting that mung bean juice can be a beneficial supplemental source of iron for adolescent girls. Adolescent girls who initially had low hemoglobin levels showed a significant increase in hemoglobin levels after regularly consuming mung bean juice. The Wilcoxon test confirmed that mung bean juice had a beneficial effect in increasing hemoglobin levels, with a p value of $0.00 < \alpha 0.05$. This finding suggests that the observed variation is a real consequence of the mung bean juice intervention and not a coincidence. In addition, supporting these results were the univariate and bivariate analyses, both of which showed a statistically significant correlation between drinking mung bean juice and increased hemoglobin levels. Individual hemoglobin levels varied before and after the intervention, according to the univariate analysis, while the bivariate analysis showed a large correlation between the variable of mung bean juice consumption and higher hemoglobin levels. These results validate that mung bean juice can be a useful treatment to increase hemoglobin levels in adolescent girls, particularly in those with iron deficiency.

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Effectiveness of Garlic Extract (*Allium sativum L.*) as a Diuretic in Male Mice (*Mus musculus*) Swiss Webster Strains

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ABSTRACT

Background: Diuretics are drugs that can increase the rate of urine formation. One of the plants that is efficacious as a diuretic is garlic (*Allium sativum L.*) containing flavonoids and saponins. Flavonoids work by inhibiting the reabsorption of Na⁺, K⁺, and Cl⁻ so that there is an increase in sodium and water in the renal tubules, saponins have the effect of lowering surface tension, stimulating the kidneys to work more actively.

Method: The method used is experimental, pre-experimental, this research was conducted at home. The research subjects were male mice (*Mus musculus*) which were divided into 5 (five) treatment groups randomly, namely the negative control group (Cmc Na 1%), the positive control group (Furosamide), the garlic extract group with a dose of 100 mg/kgbb, the garlic extract group with a dose of 150 mg/kgbb, the garlic extract group with a dose of 180 mg/kgbb. The data obtained were then analyzed statistically using SPSS version 20.0. with the Kolmogorov Smirnov normality test and *One Way Anova*.

Results: The results of the study showed that garlic (*Allium sativum L.*) contains flavonoids and saponins which have diuretic effects. The average largest urine volume excreted by male mice negative control Cmc Na 1% 0.6ml, positive control furosamide 1.4ml, garlic dose 100mg/kgbb 2.2ml, garlic dose 150mg/kgbb 2.4ml, garlic dose 180mg/kgbb 2.7ml.

Conclusion: Garlic has a diuretic effect. The most effective dose of garlic as a diuretic is 180mg/kgbb garlic with an average urine volume produced of 2.7ml.

Keywords: Diuretic, Garlic (*Allium sativum L.*), Male mice

INTRODUCTION

Diuretics are drugs that can increase the rate of urine formation. The main function is to mobilize edema fluid, namely changing the fluid balance in such a way that the fluid volume returns to normal.(1). Diuretics are often used in patients with hypertension, heart failure, nephrotic diabetes insipidus, and glaucoma.(2).

Most diuretic drugs are synthetic drugs that have drawbacks or side effects if consumed in the long term, including electrolyte fluid imbalance such as hypokalemia, hyperuricemia,

hyperglycemia, and hyperlipidemia and are indicated for patients with allergic interstitial nephritis which causes kidney failure.(3). This has caused traditional medicine to now be considered more because it is believed to be less risky than synthetic drugs.

In Indonesia, the high utilization of medicinal plants by the local community to maintain physical health and traditional medicine is obtained from the knowledge and experience of the community and is passed down from generation to generation so that there are still many medicinal plants that have not been scientifically proven. Traditional medicine must continue to be explored, researched, and developed so that it can be used more widely by the community because it is a cultural heritage of the nation that needs to be preserved.(4).

One of the scientifically proven herbal medicines to have diuretic activity is the Garlic plant (*Allium sativum* L.). Garlic is a tuber with the Latin name *Allium sativum* L. included in the *Amaryllis* plant family (*Amaryllidaceae*), and is related to leeks, shallots, onions, onion flowers, onion stems, spring onions.(5).

According to research(6)entitled Effectiveness of Ethanol Extract Suspension of Garlic Bulbs (*Allium sativum* L.) as a Diuretic in Male Rats (*Rattuss norvegicus*) states that garlic plants (*Amillum sativum* L.) have been proven to be effective as a diuretic with the best activity effect at a dose of 45mg/kgBW. According to the study(7)entitled phytochemical Screening And Diuretic Activity Of *Allium sativum* Steroidal And Triterpenoid Saponin Fraction states that garlic has a diuretic effect. Garlic (*Allium sativum* L.) contains volatile oil in the form of sulfur compounds such as (allicin, allisatin, alinase, allypropyl disulphide, diallyl trisulphide/DATS), glucosinolate, enzymes, vitamins In addition, there are flavonoids and alakoids in garlic, where these contents are efficacious as diuretics(8).

Based on the results of the phytochemical screening test, it was shown that garlic contains flavonoids, alkaloids and tannins. Flavonoid compounds have a diuretic effect by inhibiting the reabsorption of Na⁺, K⁺ and Cl⁻, thereby causing an increase in sodium and water in the renal tubules.(6). Alkaloids work directly on the tubules by increasing the excretion of Na⁺ and Cl⁻, saponins reduce surface tension, stimulate the kidneys to work more actively, and increase the absorption of diuretics (especially the salt form in urine) thus, the alkaloid, flavonoid, and saponin content work synergistically to produce a diuretic effect.(6). Synthetic drugs that also play a role in diuretic treatment are Furosemide. Furosemide works on the thick segment of the ascending part of the loop of Henle by inhibiting the Na⁺, K⁺, Cl⁻-cotransporter (called NKCC2) on the luminal membrane of the tubule. The work of NKCC2 reabsorbs the three electrolytes, sodium, potassium, and chloride. After reabsorption via NKCC2, the level of K⁺ ions is excessive in the cell so that potassium ions diffuse back into the lumen of the tubule. This triggers the reabsorption of cations (Mg²⁺, Ca²⁺) into the intracellular fluid via the paracellular pathway. As a result, the administration of Furosemide will inhibit the reabsorption of sodium, potassium, and chloride. In addition to increasing NaCl, this drug also increases the concentration of solutes delivered to the distal part of the nephron and decreases the osmolarity of the renal medulla interstitium.

The decrease in osmolarity of the renal medulla causes a decrease in fluid reabsorption in the collecting ducts and triggers a decrease in water absorption from the descending limb of Henle. In the end, not only does the excretion of these ions increase, but the excretion of water in the urine also increases.(9). The test animals used in this study were mice because as

many as 40% of studies use mice as laboratory models.(10). Mice are often used in laboratory research related to the fields of physiology, pharmacology, toxicology, pathology, histopathology and psychiatry. Mice are widely used as laboratory animals because they have advantages such as a relatively short life cycle, a large number of offspring per birth, easy to handle, have reproductive characteristics similar to mammals, anatomical, physiological and genetic structures similar to humans. The mice used were male mice because they do not have the hormone estrogen, if any, the amount is relatively small and the hormonal conditions in male mice are more stable when compared to female mice because female mice experience hormonal changes during estrus, lactation, and pregnancy where these conditions can affect the psychological condition of the test animals. The stress level in female mice is higher compared to male mice which may interfere with research. Based on the description above, researchers are interested in conducting research on the Effectiveness of Garlic Extract (*Allium sativum* L.) on Male Mice (*Mus musculus*).

METHOD

The type of research used is experimental with a Posttest Control Group Design research design. treatment group. The control group consists of positive and negative controls, while the treatment group consists of treatments given extracts at doses of 100mg/kgbb, 150mg/kgbb, 180mg/kgbb. Each group was repeated five times.

This research was conducted from November to June 2022. Plant determination was carried out at the Biology Laboratory of the Faculty of Agriculture, Fisheries, and Biology, Bangka Belitung University. Phytochemical tests were carried out at the Chemistry Laboratory, Faculty of Agriculture, Fisheries and Biology, Bangka Belitung University and the treatment of experimental animals was carried out at the Stania Street No. 162 house. Taman Bunga Village, Gerunggang District. Bukit Baru Pangkalpinang.

Data processing starts from the urine volume data of the test animals obtained after being given treatment based on the results of the cumulative urine volume analysis of its normal distribution with the Kolmogorov Smirnov test and homogeneity variation if the results are normal and homogeneous, continued with the One Way Anova test. If the normality test and homogeneity test do not meet the requirements, a non-parametric test (Kruskal Wallis) is carried out using SPSS version 20.0.

RESULTS

A. Plant Determination

Garlic was first identified at the Herbarium Bangka Belitungense, Biology Department, Bangka Belitung University. The purpose of identification is to determine the truth of the plants used so as to avoid errors in collecting raw materials. The identification results showed that the test plant was indeed garlic (*Allium sativum* L.). A statement of the results of plant identification/determination can be seen in attachment 2. The taxonomy of garlic according to Samadi (2000) is classified as follows:

Kingdom	: Plantae
Subkingdom	: Viridiplantae
Division	: Angiospermae
Class	: Monocotyledoneae
Order	: Asparagus
Family	: Amaryllidoceae
Genus	: Allium
Species	: Allium sativum

B. Making Simple Drugs

Simplisia is a natural material used as a medicine that has not undergone any processing whatsoever and is generally in the form of dried material. The simplisia used in this study is a herbal simplisia. Herbal simplisia is a simplisia in the form of whole plants, plant parts or plant excrescences.(11). Raw material for garlic samples (*Allium sativum* L.) was purchased at the Pangkalpinang morning market in May 2022 with a uniform size of 3 kg. Garlic (*Allium sativum* L.) that had been purchased was then cleaned of dirt, washed with running water until clean. The aim is to prevent dirt, foreign materials, other parts of the plant that are not used and damaged parts of the plant are separated from the collected plants

Garlic (*Allium sativum* L.) that has been cleaned, then dried under direct sunlight. The drying process is useful for obtaining simple drugs that are not easily damaged and reducing the water content in the sample and preventing a decrease in the quality of simple drugs, because it can affect the process of withdrawing active substances in the sample Then the garlic (*Allium sativum* L.) is chopped using a knife and then ground using a blender until it becomes a powder. The grinding is done to optimize the process of extracting compounds during extraction. The smaller the particle size, the larger the surface area so that the solvent can penetrate more effectively

C. Extraction Process

Extraction is a technique for taking active substances from natural materials using appropriate solvents. This process aims to extract all chemical components contained in the herbal medicine. The extraction used in this study is maceration. Maceration is the process of extracting herbal medicine using solvents with several stirrings at room temperature.(11).

The maceration method is one of the most widely used extraction techniques because it has many advantages, namely the tools used are simple, the operational costs are relatively low, and without heating so that it does not damage the chemical content in the

herbal medicine that is not resistant to heat. In this study, 500 grams of garlic herbal powder (*Allium sativum* L.) was taken for the maceration process. The herbal powder was macerated for 5 days using 5000 ml of 96% ethanol solvent. Then several stirrings were carried out at room temperature, then filtered. Stirring was carried out because it was necessary to even out the concentration of the solution outside the herbal powder grains so that with this stirring it was maintained by the smallest possible degree of difference in concentration between the solution in the cell and the solution outside the cell.(12). The use of 96% ethanol in this study is because 96% ethanol is a universal solvent that can attract polar and non-polar chemical compounds. After a 5-day maceration process, the maceration results were filtered and then the pulp was squeezed to obtain macerate. Macerate is a solution obtained from the maceration process(13).

The macerate results obtained were 1200 ml, then the macerate results were evaporated using a rotary vacuum evaporator at a temperature of 70° C with a rotation of 80rpm to obtain a thick extract. This aims to accelerate the evaporation of the solvent below its boiling point so that the compounds contained in the solvent are not damaged by high temperatures and do not evaporate. After obtaining the thick extract, it was then weighed and the results obtained were 313 grams of thick extract presented in table 2.

Table 2. Yield Results

Amount of garlic (<i>Allium sativum</i> L) simplex (g)	Amount of solvent (ml)	Amount of liquid (ml)	Amount of extract concentrated (g)	Amount of Extract Remedy (%)
500 grams	5000	1200	313	62.6

Source: processed primary data

In Karina's (2013) research, the simplicia obtained from the extraction process of 500 grams with 96% ethanol solvent at a ratio of 1:10 for five days obtained a yield of 31.66%. The yield obtained was smaller because there were influencing factors, namely the temperature used for the extraction process, the length of extraction time, the presence of solvent circulation and the part of the simplicia (Kurinia, 2021).

D. Phytochemical Screening

Phytochemical screening was conducted on Friday, June 13, 2020 at the Chemistry Laboratory of Bangka Belitung University. The results of phytochemical screening of garlic (*Allium sativum* L.) extract are presented in Table 3.

Table 3. Results of Phytochemical Screening Test of Garlic Extract

Class of compounds	Results	Information
Alkaloid		No white precipitate is formed
Flavonoids	+	Orange color formed
Saponins	+	Formation of foam

1. Identification of Alkaloids

Identification of alkaloids was carried out using Mayer's reagent. The results of alkaloid identification in this study obtained a clear colored liquid and there was no white sediment in the Mayer's reagent, so the test result was negative. If the alkaloid is positive, it will be indicated by the formation of a white sediment in the Mayer's reagent.



(Personal Doc)

Figure 1 Results of Alkaloid Phytochemical Screening 2022

2. Identification of Flavonoids

The results of the Flavanoid test in this study obtained positive results because there was a change in the color of the sample from yellow to orange red in the sample with the addition of Mg powder and HCl.



(Personal Doc)

Figure 2 Flavanoid Phytochemical Screening Test Results

3. Identification of Saponins

In the saponin test, a positive result was obtained, namely a yellow liquid with foam on top as high as 6 cm which lasted for 10 minutes after the sample was shaken vertically in a test tube for 10 seconds.



(Personal Doc)

Figure 3 Results of Phytochemical Screening Test of Saponins

E. Diuretic Effect Test

The test animals used in this study were 25 Swiss Webster white mice aged 2-3 months with a weight of 20-30 grams. The test animals were then randomly divided into 5 test groups including a negative control group of 1% cmc na, a positive control group of furosemide, a group of garlic extract dose of 100mg/kgbb, a group of garlic extract dose of 150mg/kgbb, a group of extract dose of 180mg/kgbb. Grouping was carried out with the number of mice in each group, namely 5 mice, this is in accordance with the WHO guidelines in 2000 in the Research Guidelines for Evaluation of the Safety and Efficacy of Herbal Medicine, where for research using rodents, each treatment group must consist of at least 5 animals. The test animals were acclimated for 1 week before testing. This is in accordance with the acclimation period required by the USDA in the Guideline Stabilization/Acclimation Times for Research Animals, which is a minimum of 7 days. The acclimation of these test animals aims to adjust the environmental conditions of the test that meet the requirements in the study. Mice were observed for 4 hours and counted every 30 minutes. There were five treatment groups, namely positive control furosamide, negative control cmc na 1%, garlic extract doses of 100mg/kgbb, 150mg/kgbb, and 180mg/kgbb, each treatment consisting of 5 mice was repeated 5 times. The calculation of the dose for each test animal refers to the study(14);(15). Observations were made every 30 minutes for 4 hours to see the results of the volume of urine excreted so that the average urine volume was obtained as follows.

Table 4 Treatment Result Data

ANOVA					
volume					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	22.364	7	3.195	48.133	.000
Within Groups	2.124	32	.066		
Total	24.488	39			

ANOVA					
volume					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	22.364	7	3.195	48.133	.000
Within Groups	2.124	32	.066		
Total	24.488	39			

The data obtained in the normality test (Kolmogorov smirnov) and homogeneity to assess the distribution of data from the test results obtained. Based on the test carried out, a significance value of > 0.05 was obtained, which means that it is normally distributed and homogeneous (details of the test results are attached in appendices 9 and 10). Furthermore, the data was analyzed using the One Way Anova test to compare the average variance and determine the differences between the treatment groups based on the results of the analysis with the One Way Anova test, a significance value of 0.031 (<0.05) was obtained, which means that there is a statistically significant difference in the average urine volume produced by each test treatment. From the results of this study, it is known that garlic extract has diuretic activity against Swiss Webster mice at a dose that shows the highest diuretic effect at a test dose of 180 mg / kgbb.

One of the parameters used to determine the effects of diuretic compounds on urine is urine volume. Diuretic compounds can cause the diuretic process, according to research states that the diuretic process occurs through the addition of urine volume produced. This can occur because the main effect of diuretics in general is to reduce water reabsorption in the renal tubules. Based on the measurement of urine volume for 4 hours, the results obtained showed an increase in the average cumulative urine volume during the observation period.

In the negative control of Cmc Na 1% urine output started at minute 120 until the observation at minute 240, the volume of urine collected was only 0.4 ml. This amount is lower than the average volume of urine collected in the treatment group with the lowest dose of 100 mg/kgbb. In the positive control of Furosamide dose 40 mg, the volume of urine output started at minute 90 until the observation at minute 240, the volume of urine collected was only 1.4 ml. This amount is lower than the volume of urine collected in the garlic extract treatment group with the lowest dose (100 mg/kgbb).

In the treatment group, urine output began at minute 30. Based on the output produced, the higher the dose, the higher the average volume of urine produced. This is thought to be due to the phytochemical content in garlic extract, namely flavonoids and saponins. Flavonoids themselves work by inhibiting co-transport and reducing the reabsorption of Na^+ , K^+ , Cl^- and an increase in electrolytes in the tubules so that diuretics occur. Saponins are able to reduce surface tension, stimulate the kidneys to work more actively and increase the absorption of diuretics(6).

In the negative control, Cmc Na 1% produced the lowest urine volume because the negative control did not contain active substances that could increase urine volume. In the positive control, Furosamide produced a greater urine volume where furosamide is a strong diuretic that works on the Henle loop. Furosemide is a drug to reduce excess fluid in the body (edema). Its mechanism of action is to inhibit the reabsorption of sodium by renal tubule cells, increase the excretion of water, sodium, chloride, potassium, and does not affect normal blood pressure.(16).

In research conducted by (7) showed that garlic extract (*Allium sativum* L.) gave a diuretic effect on white mice with the highest urine volume at a dose of 20mg/kg bb of 1.13ml. According to the study (17) Garlic juice (*Allium sativum* L.) has a diuretic effect on mice with the highest urine volume at a concentration of 80% of 1.05 ml. This strengthens the results of this study which show that garlic has a diuretic effect. Furthermore, further research is needed, the right formulation and dosage for the use of Garlic extract as a natural medicine for humans.

CONCLUSION

Garlic extract (*Allium sativum* L.) has been proven to have a diuretic effect on male mice (*Mus musculus*). Data analysis showed that there was a significant difference in the average urine volume in each test treatment. The dose of Garlic extract (*Allium sativum* L.) that gave the highest diuretic effect was a dose of 180mg/kgbb with an average urine volume of 2.7ml in 240 minutes.

AUTHOR'S CONTRIBUTION STATEMENT

1. Muhamad Seto Sudirman
 - Conceived the research concept and defined the objectives of the study.
 - Was responsible for the methodology design and supervised the overall research process.
 - Drafted the initial manuscript and made substantial revisions.
2. Feby Anggraeni
 - Collected data and performed statistical analyses.
 - Assisted in the interpretation of research findings.
 - Provided critical feedback on manuscript revisions to enhance its quality.

CONFLICT OF INTEREST

1. **Financial Interests:**

The authors affirm that there are no financial interests or affiliations with any organizations or entities that could influence the outcomes or interpretations of this research. All funding sources supporting this work are transparently acknowledged within the manuscript.
2. **Institutional or Personal Relationships:**

The authors confirm that there are no personal or professional relationships with individuals or entities that could be perceived as a conflict of interest.
3. **Research Integrity:**

The study was conducted with complete independence and objectivity. The authors ensured that all methods, data analyses, and interpretations were carried out with academic rigor, adhering strictly to ethical guidelines.
4. **Transparency in Publication:**

Any potential competing interests, whether financial, personal, or institutional, have been disclosed and are not expected to influence the credibility or neutrality of the study's findings.

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