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Implementation of Lying Turning During Phototherapy to Reduce Bilirubin Levels in Hyperbilirubinemia Babies

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Abstract

Neonatal jaundice is a condition that often occurs in newborn babies. Hyperbilirubin occurs due to high levels of bilirubin in the blood which is marked yellow on the sclera and skin. Bilirubin levels that are too high can cause kernicterus if not treated immediately. To reduce bilirubin levels, phototherapy is indicated. The benefit of applying bed transfer therapy is as a way to reduce bilirubin levels evenly in neonates when phototherapy is carried out. According to the United Nations Children's Fund (UNICEF), there are 1.8% of infant deaths caused by hyperbilirubin in all perinatal cases that occur in the world. The incidence of infant hyperbilirubinemia in Indonesia is around 50% of term babies whose skin, mucosa, and facial changes become yellowish (jaundice). In preterm babies, the incidence reaches 75%. Implement bed shifting during phototherapy to determine the effectiveness of reducing bilirubin levels in hyperbilirubinemia patients. This research is an analytical descriptive research with a case study approach. The subjects of this study were 2 hyperbilirubin patients aged 18 days and 6 days. his research was conducted in June 2024 at the Hospital. Data was obtained through interviews, observation, physical examination and laboratory results of bilirubin levels. Data is presented in the form of narrative text and research instrument sheet tables. This research has gone through an ethical feasibility test. The results of the case study research using bed shifting during phototherapy resulted in a reduction in bilirubin levels in both subjects. The results of the decrease in the first patient were total bilirubin 13.36 mg/dl, direct bilirubin 0.69 mgdl, indirect bilirubin 12.67 mg/dl, the second patient total bilirubin 9.60 mg/dl, direct bilirubin 1.09 mg/dl, Indirect bilirubin 8.51 after being given bed rest during phototherapy for 2 days, the first patient had total bilirubin 10.06 mg/dl, direct bilirubin 0.37 mg/dl, indirect bilirubin 9.67 mg/dl, second patient total bilirubin 8.89 mg/dl, bilirubin direct 0.18 mg/dl, indirect bilirubin 8.71mg/dl. Patients with hyperbilirubinemia are advised to provide adequate breast milk intake and expose themselves to sunlight in the morning between 07.00 – 09.00 for 15 minutes.

Keywords: bed transfer, bilirubin levels, neonatal jaundice, phototherapy

Introduction

IMR (Infant Mortality Rate) refers to the number of babies who die in the phase between birth until the baby has not reached 1 year of age per 1,000 live births. The main problem causing death in infants and toddlers is the neonatal period (newborn babies aged 0-28 days). Most newborn babies experience jaundice in the first week of life.1 According to the World Health Organization (WHO) in Maria (2017) explained that in 2014 the infant mortality rate (IMR) in the world was still quite high, namely 34 babies were estimated to die out of 100,000 births. The percentage of jaundice that occurs is 3% (3.6 million) out of 120 million births, and of these 3.6 million jaundice incidents, 1 million babies die.2 According to the United Nations Children's Fund (UNICEF), there are 1.8% of infant deaths caused by hyperbilirubin from all perinatal cases that occur in the world.3

Based on Indonesia's health profile in 2016, the results of the 2017 National Socio-Economic Survey (SUSENAS) showed that the Infant Mortality Rate (IMR) was 22.73 per 1000 live births, which means that it has reached the 2015 MDGs target of 23 per 1000 live births. Based on the 2017 Demographic Survey (SDKI), IMR has decreased to 24 per 1000 live births. In Indonesia, of all births, 575 died as newborns (under 1 month of age). This shows that there has been a decrease in the incidence of hyperbilirubinemia in babies in Indonesia. The incidence of infant hyperbilirubinemia in Indonesia is around 50% of full-term babies whose skin, mucosa and facial changes become yellowish (jaundice). In pre-term babies the incidence reaches 75%.4

In the Health Profile of Central Java Province, 2015, the Infant Mortality Rate is still high at 10 per 1000 live births. There was a decrease but it was not significant compared

to the IMR in 2014, namely 10.08 per 1000 live births. The causes of infant death in Central Java in 2015 were respiratory disorders 37%, prematurity 34%, sepsis 12%, hypothermia 7%, jaundice 6%, post-maturity 3%, congenital abnormalities 1%.5

The results of a preliminary study of bilirubin cases that underwent phototherapy were carried out in June 2024, there is data from 2021 of 82 cases, in 2022 there were 85 cases and in 2023 there were 99 cases. These results show that cases of bilirubin at RSI PKU Muhammadiyah increase every year.

Hyperbilirubinemia or neonatal jaundice is a condition that often occurs in newborns, especially in babies with low body weight (less than 2,500 grams). Hyperbilirubinemia occurs due to high levels of bilirubin in the blood which is characterized by a yellow color on the sclera and skin. Bilirubin is the result of the breakdown of hemoglobin due to damaged red blood cells. Hyperbilirubin can occur physiologically and pathologically. Physiologically, babies experiencing jaundice on the face and neck, or in degrees one and two (12mg/dl), can be overcome by providing adequate breast milk intake and morning sunlight between 07.00 – 09.00 for 15 minutes. Pathologically the baby will experience jaundice all over the body or grade three to 5 (>12mg/dl), which is indicated for phototherapy. If the bilirubin level is >20mg/dl, then the baby will be indicated for exchange transfusion.4

Phototherapy is the main therapy for hyperbilirubinemia without causing or with minimal side effects, but you must remain alert to undesirable effects. The length of time required for phototherapy also affects the quality of the baby's health care. The effectiveness and efficiency of phototherapy depends on the surface area exposed to phototherapy, the wavelength and intensity of the light provided.6

According to Kosim 2010, phototherapy is the main choice for treating

hyperbilirubinemia in babies. The aim is to reduce abnormal blood bilirubin levels and reduce jaundice in the baby's body. For maximum results, the baby's entire body should be exposed to light (irradiance) by lying down, namely Change positions on the right side, left side, supine and prone every 3 hours during phototherapy. This bed transfer aims to increase the process of evenly distributing light to levels of bilirubin that is not soluble in water (indirect) into bilirubin that is soluble in water (direct), so that it can be excreted through urine.7

According to Widagdo 2012, the role of nurses as providers of nursing care, especially for babies with hyperbilirubinemia, is to provide nursing actions, namely preventive, promotive, curative and rehabilitative. Health workers are required to have the knowledge and skills to be able to provide optimal care for babies by providing optimal positions during phototherapy and monitoring bilirubin levels so that the toxic impact of hyperbilirubinemia can be avoided .8

Based on research conducted by Shinta (2015), of the 40 respondents who underwent intervention in the right tilt, left tilt, supine and prone positions with the lowest bilirubin levels of 12.28 mg/dl and the highest bilirubin of 21.45 mg/dl, while 20 respondents who The supine position was carried out as a control group with the lowest bilirubin level of 12.57 mg/dl and the highest bilirubin value of 20.54 mg/dl. It was found that in the intervention group the average bilirubin level after phototherapy was 44.74 hours with a change in position on the right side, sideways left, supine and prone is 7.93 mg/dl. The average length of time babies underwent phototherapy in the control group was 64.04 hours while in the intervention group it was 44.74 hours, this shows that hyperbilirubinemia babies in the control group had longer phototherapy times than hyperbilirubinemia babies in the intervention group, so it was concluded that Changing

position or changing lying down has an effect on reducing bilirubin levels in hyperbilirubinemic babies undergoing phototherapy9. Based on research conducted by Wikanthiningtyas (2016), there were 25 neonates who experienced neonatal jaundice. It was found that the bilirubin level before phototherapy was 18.39 mg/dl, while the average bilirubin level after phototherapy for 24 hours was carried out by lying down on one side. right, left side, supine and prone, namely 15.22 mg/dl. So it was concluded that there was an effect of bed transfer during phototherapy on reducing bilirubin levels in neonatal jaundice in the Neonatal HCU Room at Dr. RSUD. Moewadi10. Another study conducted by Mulyati, Iswati and Wirasti (2019) found 3 neonates who experienced hyperbilirubinemia. The nursing action given was bed transfer (changing positions on the right side, left side and prone) every 3 hours during 18 hours of phototherapy, each patient had an average decrease in total bilirubin levels of 9.55 mg/dl, direct bilirubin 0.15 mg/dl and indirect bilirubin 9.40 mg/dl. So it can be concluded that the three neonates experienced a decrease in bilirubin levels in the Melati Room at Prof. Hospital. Dr. Margono Soekarjo Purwokerto.8

Based on the phenomena that have been mentioned, researchers are interested in conducting research entitled "Implementation of Lying Transfer During Phototherapy to Reduce Bilirubin Levels in Hyperbilirubinemic Babies".

Method

The method must be arranged as follows:

1. Research Design

   The research design is a case study. A case study is research conducted on a case with a detailed, sharp, and in-depth process.

2. Setup and Sample

   The research subjects were 2 infant patients with moderate hyperbilirubinemia who underwent phototherapy intervention with bed rest to reduce bilirubin levels with

the following criteria.:

1) Inculcation Criteria

a.Hyperbilirubinemia babies undergoing phototherapy

b.Guardians/Parents are willing to be research subjects.

2) Exclusion Criteria

The exclusion criteria in this study were babies who had complications of neonatal jaundice.

3. Measurement and Data Collection

The research instruments used were an observation sheet for lying down during phototherapy and an observation sheet for monitoring bilirubin levels after phototherapy. The research was carried out by implementing bed shifting during phototherapy every hour in shifts for 2 days.

4. Data Analysis

Data analysis is carried out since research in the field, when data is collected until all data is collected. The implementation of data analysis is carried out by presenting facts, then comparing them with existing theories and pouring them into discussion opinions. The sequence in data analysis includes data collection, data reduction, data copying, and conclusions.

Results

Table 1
Observation Sheet For Lying Down During Phototherapy (Day 1)

Patient 1			Patient 2		
Day, Date	Time	Position change indicator	Day, Date	Time	Position change indicator
Thursday, June 6, 2024	8.00 a.m	Right Tilt	Friday, June 27, 2024	7.00 am	Right Tilt
	9.00 a.m	Leaning Left		8.00 a.m	Leaning Left
	10.00 a.m	Prone		9.00 a.m	Prone
	10.30 a.m	Supine		9.20 a.m	Supine
	12.30 a.m	Right Tilt		11.20 a.m	Right Tilt
	1.30 p.m	Leaning Left		12.20 p.m	Leaning Left
	2.30 p.m	Prone		1.20 p.m	Prone
	3.00 p.m	Supine		1.40 p.m	Supine

Table 2
Observation Sheet For Lying Down During Phototherapy (Day 2)

Patient 1			Patient 2		
Day, Date	Time	Position change indicator	Day, Date	Time	Position change indicator
Friday, June 7, 2024	7.45 a.m	Right Tilt	Saturday, June 8, 2024	7.30 am	Right Tilt
	8.45 a.m	Leaning Left		8.30 a.m	Leaning Left
	9.45 a.m	Prone		9.30 a.m	Prone
	10.15 a.m	Supine		9.50 a.m	Supine
	12.15 a.m	Right Tilt			
	1.15 p.m	Leaning Left			
	2.15 p.m	Prone			
	2.45 p.m	Supine			

Phototherapy for Patient 1 starts on June 5 2024 at 5.00 p.m until June 7 2024 at 5.00 p.m

Phototherapy for Patient 2 starts on June 7 2024 at 00.30 a.m. until June 8 2024 at 12 a.m. .

Table 3
Bilirubin Level Monitoring Observation Sheet
Patient 1 By. N
The results of the examination before phototherapy were carried out on June 5 2024
The results of the examination after phototherapy were carried out on June 11 2024

Inspection	Results Before phototherapy	Results After Phototherapy	Normal Value
Total Bilirubin	13.36 mg/dl	10.06 mg/dl	0 – 1
Direct Bilirubin	0.69 mg/dl	0.37 mg/dl	0 – 0.25
Indirect Bilirubin	12.67 mg/dl	9.69 mg/dl	0 – 0.60

Table 4
Bilirubin Level Monitoring Observation Sheet
Patient 2 By. Mrs. F
The results of the examination before phototherapy were carried out on June 16 2024
The results of the examination after phototherapy were carried out on June 13 2024

Inspection	Results Before phototherapy	Results After Phototherapy	Normal Value
Total Bilirubin	9.60 mg/dl	8.89 mg/dl	0 – 1
Direct Bilirubin	1.09 mg/dl	0.18 mg/dl	0 – 0.25
Indirect Bilirubin	8.51 mg/dl	8.71 mg/dl	0 – 0.60

Discussion

The discussion should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

The results of the assessment of patient 1 which was carried out for 2 days in the Perinatology Room showed that the baby had jaundice in the sclera and skin with an increase in total bilirubin levels of 13.36 mg/dl, direct bilirubin 0.69 and indirect

bilirubin 12.67 mg/dl. The assessment of patient 2, which was also carried out for 2 days in the Perinatology Room, showed that the 6 day old baby had yellowness of the sclera and skin with an increase in total bilirubin levels of 9.60 mg/dl, direct bilirubin of 1.09 mg/dl and indirect bilirubin of 8.51 mg/dl based on these data shows that the hyperbilirubinemia that occurs in these babies is physiological jaundice.

In patient 1 yellow skin appeared on the 15th day with the etiology of inadequate breast milk accompanied by a comorbidity, namely bronchopneumonia, while in patient 2 yellow skin appeared on the 4th day with the etiology of premature birth, namely birth at 34 weeks of age with a BBL of 1250 grams. and inadequate breast milk. Based on this, patient 2 experienced the most increase in bilirubin due to weak organs and immature liver function.

There were differences in the results of the studies obtained, namely the level of phototherapy given to each baby. By. N received phototherapy therapy for 48 hours, By Mrs F received phototherapy therapy for 24 hours. The duration of phototherapy is determined based on the neonate's bilirubin levels and the phototherapy time is carried out for 24 hours for changes in bilirubin levels and is repeated until the bilirubin levels return to normal.7 The provision of phototherapy can be combined with the implementation of nursing in the form of bed transfer to optimize the reduction in bilirubin levels in the blood. Lying down or changing position is the act of changing the position of a patient undergoing phototherapy to help the process of breaking down bilirubin in the liver. Changing lying down or changing the patient's position is carried out by tilting to the right, tilting to the left, prone and supine. Changing lying down or changing position aims to increase the process of conjugating indirect bilirubin into water-soluble (direct) bilirubin, so that it can be excreted in the urine.

The results of the study in this case, after being given bed rest during phototherapy, resulted in a decrease in the patient's bilirubin levels, namely in case 1 from total bilirubin 13.36 mg/dl, direct bilirubin 0.69 and indirect bilirubin 12.67 mg/dl to total bilirubin 10.06 mg/dl, direct bilirubin 0.37 mg/dl and indirect bilirubin 9.67 mg/dl, case 2 of total bilirubin 9.60 mg/dl and direct bilirubin 1.09 mg/dl and indirect bilirubin 8.51 mg /dl to total bilirubin 8.89 mg/dl, direct bilirubin 0.18 mg/dl and indirect bilirubin 8.71 mg/dl. This is in accordance with previous research (Mulyati, 2019). Changing lying down (changing the right side, left side and prone) every 3 hours

during phototherapy is an easy way to reduce bilirubin levels.

This is supported by research conducted by Shinta (2015) where of the 40 respondents there were 20 respondents underwent intervention in the right tilt, left tilt and prone positions with the lowest bilirubin levels of 12.28 mg/dl and the highest bilirubin of 21.45 mg/dl , while the 20 respondents who were placed in the supine position as the control group had the lowest bilirubin level of 12.57 mg/dl and the highest bilirubin value of 20.45 mg/dl. It was found that in the intervention group, the average bilirubin level after phototherapy was 44.74 hours with changes right side, left side, supine and prone position is 7.93 mg/dl. The average length of time babies underwent phototherapy in the control group was 66.04 hours while in the intervention group it was 44.74 hours, this shows that hyperbilirubinemia babies in the control group had longer phototherapy and treatment times than hyperbilirubinemia babies in the intervention group. So it was concluded that changes in position affected reducing bilirubin levels in neonates undergoing phototherapy.9

In this study, there was no control group and intervention group, but there was a decrease in bilirubin values in the two patients. This is supported by research by Wikanthiningtyas (2016) of 25 neonates who experienced neonatal jaundice, it was found that the bilirubin level before phototherapy was 18.39 mg/dl, while the average bilirubin level after phototherapy for 24 hours was carried out by lying down (changing the position on the right side), left side, and prone) namely 15.22 mg/dl. The average decrease before and after phototherapy was 3.17 mg/dl with a significant value of 0.00 ($p<0.05$), meaning that there was an effect of changing to bed during phototherapy on the value of bilirubin levels in neonates experiencing jaundice. In research according to Dewi (2016), data was obtained that 44 neonates underwent phototherapy without being transferred to bed, namely with an average bilirubin level before phototherapy of 15.30 mg/dl and after 24 hour phototherapy of 12.80 mg/dl. Decrease in bilirubin levels of 2.50 mg/dl in 24 hours.10

Researchers assume that this research is the same as previous research in which changing beds during the phototherapy process is useful for reducing bilirubin levels in hyperbilirubinemic babies with the frequency during phototherapy therapy carried out according to doctor's instructions being more effective than phototherapy carried out. without lying down.

The intervention that the researchers took to reduce bilirubin levels was by implementing a bed shift or changing the patient's position during phototherapy in the Perinatology Room at RSI PKU Muhammadiyah Tegal. The instruments used to monitor bilirubin levels and bed transfer observations use observation sheets, bed transfer observations are carried out when therapy is carried out and monitoring of bilirubin levels is carried out when phototherapy therapy is completed.

From the results of the research, it was found that patient 1 on the first day before implementing the bed transfer, the researcher explained the procedures for carrying out the research as well as the SOP for providing therapy, carried out for 2 days by changing the patient's position from right side, left side, prone and supine during phototherapy. Phototherapy therapy was given to By N on 5-7 June 2024 at the age of 18 days, female, resulting in a Kramer III degree in the assessment of neonatal jaundice. On the second day, the patient's skin changed or decreased in yellow and the baby's movements were active, sucking breast milk hard and crying strongly.

In Patient 2 Mrs. F received instructions from the doctor to carry out phototherapy for 1 x 24 hours, the researchers carried out the implementation of bed transfer carried out on 7-8 June 2024 with the age of 6 days, female, the results were obtained on the first day with a Kramer III grade assessment, namely yellow on the head, neck, chest and above the umbilical cord. On the second day, the patient experienced a decrease in the yellow color of the patient body, namely at Kramer II degree, with yellow color on the head, neck, and chest, the patient's movements were active, muscle tone was good, the sucking reflex was strong, and the baby cried strongly.

Conclusion

Based on research conducted at Perinatology Room at RSI PKU Muhammadiyah Tegal, the following conclusions were obtained:

1. The act of changing the bed during the phototherapy process is useful for reducing bilirubin levels. Changing positions on your back, right side, left side and stomach can increase the process of evenly distributing phototherapy light exposure, thereby accelerating the reduction in bilirubin levels.
2. Implementation of bed transfer during phototherapy in both patients was carried out 2 x 24 hours in 1 day 7 hours/per shift for 1-2 hours changing positions.

3. The results of the bed transfer intervention during phototherapy showed changes in bilirubin levels in both patients, indicated by the result that the yellow color of the skin decreased in patient By. N with total bilirubin 10.06 mg/dl, direct bilirubin 0.37 mg/dl and indirect bilirubin 9.67 mg/dl. Patient By Mrs. F with the results of a decrease in total bilirubin of 8.89 mg/dl, direct bilirubin of 0.18 mg/dl and indirect bilirubin of 8.71 mg/dl, the yellow color of the patient's skin was reduced, the baby's movements began to be active, muscle tone was good, and crying was strong.

Ethical Considerations

This research has received ethical approval from Bhamada Slawi University (Letter No.033/Univ.Bhamada/KEP.EC/VI/2024).

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Confession

This research uses personal funds by researchers for publication.

Conflict of Interest

There is no conflict of interest in conducting this research.

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The Impact of Gadget Use and Parenting Styles on Speech Delays in Early Childhood: A Literature Review

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Abstract

The case of speech delay in Indonesia is still very high with a percentage of 9.54% of the population in 2014. The prevalence data of speech delay in Indonesia is 5-10% in early childhood. Many factors cause the incidence of speech delay in Indonesia to increase, one of which is the use of gadgets. This study aims to describe and find evidence regarding the effect of gadget use on speech delays. This study uses a literature review study approach method using research sources that have been selected according to the inclusion criteria. The results of the literature analysis found that there is 1 journal that states that there is a relationship between parenting styles and speech delays, 1 journal says that there is no relationship between parenting styles and speech delays, and 8 journals reveal a relationship between the intensity of use and speech delays. Based on parenting styles, generally permissive parenting styles have a major influence on children's language development. The duration of gadget use can trigger speech delays if children use gadgets for more than 2 hours/day. Parenting styles and the intensity of gadget use following guidelines can reduce the incidence of speech delays in children. The use of gadgets in early childhood has a significant relationship with speech delays, which is influenced by parenting styles and the intensity of gadget use.

Keywords: Children, Gadgets, Growth and Development, Speech Delay

Introduction

The development of technology in Indonesia has experienced very rapid progress. According to data from the Central Statistics Agency, the results of the 2022 SUSENAS

data collection showed that 66.48% of the population in Indonesia could access the internet and in 2021 around 62.10% of the Indonesian population could access the internet while in 2023 about 190 million Indonesians used mobile phones [1]. Based on this data, internet usage in Indonesia has increased significantly from year to year, where the high internet usage can reflect a large number of gadget users in Indonesia. Technological advances are a huge challenge for children's development. The National Association for the Education of Young Children (NAEYC) states that early childhood is in the age range around 0 to 8 years. Children at this age are experiencing a gradual process of growth, development and refinement [2].

Language development is one of the developments that occurs when children are able to respond to sounds and sights and can communicate with other people. Language development has 4 stages, including the pre-linguistic stage (0 to 1 year old), linguistic (1 to 2 years old who already has 30-100 vocabularies), grammar development (3 to 5 years old who can construct a simple sentence), and grammar skills (6 to 8 years old who can construct complex sentences). Children who do not have development appropriate to their developmental stage and age can be said to have deviations [3].

Speech delay is one of the growth and development disorders that occurs in children if it is not appropriate for their age. Speech delay occurs when children tend to have difficulty expressing themselves according to their wishes [4]. According to the Indonesian Ministry of Health in 2022, the prevalence of speech delay in children is around 5-10% at the developmental stage [5]. Research by Medise (2013) states that around 1-3% of speech delays occur in toddlers or children under the age of 5 years. Speech delays in children can occur due to the influence of external and internal factors.

The use of gadgets in early childhood is one of the factors that can cause delays in speech development in children. This is due to the influence of parental parenting styles and the intensity of device use. Parenting styles play an important role in children's conditions. Parents should accompany and supervise children when playing with devices, because if they are not supervised, children can choose what features they want [7]. Children who are exposed to gadgets before going to school will have a risk of language development disorders 6 times faster than children who have provisions for the duration of playing gadgets [8,9]. This indicates that there is a relationship between parenting styles and the intensity of gadget use on speech delays. Based on the problems

and research that has been done, the author wants to conduct a study entitled "The Influence of Communication Tools (Gadgets) on Speech Delay in Early Childhood: A Literature Review ". This study aims to describe and find evidence regarding the effect of gadget use on speech delays.

Method

Design

The type of research conducted is the literature review method.

Inclusion and Exclusion Criteria

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Source	Indexed scientific journals such as Google Scholar	Reports, magazines
Year	August 2018 – November 2023	-
Language	Indonesian and English	Other than Indonesian and English
P (Population)	Early childhood / toddler (0-6 years)	Newborns, adolescents, and adults
E (Exposure)	Factors that influence gadget use on speech delay	-
O (Outcome)	Speech delay and language delay	-
S (Study design)	Case control, descriptive, cross-sectional, analytical	Other than included studies
Publication Type	Open and indexed	Other than included

Search strategy

The database used is Google Scholar indexed by SINTA with published articles in the last 10 years. The keywords used in the article search are speech delay, gadgets, and growth and development.

Study selection

The sample that matches the number of articles analyzed is the category of early childhood (0-6 years) of both male and female gender. The intervention consists of limiting the duration of gadget use and implementing good parenting styles. The article has a case control, descriptive, cross-sectional, and analytical study design.

Data extraction

In this literature review, data extraction was carried out by examining all selected articles that met the inclusion criteria and then writing down the important findings from the articles.

Data analysis

Researchers reviewed selected studies and the expected result of the study search is a relationship between gadget use and speech delay.

Results

The research ranges from 2018 to 2023. Geographically, the research is generally conducted on the island of Java. In this study, the authors are generally students from health majors at universities. Respondents in the study were children aged 2-6 years. The place used is generally a school with a sample size of at least 2 people and a maximum of 254 people. General characteristics based on the research method in the table above, 8 journals use quantitative methods, and 2 journals use qualitative methods. Generally, the instruments in the study use questionnaires. In the journals, there are similarities in the contents of the journals, namely discussing the effect of the use of communication tools (gadgets) on speech delay. Based on the causal factors of the main contents of the journals above, 2 journals discuss the relationship between parenting styles and speech delays, and 8 journals discuss the relationship between the intensity of gadget use and speech delays. Based on the results, there is 1 journal that states that there is a relationship between parenting styles and speech delays, 1 journal that says that there is no relationship between parenting styles and speech delays, and 8 journals that reveal a relationship between the intensity of use and speech delays.

Table 2
Article Search Results

No	Author	Place & Sample	Design, Instrument, Statistical Test	Research Results
1.	Kamilah et al., (2020)	Place: Kindergarten in Sedati sub-district, Sidoarjo Regency, East Java. Sample: Children from Dharma Wanita Kindergarten, Khoirul Huda Kindergarten, and Ar-Rahman Kindergarten with 153 respondents.	Design: Quantitative. Statistical test: Simple regression test. Instrument: Questionnaire with Likert scale.	The following study obtained a p-value of 0.000 (<0.05) which means that gadget addiction affects language development in early childhood. Gadget addiction in early childhood has a negative effect on children's language development in Sedati District, Sidoarjo Regency with a percentage of 20.7%. This value is included in the moderate level.

2.	Herpiyana et al., (2022)	Place: PAUD Terpadu Tarbiyatul Athfal, Banjarmasin, South Kalimantan. Sample: Twins (Child Y and child H) with speech delays with their parents and two A1 group teachers.	Design: Qualitative research. Statistical test: Case study approach. Instrument: Observation sheet.	Speech delay in children from this research is caused by watching cartoons through communication tools or gadgets without supervision. Both children are known to have different social interaction developments. Child Y tends to be more developed in interacting than child H. The teacher handles the child by providing stimulation such as: asking questions, inviting conversations, teaching to make choices, and so on.
3.	Fernandez & Lestari, (2019)	Place: Childcare facilities in Manado. Sample: The sample was children aged 15-36 months with a total of 51 respondents. The study was conducted from February to April 2018.	Design: Analytical study. Statistical test: Chi-Square test. Instrument: Self-made questionnaire.	The study showed that there were 3 children with language delays (5.8%), 10 children (19.6%) used gadgets for more than 2 hours/day, and 36 children used gadgets for more than 2 days per week (70.5%). The results of the analysis showed that the intensity of gadget use for more than 2 hours/day was significantly related to language delays in children (p=0.034), but the frequency of gadget use for 2 days/week was not significantly related to speech delays in children (p=0.144).
4.	Rohana & Hartini, (2020)	Place: SDN 02 Banyuurip, Margorejo, Pati, Central Java. Sample: The total number of respondents was 39 children.	Design: Qualitative study. Statistical test: Cross sectional approach. Instrument: Questionnaire.	There are 23 children (59.0%) who use gadgets with high intensity and 6 children (15.4%) who use gadgets with low intensity and 10 children (25.6%) who use gadgets with moderate intensity. A p-value of 0.000 (<0.05) was obtained, indicating a significant relationship between gadget use and social interaction.
5.	Novianti & Garzia, (2020)	Place: Pekanbaru. Sample: The total number of respondents was 254, namely parents with children aged 2-7 years.	Design: Quantitative descriptive approach. Statistical test: Survey method. Instrument: Questionnaire.	The study found that 40% of children throw tantrums if they are not given gadgets. There are several reasons why parents give gadgets to their children, including so that the child becomes smart (22%), so that the child does not fuss (21%), and other reasons as much as 34%. Parents allow

				their children to use gadgets because the child asks for them (42%) and there are 1% of parents who allow the use of gadgets when the child excels at school. This shows that parenting styles greatly influence children's development in the use of gadgets, so supervision and restrictions on the duration of use are needed.
6.	Fajariyah et al., (2018)	Place: Simomulyo Village, Surabaya. Sample: Children aged 24-60 months with a total of 66 respondents.	Design: Analytical observation. Statistical test: Cross sectional approach. Instrument: Questionnaire.	Children with low intensity of gadget use have normal development with a percentage of 87.5%. While in children with high intensity of gadget use (75%), they experience questionable development. The results of the analysis show that the intensity of gadget use is significantly related to the development of children aged 24 to 60 months, where the higher intensity of gadget use will increase the chances of children experiencing deviations and vice versa.
7.	Oktaviani et al., (2019)	Place: Pendawa Pandawa, Lebaksiu District, Tegal Regency, Central Java. Sample: There were a total of 45 respondents in the categories of children aged 24 months, 30-48 months, and 50-60 months.	Design: Analytical survey. Statistical test: Cross sectional approach. Instrument: KPSP.	The study found that the majority of toddlers used gadgets (55.6%) and most toddlers used 1 application (72.0%). Based on child development, it was found that 31.1% of toddlers experienced questionable development and 24.5% of toddlers experienced abnormal development. The results of the analysis in the study showed that the use of gadgets was significantly related to toddler development (p-value = 0.000) where giving gadgets to toddlers would affect the child's fine and gross motor skills.
8.	Yunalia et al., (2023)	Place: Trimulia Physiotherapy Clinic, Kediri, East Java. Sample: The total number of respondents was 70 children.	Design: Correlational analysis method. Statistical test: Chi-Square test and Spearman rank test. Instrument: Questionnaire.	Based on the study, 51 respondents (73%) were male, 37 respondents (53%) had low gadget usage duration and 58 respondents (83%) experienced speech delay. Analysis with the chi square test showed a significant relationship between the duration of gadget use and

				speech delay (p = 0.003). The correlation coefficient (r) of 0.354 has a strong relationship between the duration of gadget use and speech delay. The higher the use of gadgets, the higher the incidence of speech delay.
9.	Rukmana et al., (2021)	Place: Al-Furqon Kindergarten School and Bunda Ghifari Kindergarten, Surabaya. Sample: Children aged 48-72 months with a total of 126 respondents.	Design: Analytical observational study with Cross-Sectional. Statistical test: Spearman's non-parametric statistical test. Instrument: Questionnaire.	The study shows a significant relationship between the intensity of gadget use and children's emotional and social development (p = 0.000). There are 69.6% of children with high gadget use intensity who have social and emotional development that requires referral to the hospital. This shows that excessive use of gadgets in early childhood affects children's emotional and social development.
10.	Meriyani et al., (2023)	Place: Tinga-Tinga Village, Buleleng, Bali. Sample: Toddlers aged 2-5 years with 68 toddler samples.	Design: Quantitative research with cross sectional. Statistical test: Chi-Square test. Instrument: DDST/ questionnaire/ KPSP.	The study obtained a p-value of 0.000 (p value <0.05) which indicates that the intensity of gadget use is significantly related to the delay in children's speech development. A total of 35 respondents (51.4%) had a high intensity of gadget use.

Discussion

8 journals discuss the relationship between the intensity of gadget use and speech delay. According to research by Kamilah et al. (2020), gadget addiction hurts language development in early childhood, with a percentage of 20.7%, and is at a moderate level in Sedate District, Sidoarjo Regency. Playing with gadgets without any limits on the duration of use and supervision from parents tends to make children addicted to gadgets. This is in line with the opinion of KPAI (2018) which stated that gadget addiction in children is a fairly serious obstacle, it's just that not all parents realize that their children may be indicated as experiencing gadget addiction.

Research by Rohana & Hartini (2020) and Rukmana et al. (2021) revealed that there is a relationship between the intensity of gadget use and social interactions that are

influenced by speech delay. Study by Fajariyah et al. (2018) and Yunalia et al. (2023) also found a relationship between gadget use and speech delays. This study is in line with the study of Sofiyah et al. (2024) which stated that there was a relationship between the duration of gadget use and the incidence of speech delays in children aged 3 to 5 years at the Ikhlas Medika 2 Clinic (p = 0.025). These results were reinforced by the American Paediatric Society in 2010 which published screen time guidelines, as follows (22):

Children under 2 years of age are not recommended to play gadgets alone, including televisions, smartphones or tablets. At this age range, the role of parents is needed to supervise whatever is played or watched by children.

Children aged between 2 and 4 years are advised to use gadgets with a time limit of no more than 1 hour a day. This is important to maintain their development.

Children aged 5 years and above should limit their gadget playing time to a maximum of 2 hours per day. This restriction aims to ensure that children still have time to be physically active and interact directly with their environment.

Research by Herpiyana et al. (2022) and Novianti & Garzia (2020) stated that parenting styles have a huge influence on the inhibition of speech development in early childhood. This is in line with research by Krisdiantini et al. (2020) and Sofiyah et al. (2024) which obtained a p-value of 0.00 which indicates a significant relationship between parenting styles and gadget use and speech development in children. Fernandez and Lestari (2019) showed that as many as 66.7% of children used gadgets under parental control and as many as 33.3% of children used gadgets without parental supervision. Parenting styles are something that must be considered because they can affect children to experience speech delays, generally, the type of permissive parenting styles has a major influence on child development (24). Parenting styles according to Hasanah and Sugito (2020) for children are divided into 3 types, namely:

1. Democratic: parents give their children the right to express their opinions and arguments freely under parental supervision.
2. Authoritarian: parents raise their children by restraining, demanding, and punishing them so that they always obey their parents' wishes.
3. Permissive: parents with this type of parenting style are not always involved in their children's lives and tend to give them full freedom while imposing some restrictions.

Limitation

Research is not conducted systematically and is more in the Asian region

Conclusion

After reviewing the article on the influence of communication devices (gadgets) on speech delays in early childhood, researchers concluded that there is a significant relationship between gadget use and speech delays, which are influenced by parenting styles and the intensity of gadget use. The time spent using gadgets is one of the factors causing speech delays in children. If children play with electronic devices for more than 2 hours/day, it can increase the risk of speech and language delays. The duration of gadget use in children must be according to the screen time guidelines published by The American Paediatric Society. Parenting styles, intensity, and duration of gadget use by the guidelines can reduce the incidence of speech delays, so parents are expected to pay attention to their children's growth and development. It can be concluded that these two causal factors will trigger developmental delays in children.

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Conflict of Interest

The author declares that there is no conflict of interest.

Data Availability

The datasets obtained during this research, whether generated or analyzed, are accessible from the corresponding author upon reasonable request.

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Factors Affecting Compliance of ThirdTrimester Pregnant Women in Consuming Iron (FE) Tables

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Abstract

Giving Fe tablets is one of the important efforts and is an effective way to prevent and overcome anemia due to iron and folic acid deficiency. To know the factors that influence the compliance of third-trimester pregnant women in consuming Iron (Fe) Tablets at Pesanggrahan Health Center, South Jakarta City in 2024. The research design used cross-sectional. The sample of this study was 78 respondents. The data collected were secondary data using a control card sheet for taking Iron (Fe) tablets in the respondent's Maternal and Child Health Book (MCH book) and primary data using a questionnaire Data analysis was univariate and bivariate. Data analysis used a chi-square test. Pregnant women who obediently consume Fe tablets are 49 respondents (62.8%). There was a significant relationship between the variables of knowledge, attitude, and family support with the compliance of pregnant women consuming Fe tablets. While the variable of side effects showed no significant relationship with the compliance of pregnant women to consume Fe tablets. Based on the Odd Ratio value, it was obtained that the Knowledge Variable more dominantly influenced the condition of pregnant women consuming Iron Tablets. It is expected that midwives can provide information about Fe tablets so that mothers are obedient in consuming Fe tablets.

Keywords: compliance, consuming Fe tablet, pregnant women

Introduction

Giving iron tablets (Fe) is one of the important efforts and is an effective way to prevent and overcome anemia due to iron deficiency. Iron (Fe) tablets are essential microelement tablets for the body that are needed in hemopoboesis (blood formation), namely hemoglobin (Hb) synthesis. Iron (Fe) tablets are given to women of childbearing

age and pregnant women (Kemenkes RI, 2018). By giving Iron (Fe) tablets to pregnant women at least 90 tablets during pregnancy, the government hopes to prevent anemia in pregnant women (Kemenkes RI, 2015).

However, according to the Indonesian Health Survey (2023) the prevalence rate of anemia in pregnant women (current pregnancy) in Indonesia is 27.7% and it is stated that 91.4% of pregnant women have obtained Iron (Fe) Tablets from their respective regional government facilities, while in DKI Jakarta Province it was 88.5% (Ministry of Health RI, 2023). The proportion of history of Iron (Fe) Tablets received by pregnant women less than 90 tablets during the last child's pregnancy in DKI Jakarta Province was 51.8% while those taken were 59.1%. Meanwhile, the proportion of the history of Iron (Fe) Tablets received by pregnant women more than 90 tablets during the last child's pregnancy was 48.1% while those taken were 40.7% (Kemenkes RI, 2023).

According to Arlym, et al, (2024) mentioned there is an influence between the mother's knowledge and her compliance in consuming Iron (Fe) tablets. In addition, there is also an influence between the mother's attitude towards the compliance of pregnant women in consuming Iron (Fe) Tablets, with the results of pregnant women who have a negative attitude almost entirely (86.1%) are not compliant with taking Iron (Fe) Tablets. In a study conducted by Putri A & Rukmaini, (2023) it was said that there was a relationship between perception and family supports with compliance of pregnant women in consuming iron tablets (Fe).

Many factors cause pregnant women to be non-compliant in consuming Iron (Fe) Tablets. The main reasons why pregnant women did not forget to take Iron (Fe) Tablets from the government program in DKI Jakarta Province were 5.2% because they felt unnecessary or not useful, 27.1% forgot, 11.9% felt that the taste and smell were bad, 26.1 because they were nauseous and vomiting during pregnancy, 8.9% because of uncomfortable side effects, 1.5% thought that Iron (Fe) Tablets were medicine, 3.7% it was not time to finish, 9.3% felt bored and 6.4% others (Kemenkes RI, 2023).

Impact of non-compliance of pregnant women in consuming Iron (Fe) Tablets can cause anemia in pregnant women (Cogswell et al., 2003). Anemia is a condition where a person's Hemoglobin (Hb) level in the blood is lower than normal according to the threshold value according to age (Bencaiova et al., 2012; Fatmah, 2016; Sifakis & Pharmakides, 2006).

According to the World Health Organization (WHO) in 2019 the global prevalence of anemia was 39.8% the number of cases of anemia in pregnant women worldwide is still high, which is 43.9%. While in developing countries there are about 40% of maternal deaths related to anemia in pregnancy World Health Organization (WHO) (2021). The incidence of anemia in pregnant women in Indonesia is still relatively high, which is 48.9% (according to the Indonesian Ministry of Health in 2019).

Based on preliminary studies conducted by researchers at the Pesanggrahan Health Center in May 2024, it was found that there were 13 pregnant women in Trimester III who received Iron (Fe) Tablets when conducting pregnancy checks at the Puskesmas but there were only 4 pregnant women who obediently took the Iron (Fe) Tablets regularly while the other 6 mothers took them but not routinely only if they remembered and felt their body condition was unhealthy and 3 others did not want to take Iron (Fe) Tablets because they tasted nauseous and made it difficult to defecate. This study will look for factors related to maternal compliance in consuming Iron (Fe) Tablets.

Method

Method should be structured as follows:

1. Research design

This study was a quantitative study and uses analytical methods with a cross sectional approach, the implementation of the study was conducted in July 2024 at Pesanggrahan Health Center, South Jakarta City.

2. Setting and samples

The population in this study were 362 third trimester pregnant women. The sample size used the slovin formula so that a sample of 78 people was obtained. Sampling using purposive sampling technique.

3. Measurement and data collection

Maternal compliance was assessed based on the number of blood supplement tablets consumed by pregnant women at least 90 tablets. Maternal knowledge about anemia in pregnancy and its treatment. Maternal attitudes related to anemia and iron (Fe) tablets. Family support related to attention and support system reminding to consume iron tablets. Side effects based on those experienced by respondents while consuming iron tablets (Fe).

The data collected were secondary data using a control card sheet for taking Iron (Fe) tablets in the respondent's Maternal and Child Health Book (MCH book) and primary data using a questionnaire instrument that had been tested for validity and reliability.

4. Data analysis

Data processing using chi-square statistical test.

Results

Table 1
Frequency distribution of adherence, knowledge, attitude, family support and side effects

Variable	Frequency	%
Compliance		
Compliance	49	62,8
Not compliance	29	37,2
Knowledge		
Good	47	60,3
Poor	31	39,7
Attitude		
Positive	50	64,1
Negative	28	35,9
Family Support		
Supportive	59	75,6
Less supportive	19	24,4
Side Effects		
Mild	70	89,7
Severe	8	10,3

Based on Table 1, it was found that the majority of respondents were compliant in consuming Iron (Fe) Tablets (62,8%) dan were not compliant (37,2%). Based on knowledge, it was found that most respondents had good knowledge (60.3%) and less (39.7). Based on attitudes, it was found that most respondents had positive attitudes (64.1%) and negative attitudes (35.9%)/ Based on family support, it was found that most respondents had supportive families (75.6%) and less supportive (24.4%). Based on side effects, it was found that most respondents had mild side effects (89.7%) and severe side effects (10.3%). Bivariate analysis was conducted to analyze the relationship between two variables because the variables were categorical data, so at this stage, the Chi-square statistical test was performed.

Table 2
Relationship between Knowledge and Adherence to Taking Iron (Fe) Tablets

Variable	Compliance with consuming Iron (Fe) Tablets				Amount		P-Value	OR
	Compliance		Not Compliance					
	n	%	n	%	n	%		
Knowledge								
Good	46	97,9	1	2,1	47	100	0,001	429 (42.556 - 4331)
Poor	3	9,7	28	90,3	31	100		
Attitude								
Positive	44	88	6	12	50	100	0,001	33,73 (9.290-122.487)
Negative	5	17,9	23	82,1	28	100		
Family Support								
Supportive	42	71,2	17	28,8	59	100	0,001	4,23 (1,425-12.587)
Less Supportive	7	36,8	12	63,2	19	100		
Side Effect								
Mild	46	65,7	24	34,3	70	100	0,239	0,313 (0,069-1,423)
Severe	3	37,5	5	62,5	8	100		
Total	49	62,8	29	37,2	78	100		

Based on Table 2, it was found that respondents who were not compliant in consuming iron (Fe) tablets were respondents who had low knowledge (90.3%) with a p value of 0.001 which indicated that there was a relationship between knowledge and compliance in consuming iron (Fe) tablets. The Odds Ratio value was 429 which means that the respondent's chance of consuming Fe tablets would be 429 times greater if the respondent had good knowledge. Respondents who were not compliant in consuming iron (Fe) tablets were respondents who had a negative attitude (82.1%) with a p value of 0.001 indicating that there was a relationship between attitude and compliance in consuming iron (Fe) tablets. The Odds Ratio value was 33.7, which means that the respondent's chance of consuming Fe tablets would be 33.7 times greater if the respondent had a positive attitude.

Respondents who were not compliant in consuming iron (Fe) tablets were respondents who lacked family support (63.2%) with a p value of 0.001 indicating that there was a relationship between family support and compliance in consuming iron (Fe) tablets. The Odds Ratio value obtained was 4.23, which means that the respondent's chance of consuming Fe tablets would be 4.23 times greater if the respondent received support from their family. Respondents who were not compliant in consuming Fe tablets were respondents who had severe side effects (62.5% with a p value of 0.239, which indicates that there is no relationship between side effects and compliance in consuming iron (Fe) tablets.

Discussion

In this study, 49 respondents (62.8%) were obedient to taking iron (Fe) tablets. Research by Arlym et al. (2024) showed that pregnant women who have a good knowledge tend to be more compliant in consuming this supplement. The study found that a comprehensive education program can improve pregnant women's knowledge and awareness of the importance of iron (Fe) tablets, which in turn improves their adherence. This is in line with research in Kuningan and Ethiopia (Desta et al., 2019; Rahim, 2020).

This study showed a significant relationship between pregnant women's knowledge about iron tablets (Fe) and compliance with taking iron tablets (Fe), as evidenced by a p-value of 0.001 and an Odds Ratio (OR) value of 429. This finding is in line with the opinion of Notoatmodjo (2010) which states that knowledge is a key factor influencing a person's health behavior. Study in Philipines showed higher health programme knowledge were positively associated with taking Iron (Fe) tablets (Lutsey et al., 2008)

According to Notoatmodjo, individuals who have good knowledge about health tend to have more positive behavior and adhere to medical recommendations. Thus, increasing pregnant women's knowledge about the importance of iron (Fe) tablets is essential to improve their compliance (Notoatmodjo, 2007). Pregnant women's attitude towards iron (Fe) tablets is an important factor influencing their adherence to taking this supplement. A positive attitude towards iron (Fe) tablets includes belief in the benefits of the supplement, perception of risks and side effects, and motivation to maintain health during pregnancy. From the results of this study obtained p-value = 0.001 ≤ 0.05. So it can be concluded that there is a relationship between the attitude of pregnant women and their compliance in consuming iron tablets (Fe) at Pesanggrahan Health Center, South Jakarta City. The OR value of 33.7 means that pregnant women who have a positive attitude are 33.7 times more likely to adhere to taking iron tablets (Fe) compared to pregnant women who have a negative attitude. In addition to knowledge and attitude, family support also plays a significant role in the compliance of pregnant women. Based on the results of research on family support variables, the p-value = 0.015 ≤ 0.05. So it can be concluded that there is a relationship between family support and compliance in taking iron tablets (Fe) at Pesanggrahan Health Center, South Jakarta City. The OR value

= 4.235 means that pregnant women who get positive support from the family in consuming iron tablets (Fe) are 4.2 times more likely to be obedient than pregnant women who get negative support for iron tablets (Fe).

Susanti et al. (2024) revealed that pregnant women who get emotional and practical support from their families, especially from their spouses, are more likely to be compliant in taking iron (Fe) tablets. Family support can be in the form of regular reminders, assistance in overcoming side effects, and moral encouragement. This suggests that interventions that involve families can be more effective than interventions that only focus on individuals. Currently, in the Maternal and Child Health book, there is a control card for taking iron tablets by families (Kemenkes RI, 2020).

Family support is also one of the other important factors affecting pregnant women's compliance in taking iron (Fe) tablets. According to social support theory, support from family, especially from spouses, can increase motivation and provide a significant emotional boost for pregnant women (Heiby et al., 2005; Notoatmodjo, 2010). Research by Nurhaida et al. (2024) showed that pregnant women who get emotional and practical support from their families tend to be more compliant in consuming iron (Fe) tablets. This support can be in the form of regular reminders to consume iron (Fe) tablets, assistance in overcoming side effects, and moral encouragement.

Side effects of iron (Fe) tablets are often a major barrier to adherence among pregnant women. According to Galloway & McGuire (1994) side effects such as nausea, constipation, and abdominal discomfort can reduce the desire of pregnant women to continue taking these supplements. This study emphasizes the importance of providing information and strategies to overcome these side effects as part of the education program. For example, providing advice on taking iron (Fe) tablets with meals or at specific times of the day may help reduce side effects and improve adherence. In this study, the variable of side effects showed no relationship between family support and compliance in consuming iron tablets (Fe) at Pesanggrahan Health Center, South Jakarta City, p-value = 0.239> 0.05 while OR value = 0.313. This shows that it is not in accordance with the theory that says the side effects felt by pregnant women when taking iron tablets (Fe) can adhere to taking iron tablets (Fe) and is not in line with the following studies. According to research by Oiye et al. (2020), side effects such as nausea, constipation, and indigestion are common complaints and can cause pregnant women to be reluctant to continue taking

iron tablets. This study emphasizes that negative experiences related to side effects can greatly influence pregnant women's perceptions and attitudes toward these supplements, ultimately lowering their adherence rates.

Conclusion

Knowledge, attitude, and family support are related to the compliance of pregnant women in consuming Fe tablets while the side effects of Fe tablets do not affect the compliance of pregnant women in consuming Fe tablets. Based on the Odd Ratio value, it was obtained that the Knowledge Variable more dominantly influenced the condition of pregnant women consuming Iron Tablets.

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The Effect of Blood Transfusion on Hemoglobin, Hematocrit, and Ferritin Levels in Children with Thalassemia at RSUDZA Banda Aceh

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Abstract
In children with thalassemia, lower hemoglobin levels are associated with several symptoms of general weakness and decreased mental alertness that can cause disturbances in several quality-of-life domains. This study aimed to determine the effect of blood transfusion on hemoglobin levels, hematocrit, and ferritin levels in children with thalassemia at RSUDZA Banda Aceh. This type of research is a Quasy Experiment design one only group pretest and posttest. This research was conducted in July 2024. The population in this study was 59 pediatric patients with thalassemia while sampling used a simple random sampling technique of 30 respondents. Data were analyzed univariately and bivariately using the Paired sample t-test. The results of the study obtained an average hemoglobin level before blood transfusion of 6,350 gr / dL and after 11.44 gr / dL, an average hematocrit level before blood transfusion of 22.50% and after 40.23%, an average ferritin level before blood transfusion of 379.167 µg / L after 35.5475 µg / L. There is an effect of blood transfusion on hemoglobin levels (p = 0.000), hematocrit levels (p = 0.000), and ferritin levels (p = 0.000) in children with thalassemia at RSUDZA Banda Aceh. Based on the results, it can be concluded that blood transfusion affects hemoglobin levels, hematocrit, and ferritin levels in children with thalassemia. Suggestion: It is hoped that all health workers can provide information about the occurrence of thalassemia and it is hoped that they can provide information related to differences in hemoglobin, hematocrit, and ferritin levels in children with thalassemia.
Keywords: Children, Ferritin, Hemoglobin Level, Hematocrit, Thalassemia

Introduction

Thalassemia is a genetic disease caused by a disruption in the process of

forming red blood cell hemoglobin chains so that red blood cell breakdown is faster than normal (Alfian, 2021).

Based on research results, with calculations from the birth rate and population in the world, it is estimated that newborn thalassemia patients are quite high, reaching 2500 babies per year. The number of patients registered at the Thalassemia Center, Department of Pediatrics, FKUI-RSCM, until August 2021 reached 1,494 patients with the largest age range between 11-14 years. The number of new patients continues to increase every year, reaching 100 people/year (WHO, 2021).

Indonesia is one of the countries that has a population of thalassemia carriers, where the frequency of thalassemia carriers in Indonesia is around 3-8%. This means that 3-8 out of 100 people are carriers of the thalassemia gene, and if the average birth rate is 23% in a population of 240 million, it is estimated that 3,000 babies carrying the thalassemia gene will be born each year. Based on data from the Indonesian Thalassemia Foundation (YTI) / Association of Parents of Sufferers (POPTI), thalassemia sufferers in Indonesia have increased from 4,896 sufferers in 2020 to 9,028 sufferers in 2021 (Ministry of Health of the Republic of Indonesia, 2022).

Riskesdas (2018) noted that the highest number of thalassemia sufferers was in Nanggroe Aceh Darussalam Province (13.4%), then the second highest was DKI Jakarta (12.3%), while Central Java was ranked 16th (0.5%).

Beta-thalassemia is divided into three types which also distinguish the various symptoms that may arise. The three types are major, intermedia, and minor. The major type appears on its own in the first 2 years of life with symptoms of severe anemia, poor growth, and bone abnormalities, and as a treatment requires regular blood transfusions throughout life. In the intermediate type, the treatment only requires periodic blood transfusions and symptoms appear less frequently, while the minor type does not require special treatment and is usually asymptomatic (Alfian, 2021).

The main complaint most often found in children with thalassemia is paleness with an average Hb level of <7 g/dL which is classified as major thalassemia. The sooner the child is diagnosed and the older the child, the greater the frequency and number of blood transfusions received each month. Continuous and repeated blood transfusions in large amounts and over a long period cause iron accumulation which causes complications. This can interfere with the child's daily activities, resulting in a

decrease in the child's physical function (Maulana, 2020).

Thalassemia if the transfusion is inadequate will also result in physical changes such as facial bone deformities, bone marrow expansion, and short stature so that the child's physical appearance is different from their peers which makes the child withdraw from socializing and has an impact on the decline in the child's social function. Routine transfusions that must be carried out throughout life can have an impact on psychological reactions such as fear of death, negative thoughts about the future and changes in self-image that cause depression in sufferers. Blood transfusions that must be carried out routinely require thalassemia patients to be absent from school which has an impact on the poor academic performance of thalassemia patients. Children who have undergone transfusions and treatment for thalassemia major patients for >5 years, greatly affect the child's psychosocial reactions which interfere with the quality of the child's health (Muhyi, 2020).

Based on the results of a study conducted by Kristanty (2021) entitled the relationship between pre-transfusion hemoglobin and hematocrit levels with ferritin levels in children with thalassemia at the Faculty of Medicine Hospital, University of Indonesia. The results of the study showed that many were found, namely 56.8% low hemoglobin levels, many were found, namely 64.1% low hematocrit levels and many were found, namely 63.4% low serum ferritin levels. The results of the study also showed that there was a relationship between pre-transfusion hemoglobin and hematocrit levels with ferritin levels p-value 0.023 at the Faculty of Medicine Hospital, University of Indonesia. Based on the background above, the researcher has conducted a study entitled "The Effect of Blood Transfusion on Hemoglobin, Hematocrit and Ferritin Levels in Children with Thalassemia at RSUDZA Banda Aceh".

Method

This type of research is a Quasy Experiment design one only group pretest and posttest where a measurement or observation is carried out at one time or occasionally. This study is to see the effect of blood transfusion on hemoglobin levels, hematocrit, and ferritin levels in children with thalassemia at RSUDZA Banda Aceh.

Research design: Pre-Test (O1) → Treatment (O2) → Post-Test (O3)

O1: Hemoglobin, hematocrit, and ferritin levels before blood transfusion.

O2: Blood transfusion.

O3: Hemoglobin, hematocrit, and ferritin levels after blood transfusion.

The population in this study was all children with thalassemia in June 2024, totaling 59 patients. The sample size was calculated using the Federer formula with a sample size of 30 respondents, sampling using a simple random sampling technique by the researcher's criteria. Data collection by looking at the results of hemoglobin levels, pre-transfusion hematocrit, and ferritin levels. The collected data were processed with SPSS and analyzed univariately to see the average value of hemoglobin levels, hematocrit, and ferritin levels before and after blood transfusion in children with thalassemia at RSUDZA Banda Aceh.

Results

Respondent Characteristics

Table 1
Respondent Characteristics

Respondent Characteristics	f	%
Gender		
a. Laki-laki	27	90.0
b. Perempuan	3	10.0
Age		
a. 5-10 years old	6	20.0
b. 11-20 years old	24	80.0
Amount	**30**	**100**

Based on Table 1, it can be seen that of the 30 respondents, the majority were 27 respondents (90) male compared to 3 respondents (10%) female, and the majority were 24 respondents (80%) aged 11-20 years compared to 6 respondents (20%) aged 5-10 years in children with thalassemia at RSUDZA Banda Aceh.

Univariate analysis

Table 2
Average Hemoglobin Levels Before and After Blood Transfusion in Children with Thalassemia at RSUDZA Banda Aceh

Hemoglobin Levels	Average	SD	Min-Max	n
Hemoglobin Levels Before	6.350	0.721	4.8-7.6	30
Hemoglobin Levels After	11.44	0.671	10.3-12.8	

Based on Table 2, it can be seen that from 30 patients, the average hemoglobin level before blood transfusion was 6,350 with a standard deviation of 0.721 and the average hemoglobin level after blood transfusion was 11.44 with a standard deviation of 0.671. Before blood transfusion, the lowest hemoglobin level was 4.8 gr/dL and the

highest was 7.6 gr/dL, while after blood transfusion, the lowest hemoglobin level was 10.3 gr/dL and the highest hemoglobin level was 12.8 gr/dL in children with thalassemia at RSUDZA Banda Aceh.

Table 3
Average Hematocrit Levels Before and After Blood Transfusion in Children with Thalassemia at RSUDZA Banda Aceh

Hematocrit Levels	Average	SD	Min-Max	n
Hematocrit Levels Before	22.50	3.857	12-29	30
Hematocrit Levels After	40.23	5.104	32-49	

Based on Table 3, it can be seen that from 30 patients, the average hematocrit level before blood transfusion was 22.50 with a standard deviation of 3.857 and the average hematocrit level after blood transfusion was 40.23 with a standard deviation of 5.104. Before blood transfusion, the lowest hematocrit level was 12% and the highest was 29%, while after blood transfusion, the lowest hemoglobin level was 32% and the highest hemoglobin level was 49% in children with thalassemia at RSUDZA Banda Aceh.

Table 4
Average Ferritin Levels Before and After Blood Transfusion in Children with Thalassemia at RSUDZA Banda Aceh

Ferritin Levels	Average	SD	Min-Max	n
Ferritin Levels Before	379.167	248.7123	123.0-971.3	30
Ferritin Levels After	35.5475	2.085.099	1.251.0-8.521.0	

Based on Table 4, it can be seen that from 30 patients, the average ferritin level before blood transfusion was 379.167 µg/L with a standard deviation of 248.712 and the average ferritin level after blood transfusion was 35.547 µg/L with a standard deviation of 2.085.00. Before blood transfusion, the lowest ferritin level was 123.0 µg/L and the highest was 971.3 µg/L, while after blood transfusion, the lowest ferritin level was 1.251 µg/L and the highest ferritin level was 8.521 µg/L in children with thalassemia at RSUDZA Banda Aceh.

Bivariate analysis

Table 5
Effect of Blood Transfusion on Hemoglobin Levels in Children with Thalassemia at RSUDZA Banda Aceh

Hemoglobin Levels	Average	Difference	95% confidence interval of the difference		t	df	P value
			Lower	Upper			
Pretest Hemoglobin Levels	6.35	-5.09	-5.425	-4.760	-31.326	29	**0,000**
Posttest Hemoglobin Levels	11.44						

Based on Table 5, it can be seen that the average hemoglobin level before blood transfusion was 6.35 gr/dL, while the average hemoglobin level after blood transfusion was 11.44 gr/dL with a difference in average value of -5.09 gr/dL. Based on the results of the Paired sample t-test, a p-value of 0.000 ($p<0.05$) was obtained, so it can be concluded that there is an effect of blood transfusion on hemoglobin levels in children with thalassemia at RSUDZA Banda Aceh.

Table 6
Effect of Blood Transfusion on Hematocrit Levels in Children with Thalassemia at RSUDZA Banda Aceh

Hematocrit Levels	Average	Different	95% confidence interval of the difference		t	df	P value
			Lower	Upper			
Pretest Hematocrit Levels	22.50	-17.73	-20.04	-15.42	-15.686	29	**0,000**
Posttest Hematocrit Levels	40.23						

Based on Table 4.5, it can be seen that the average hematocrit level before blood transfusion was 22.50% while the average hematocrit level after blood transfusion was 40.23% with a difference in the average value of -17.73%. Based on the results of the Paired sample t-test, a p-value of 0.000 ($p <0.05$) was obtained, so it can be concluded that there is an effect of blood transfusion on hematocrit levels in children with thalassemia at RSUDZA Banda Aceh.

Table 7
The Effect of Blood Transfusion on Ferritin Levels in Children with Thalassemia at RSUDZA Banda Aceh

Ferritin Levels	Average	Different	95% confidence interval of the difference		t	df	P value
			Lower	Upper			
Pretest Ferritin Levels	379.167	343.620	-59.84	-50.49	-24,144	29	**0,000**
Posttest Ferritin Levels	35.5475						

Based on Table 7, it can be seen that the average hematocrit level before blood transfusion was 379,167 µg/L, while the average hematocrit level after blood transfusion was 35,547 µg/L with a difference in average values of 343,620 µg/L. Based on the results of the Paired sample t-test, a p-value of 0.000 ($p<0.05$) was obtained, so it can be concluded that there is an effect of blood transfusion on hematocrit levels in children with thalassemia at RSUDZA Banda Aceh.

Discussion

Univariate analysis

1. **Average Hemoglobin Levels Before and After Blood Transfusion in Children with Thalassemia at RSUDZA Banda Aceh**

Based on the results of the study, it can be seen that from 30 patients, the average hemoglobin level before blood transfusion was 6,350 with a standard deviation of 0.721 and the average hemoglobin level after blood transfusion was 11.44 with a standard deviation of 0.671. Before blood transfusion, the lowest hemoglobin level was 4.8 gr/dL and the highest was 7.6 gr/dL, while after blood transfusion, the lowest hemoglobin level was 10.3 gr/dL and the highest hemoglobin level was 12.8 gr/dL in children with thalassemia at RSUDZA Banda Aceh.

The results of this study are in line with the study conducted by Mustofa (2020) entitled The Effect of Blood Transfusion on Hemoglobin Levels in Children with Thalassemia at the Bandar Lampung Thalassemia Shelter. The results of the study stated that the hemoglobin level before blood transfusion was 7.62 gr/dL while the hemoglobin level after transfusion was 10.9 gr/dL in thalassemia patients in children at the Bandar Lampung Thalassemia Shelter.

The researcher's assumption is that the results of the study show that there is a change in hemoglobin levels before and after blood transfusion in children with thalassemia, this is because children with thalassemia experience a decrease in hemoglobin levels in red blood cells which causes children to experience thalassemia, so children need to be given continuous blood transfusions so that the hemoglobin levels in children are sufficient in red blood cells. In children with thalassemia, blood transfusions are essential so that proteins are broken down into amino acids. If the body's Hb decreases, then the condition in the body is very at risk for thalassemia.

2. Average Hematocrit Levels Before and After Blood Transfusion in Children with Thalassemia at RSUDZA Banda Aceh

Based on the results of the study, it can be seen that from 30 patients, the average hematocrit level before blood transfusion was 22.50 with a standard deviation of 3,857 and the average hematocrit level after blood transfusion was 40.23 with a standard deviation of 5,104. Before blood transfusion, the lowest hematocrit level was 12% and the highest was 29%, while after blood transfusion, the lowest hemoglobin level was 32% and the highest hemoglobin level was 49% in children with thalassemia at RSUDZA Banda Aceh.

The results of this study are in line with the study conducted by Aji (2020) entitled the effect of hematocrit levels on blood transfusion in children with thalassemia at RSCM. The results of the study stated that the average hematocrit level before blood transfusion was 18.27% and the average hematocrit level after blood transfusion was 39.48% in children with thalassemia at RSCM. The researcher's assumption is that the results of the study show that there is a change in hematocrit levels before and after blood transfusion in children with thalassemia, this is because in children with thalassemia, hematocrit levels are often problematic which is indicated by a decrease in the volume of red blood cells in the blood, the decrease in red blood cells in thalassemia patients is caused by B12 deficiency which causes children to experience thalassemia. Changes occur between hematocrit levels due to blood transfusion to children with thalassemia so that children get hematocrit levels from the blood transfusion so that they meet the needs in the blood.

3. Average Ferritin Levels Before and After Blood Transfusion in Children with Thalassemia at RSUDZA Banda Aceh

Based on the results of the study, it can be seen that from 30 patients, the average ferritin level before blood transfusion was 379.167 µg/L with a standard deviation of 248.712 and the average ferritin level after blood transfusion was 3,554.7 µg/L with a standard deviation of 2,085.00. Before blood transfusion, the lowest ferritin level was 123.0 µg/L and the highest was 971.3 µg/L, while after blood transfusion, the lowest ferritin level was 1,251 µg/L and the highest ferritin level was 8,521 µg/L in children with thalassemia at RSUDZA Banda Aceh.

The results of this study are in line with the study conducted by Widiyani (2021) entitled the effect of blood transfusion on ferritin levels in children with thalassemia at RSI Sultan Agung Semarang. The results of the study stated that the average ferritin level before blood transfusion was 20.15 µg/L while the average ferritin level after blood transfusion was 56.28 µg/L in children with thalassemia at RSI Sultan Agung Semarang. The researcher's assumption is that the results of the study show that there is a change in ferritin levels before and after blood transfusion in children with thalassemia, this is because in children with thalassemia ferritin levels increase after blood transfusion due to additional ferritin levels from the transfusion, in children with thalassemia who lack blood ferritin levels will not store protein and iron in red blood cells, so that children are prone to anemia which causes thalassemia.

Bivariate analysis

1. The Effect of Blood Transfusion on Hemoglobin Levels in Children with Thalassemia at RSUDZA Banda Aceh

Based on the results of the study, it can be seen that the average hemoglobin level before blood transfusion was 6.35 gr/dL, while the average hemoglobin level after blood transfusion was 11.44 gr/dL with a difference in average values of -5.09 gr/dL. Based on the results of the Paired sample t-test, a p-value of 0.000 ($p<0.05$) was obtained, so it can be concluded that there is an effect of blood transfusion on hemoglobin levels in children with thalassemia at RSUDZA Banda Aceh.

The results of this study are in line with the study conducted by Mustofa (2020) entitled the effect of blood transfusion on hemoglobin levels in thalassemia patients in

children at the Bandar Lampung Thalassemia Shelter. The results of the study stated that there was an effect of blood transfusion on hemoglobin levels (p = 0.000) in thalassemia patients in children at the Bandar Lampung Thalassemia Shelter.

In children with thalassemia, lower hemoglobin levels are associated with several symptoms of general weakness and decreased mental alertness which can cause disorders in several domains of quality of life. Disruption of school performance in children, due to the need to undergo transfusions to maintain hemoglobin levels and symptoms of anemia cause children to tire easily so that they experience disorders in activities and problems concentrating while studying. Chronic hypoxia that can occur is one of the risk factors for cognitive disorders that affect IQ performance in children with thalassemia (Riastiti, 2021).

The researcher's assumption, the results of the study show that there is an effect of blood transfusion on hemoglobin levels in children with thalassemia, the effect of blood transfusion is that children with thalassemia experience a lack of hemoglobin levels which is one of the hereditary diseases carried by genes in children. The effect of blood transfusion is also because, in children with thalassemia, the hemoglobin levels are irregular, so repeated blood transfusions are needed.

2. The Effect of Blood Transfusion on Hematocrit Levels in Children with Thalassemia at RSUDZA Banda Aceh

Based on the results of the study, it can be seen that the average hematocrit level before blood transfusion was 22.50%, while the average hematocrit level after blood transfusion was 40.23% with a difference in average values of -17.73%. Based on the results of the Paired sample t-test, a p-value of 0.000 (p <0.05) was obtained, so it can be concluded that there is an effect of blood transfusion on hematocrit levels in children with thalassemia at RSUDZA Banda Aceh.

The results of this study are in line with the study conducted by Aji (2020) entitled the effect of hematocrit levels on blood transfusions in children with thalassemia at RSCM. The results of the study stated that the effect of hematocrit levels on blood transfusions (p = 0.000) in children with thalassemia at RSCM.

In children with thalassemia, lower hemoglobin levels are associated with several symptoms of general weakness, and decreased mental alertness that can cause

disturbances in several domains of quality of life. Disruption of school performance in children, due to the need to undergo transfusions to maintain hemoglobin levels and symptoms of anemia cause children to tire easily so that they experience disturbances in activities and problems concentrating while studying. Chronic hypoxia that can occur is one of the risk factors for cognitive disorders that affect IQ performance in children with thalassemia (Riastiti, 2021). The researcher's assumption, the results of the study showed that there was an effect of blood transfusion on hematocrit levels in children with thalassemia, the effect of blood transfusion was because children with thalassemia experienced a decrease in the volume of red blood cells in the blood so that the red blood cells in children did not meet the needs of hemoglobin in carrying red blood cells throughout the body which resulted in children experiencing thalassemia. The effect of blood transfusion is also because children with thalassemia to increase hematocrit levels need to be given blood transfusions continuously or periodically.

3. The Effect of Blood Transfusion on Ferritin Levels in Children with Thalassemia at RSUDZA Banda Aceh

Based on the results of the study, it can be seen that the average ferritin level before blood transfusion was 379,167 while the average hematocrit level after blood transfusion was 3,554.7 µg/L. Based on the results of the Paired sample t-test, a p-value of 0.000 ($p<0.05$) was obtained, so it can be concluded that there is an effect of blood transfusion on hematocrit levels in children with thalassemia at RSUDZA Banda Aceh.

The results of this study are in line with the study conducted by Widiyani (2021) entitled the effect of blood transfusion on ferritin levels in children with thalassemia at RSI Sultan Agung Semarang. The results of the study stated that there was an effect of blood transfusion on ferritin levels ($p=0.000$) in children with thalassemia at RSI Sultan Agung Semarang.

Serum ferritin is a measure of iron stores in the reticuloendothelial. Serum ferritin is the same as iron staining in bone marrow, which provides the same clinical information. Every 1 µg/L of serum ferritin represents 8-10 mg of iron stores. Normal serum ferritin levels are around ≥30 µg/L. Serum ferritin levels are affected by age. The older you get, the higher the serum ferritin levels. Serum ferritin is not only used as a measure of iron

deficiency, it can also be used to see the effectiveness of anemia treatment with iron tablets (sulfa ferosus). Serum ferritin will increase if anemia has improved (Corwin, 2018). The researcher's assumption, the research results show that there is an effect of blood transfusion on ferritin levels in children with thalassemia, the effect of blood transfusion is because children with thalassemia experience a decrease in ferritin levels, the decrease in ferritin levels in children with thalassemia is caused by iron and protein deficiency in the blood in children with thalassemia, the effect is also caused by blood transfusion being able to provide additional ferritin levels into the blood content in children with thalassemia

Conclusion

1. The average hemoglobin level before blood transfusion was 6,350 gr/dL and the average hemoglobin level after blood transfusion was 11.44 gr/dL in children with thalassemia at RSUDZA Banda Aceh
2. The average hematocrit level before blood transfusion was 22.50% and the average hematocrit level after blood transfusion was 40.23% in children with thalassemia at RSUDZA Banda Aceh
3. The average ferritin level before blood transfusion was 3791.7 µg/L and the average ferritin level after blood transfusion was 3554.7 µg/L in children with thalassemia at RSUDZA Banda Aceh
4. There is an effect of blood transfusion on hemoglobin levels (p=0.000) in children with thalassemia at RSUDZA Banda Aceh
5. There is an effect of blood transfusion on hematocrit levels (p=0.000) in children with thalassemia at RSUDZA Banda Aceh
6. There is an effect of blood transfusion on ferritin levels (p=0.000) in children with thalassemia at RSUDZA Banda Aceh.

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The Effect of A Boiled Betel Leaf and Turmeric on Vaginal Discharge in Women of Childbearing Age

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Abstract
Vaginal discharge is the most common complaint in women of childbearing age, with 8 0% of cases occurring between the ages of 15 and 45 years. Physiological vaginal discharge is at risk of developing into pathological vaginal discharge and can lead to complications, such as vaginitis and cervicitis. Betel leaves have the potential to be a natural remedy because of the content of eugenol chemical compounds that can ward off the fungus candida albicans. Turmeric contains curcumin that inhibits growth and kills pathogenic bacteria and fungi. This study aims to determine the effect of betel leaf and turmeric decoction on vaginal discharge in women of childbearing age. Quasy-Experimental Research Pretest Posttest with Control Group Design. The number of respondents was 30 women of childbearing age who experienced pathological vaginal discharge, selected by purposive sampling technique. The instruments used were a whitish questionnaire and an observation sheet. The average vaginal discharge value of women of childbearing age in the intervention group was obtained with a pretest score of 3.80 and a posttest score of 2.13. The average rate of vaginal discharge of women of childbearing age in the control group had a pretest score of 4.27 and a posttest score of 4.13. In the Paired Sample T Test, the p-value of the intervention group was 0.000. In the Independent T Test, the mean difference between the posttest group was 2.00 and the p-value was 0.000. There is an effect of betel leaf decoction and turmeric on vaginal discharge in women of childbearing age.

Keywords: betel leaf and turmeric, vaginal discharge, women of childbearing age

Introduction

Reproductive health problems, such as vaginal discharge, are a significant part of the global burden of disease that women experience. Vaginal discharge, or leukore, is the discharge of fluid from the vagina that can become a serious problem if not treated properly[1]. Vaginal discharge is a common complaint in women of childbearing age, with

a prevalence of up to 80% in women aged 15 to 45 years. The risk of infections such as candidiasis, trichomoniasis, and gonorrhea is higher in this age group[2].

The global prevalence of vaginal discharge shows that about 75% of women experience this condition at least once in their lifetime. In Indonesia, the prevalence of vaginal discharge reaches around 90%, much higher compared to other countries, such as Europe, due to climatic conditions that favor the growth of fungal infections[3,4]. This figure shows the urgent need for effective and affordable treatment methods.

Treatment of vaginal discharge can be done both pharmacological and non-pharmacological. Pharmacological methods include the use of antibiotics such as metronidazole and fluconazole[5]. However, non-pharmacological treatments, such as the use of betel leaf decoction and turmeric, have also shown significant potential in overcoming vaginal discharge. Betel leaves and turmeric are known to have antiseptic and anti-inflammatory properties that can help reduce symptoms of vaginal discharge[6].

Previous studies have shown the effectiveness of betel leaf and turmeric decoction in reducing vaginal discharge symptoms. For example, a study by Amin et al. (2023) and Aprianisa et al. (2023) shows that betel leaf decoction can reduce vaginal discharge in women of childbearing age[7,8]. In addition, research by Oktaviana et al. (2020) and Suyenah & Dewi (2022) shows that turmeric is also effective in overcoming vaginal discharge[9,10].

Against this background, this study aims to evaluate the effect of betel leaf decoction and turmeric on vaginal discharge in women of childbearing age at the Karya Mulya Husada Clinic, Bekasi Regency, in 2024. This research is expected to provide further insight into safe and effective treatment alternatives for vaginal discharge.

Method

This research is a quasi-experimental quantitative with Pretest Posttest with Control Group Design. The research was carried out at the Mulya Husada Clinic, Bekasi Regency, from May to July 2024. The population of this study includes 33 women of childbearing age who experience pathological vaginal discharge at the Karya Mulya Husada Clinic, Bekasi Regency. Samples are taken using the purposive sampling technique, which is the selection of samples based on predetermined criteria. The inclusion criteria include women of childbearing age aged 20-45 years who experience

pathological vaginal discharge, are not on special medication (HIV, syphilis, and other infectious diseases), are not allergic to betel leaves and turmeric, and are not pregnant. Using the Slovin formula, the sample used was 30 respondents from a total of 33 women of childbearing age, with a margin of error of 5% and a confidence level of 95%. The independent variable in this study was the administration of betel leaf decoction and turmeric and the bound variable in this study was vaginal discharge. In this study, the data was analyzed using a univariate method to identify the level of vaginal discharge of women of childbearing age presented in the frequency and percentage tables. In addition, bivariate analysis was carried out to test the effect of giving betel leaf decoction and turmeric on vaginal discharge in women of childbearing age using the Paired Sample T Test and Independent T Test.

Result

The study on the effect of betel leaf decoction and turmeric on vaginal discharge in women of childbearing age was carried out at the Karya Mulya Husada Clinic, Bekasi Regency 2024 with a total of 30 respondents of women of childbearing age, the results of the study were as follows:

Univariate Analysis

Table 1.
Average Vaginal Discharge Rate in Women of Childbearing Age in the Betel and Turmeric Leaf Feeding Group (Intervention Group)

Intervention Groups	Mean	Mean Difference	Min	Max
Pretest	3,80	1,67	3	6
Posttest	2,13		0	5

Based on the results of the descriptive analysis in Table 1, there was a difference in values in the pretest intervention group which was characterized by a minimum whiteness value of 3, a maximum whiteness value of 6, and an average whiteness value of 3.80. In the posttest intervention group, there was a decrease which was characterized by a minimum whiteness value of 0, a maximum whiteness value of 5, and an average whiteness value of 2.13. There was a decrease of 1.67.

Table 2.
Average Vaginal Discharge Rate in Women of Childbearing Age in the Betel and Turmeric Leaf Feeding Group (Control Group)

Control Group	Mean	Mean Difference	Min	Max
Pretest	4,27	0,14	3	6
Posttest	4,13		3	6

In contrast to the results of the pretest control group with a minimum whiteness value of 3, a maximum whiteness value of 6, and an average whiteness value of 4.27. In the posttest control group, a minimum whiteness value of 3, a maximum whiteness value of 6, and an average whiteness value of 4.13 were obtained. There was a decrease of 0.14. So descriptively there was a difference in the value of vaginal discharge in women of childbearing age in both intervention and control groups.

Bivariate Analysis

Table 3.
The Effect of a Boiled Betel Leaf and Turmeric on Vaginal Discharge in Women of Childbearing Age

Group	*Pretest*		*Posttest*		*p-value*
	Mean	SD	Mean	SD	
Intervensi	3,80	1,014	2,13	1,407	0,000
Control	4.27	1,223	4,13	1,246	0,164

Based on Table 3, it is known that the p-value of the intervention group is 0.000 < 0.05. So it can be said that there is an effect of giving a decoction of betel leaf and turmeric on vaginal discharge in women of childbearing age at the Karya Mulya Husada Clinic in 2024. Meanwhile, in the control group, a p-value of 0.0154 >0.05 was obtained, which means that there was no difference between the pretest and posttest in the control group.

Table 4.
Differences in the Effect of a Boiled Betel Leaf and Turmeric Giving in the Intervention and Control Groups

	Intervention	Kontrol	SD	Mean Difference	*P-value*
	Mean				
Pretest	3,80	4,27	1,014 1,407	0,47	0,265
Posttest	2,13	4,13	1,223 1,246	2,00	0,000

Based on Table 4, it is known that the calculation of the mean difference in vaginal discharge pretest in women of childbearing age is 0.47. The results of the Independent T Test in the pretest of both groups with p-values of 0.265 > 0.05. If the significance value of the p-value is greater than the alpha value of 5% (0.05), it is concluded that there is no difference in the average vaginal discharge of women of childbearing age before being given a decoction of betel leaf and turmeric against vaginal discharge in women of childbearing age at the Karya Mulya Husada Clinic, Bekasi Regency.

This is different from the calculation of the mean difference in vaginal discharge posttest in women of childbearing age of 2.00. The results of the Independent T Test in the posttest of the two groups with p-values of 0.000 < 0.05. If the significance value of the p-value is less than the alpha value of 5% (0.05), the author can assume that there is a difference in the average vaginal discharge of women of childbearing age after being given a decoction of betel leaf and turmeric at the Karya Mulya Husada Clinic, Bekasi Regency.

Discussion

The results of the descriptive analysis showed a significant decrease in cases of vaginal discharge in women of childbearing age after the use of betel leaf and turmeric decoction. This data is consistent with research by Anggraini & Wulandari (2020) and Ellisa & Rahmayanti (2021), which revealed that betel leaf decoction given twice a day for six days was effective in reducing vaginal discharge[11,12]. This study shows that regular administration of betel leaf decoction can improve the condition of vaginal discharge by reducing the symptoms and frequency of vaginal discharge in women of

childbearing age.

The study showed that before the use of betel leaf decoction and turmeric, all respondents experienced vaginal discharge with characteristics such as yellowish liquid color and itching. After the use of the decoction, a decrease in vaginal discharge began to be seen on the third day, with a significant improvement on the seventh day. Although some women still experience vaginal discharge, its amount and intensity are significantly reduced, suggesting that this therapy can be effective in addressing vaginal discharge problems[13].

The mechanism of action of betel leaf decoction in overcoming vaginal discharge is related to the content of its active compounds. Betel leaves contain eugenols, cavicol, and tannins, which have antimicrobial, anti-inflammatory, and astringent properties. Eugenol fights bacteria and fungi such as Candida albicans, while tannins reduce fluid secretion and relieve inflammation[6]. The research of Kabuhung & Handayani (2022) supports this finding by showing that the active compounds in betel leaves are effective in overcoming vaginal discharge[14].

In addition to betel leaves, turmeric also shows effectiveness in reducing vaginal discharge. Research by Sari (2019) and Oktaviana et al. (2020) shows that turmeric decoction can reduce the symptoms of vaginal discharge from severe to mild, and in some cases, eliminate vaginal discharge altogether[9,13]. Turmeric contains curcumin and demethoxycurcumin which have anti-inflammatory and antimicrobial properties, which help overcome infections and inflammation[15,16].

A literature review by Maulidiyah (2019) concluded that the combination of betel leaf decoction and turmeric is effective as a non-pharmacological treatment for vaginal discharge, with a duration of administration between 3 to 14 days. This study reinforces the assumption that these two natural ingredients, each with their antimicrobial and anti-inflammatory mechanisms, can effectively reduce vaginal discharge in women of childbearing age. Based on these results, the researchers assumed that the decrease in vaginal discharge was caused by the synergistic effect of the active compounds in betel leaf and turmeric which function complementarily in relieving vaginal discharge symptoms[17].

The results of the Paired Sample T Test showed a p-value of 0.000 ($p < 0.05$), indicating that a decoction of betel leaf and turmeric has a significant effect on the

reduction of vaginal discharge in women of childbearing age at the Karya Mulya Husada Clinic in 2024. Research by Aprianisa et al. (2023) also supports this finding, where the administration of betel leaf decoction routinely for 5 days showed significant results with a p-value of 0.000. This proves that betel leaf decoction can effectively reduce vaginal discharge[8].

The interaction between betel leaves and turmeric shows a synergistic effect in overcoming vaginal discharge. Noor & Putri (2021) and Mustika et al. (2024) explained that the combination of eugenol from betel leaves and curcumin from turmeric has a stronger antimicrobial effect, inhibiting the growth of bacteria and fungi that cause vaginal discharge. In addition, kavikol and sesquiterpenes in betel leaves along with curcumin in turmeric reduce inflammation and irritation, while tannins in betel leaves help reduce fluid secretion. This combination speeds up healing and reduces vaginal discharge symptoms[18,19].

The choice of betel leaf decoction and turmeric as non-pharmacological therapies is based on various advantages over pharmacological drugs, such as lower side effects, natural antimicrobial effectiveness, more affordable cost, and lower risk of drug resistance[20,21,22]. Based on the results of the study, researchers assume that the decrease in vaginal discharge is influenced by the technique and frequency of giving decoction, which is 3 times a day for 7 days, which makes this therapy a useful alternative in overcoming vaginal discharge in women of childbearing age.

Conclusion

Based on the results of the study, the researcher concluded that there was a decrease in the value of vaginal discharge before and after giving boiled betel leaves and turmeric to women of childbearing age. The results of the study also stated that there was an effect of boiled betel leaves and turmeric on vaginal discharge in women of childbearing age at the Karya Mulya Husada Clinic, Bekasi Regency in 2024. The suggestion that can be given is that women of childbearing age can use boiled betel leaves and turmeric as an alternative natural treatment to overcome vaginal discharge.

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Relationship between Quantitative C-Reactive Protein (CRP) Levels and Leukocyte Counts in Pulmonary Tuberculosis Infection Patients at Arifin Achmad Regional Hospital

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Abstract

Pulmonary tuberculosis is a chronic infectious disease caused by Mycobacterium tuberculosis. C-reactive protein (CRP) and leukocyte count are indicators that can reflect the severity of infection in pulmonary TB patients. This study aims to analyze the relationship between quantitative CRP levels and leukocyte counts in pulmonary tuberculosis patients. This study is an observational analytical study with a cross-sectional approach conducted on 30 pulmonary TB patients at Arifin Achmad Hospital, Pekanbaru who met the inclusion and exclusion criteria. Data on CRP levels and leukocyte counts were obtained through laboratory examinations, while demographic data were taken from patient medical records. Normality and linearity tests were performed before correlation analysis using linear regression tests. The average CRP level of patients was 84.14 ± 91.59 mg/L, with the lowest level of 0.71 mg/L and the highest of 316.7 mg/L. The mean number of leukocytes was 10,481 ± 4,625.53 mm^3, with the lowest number of 3,190 mm^3 and the highest of 21,310 mm^3. The results of the bivariate analysis showed no significant relationship between CRP levels and leukocyte counts in pulmonary TB patients ($p = 0.378$). There was no significant correlation between quantitative CRP levels and leukocyte counts in pulmonary tuberculosis patients at Arifin Achmad Hospital Pekanbaru. Further research with larger samples and longitudinal designs is needed to further explore the relationship between these two variables and their implications in the management of pulmonary TB.

Keywords: C-Reactive Protein, Leukocytes, Pulmonary tuberculosis.

Introduction

Tuberculosis is an infectious disease caused by the Mycobacterium tuberculosis bacteria. There are several species of Mycobacterium, including Mycobacterium tuberculosis, Mycobacterium africanum, Mycobacterium bovis, Mycobacterium leprae, and others. Tuberculosis (TB) is one of the main infectious diseases and has become a public health concern worldwide (Ministry of Health, 2021)

The World Health Organization (WHO) estimates that there were around 10.6 million cases of TB in 2021, equivalent to 134 cases per 100,000 population. Most TB cases recorded in 2021 were in Southeast Asia (45%), Africa (23%) and the Western Pacific (18%), with smaller percentages in the Eastern Mediterranean (8.1%), America (2.9%) and Europe (2.2%) (WHO, 2022). For Riau Province, from the TB Incident Estimate set at 31,899 cases, 13,011 TB cases were found consisting of 12,866 SO TB and 145 RO TB cases. The percentage of TB Treatment Coverage is 40.78%, and the achievement in 2022 is also the highest record achievement since TB was declared a national priority program and the total number of suspected TB in Pekanbaru City in 2022 was 32,755 cases (P2P Profile, 2022)

In general, every tuberculosis sufferer will experience general symptoms in the form of coughing up phlegm for more than two weeks, coughing up blood, weakness, weight loss, increased body temperature, and frequent night sweats (Hasnawati, 2018).

In efforts to treat TB, a fast and accurate diagnosis is crucial to reduce the impact of this disease. Laboratory examinations, especially measuring C-Reactive Protein (CRP) levels and Leukocyte Counts, have become an important part of the TB diagnostic process. C-Reactive Protein (CRP) is a biomarker that is useful for monitoring disease progression. C-Reactive Protein (CRP) is useful for monitoring disease progression.

The concentration of C-Reactive Protein (CRP) is related to the severity of the disease. A rapid decrease in the concentration of C-Reactive Protein (CRP) is considered to be associated with a good response to early antimicrobial treatment (Purwanto and Astrawinata, 2019).

Leukocytes are one of the blood components that play an important role in fighting infections in the body. These infections can be caused by many things such as viruses, bacteria, or metabolic processes of toxins. In bacterial infections, the number of leukocytes can increase or leukocytosis (Dicky & Ahmad, 2019).

Mycobacterium tuberculosis that enters the body can cause inflammation. Inflammation is a body mechanism caused by the presence of foreign objects entering. In the process, these cells will release pro-inflammatory cytokines including IL-6, then IL-6 will induce liver cells to synthesize active phase proteins such as C-Reactive Protein (CRP) and fibrinogen which function as extracellular proteins that induce phagocytes to phagocytosis bacteria. Measurement of cytokines and acute phase proteins can be used as indicators of inflammation. CRP levels in the body will increase when the body experiences inflammation (Ustiawaty et al., 2020).

Leukocytes are white blood cells that are part of the bone marrow of human blood cells that have a major role in the immune system or protect the body's defenses from infection (Geni L, Panjaitan LMR., 2019). The number of leukocytes in normal conditions is 4000/mm2. If the number of leukocytes is above 10,000/mm2 this condition is called leukocytosis and if the number of leukocytes is less than 4000/mm2 it is called leukopenia (Geni L, Panjaitan LMR, 2019).

Tuberculosis causes an increase in the number of leukocytes related to its function as a defense, so that blood sedimentation accelerates due to the increase in the number of

blood cells (Tahumurin et al., 2017). Based on previous studies, it was found that there were very diverse changes in hematology examination results, both in the number of leukocytes, erythrocytes, platelets and LED (Sundari et al., 2017).

Arifin Achmad Regional General Hospital (RSUD) Pekanbaru, as one of the main health institutions that is a reference for handling TB disease. Based on laboratory data, the request for CRP examination and the number of leukocytes increased in pulmonary TB patients who were controlled at this hospital,

Based on the explanation above, researchers have conducted research on "The Relationship between Quantitative C-Reactive Protein (CRP) Levels and Leukocyte Counts in Patients with Pulmonary Tuberculosis Infection at Arifin Achmad Hospital". This study is expected to provide a better understanding of the role of C-Reactive Protein (CRP) and leukocyte count in the diagnosis and management of Pulmonary TB, so that it can help improve the quality of health services provided to patients and optimize TB control efforts at the hospital level.

Method

The design used for this study is analytical research using a cross-sectional approach, namely measuring the variables at the same time and at the same time and once observed. Then the comparative analysis in this study was to determine the relationship between quantitative CRP levels and the number of leukocytes in patients with tuberculosis (TB) infection at Arifin Achmad Hospital. Population is the total number of objects or subjects that have certain characteristics determined by researchers to be studied and then conclusions drawn. (Sujarweni, 2014). The population in this study were TB infection patients who were controlled at Arifin Achmad Hospital from May 2024 to June 2024, totaling around 30 people. The sample in this study was all samples of pulmonary TB infection patients who were treated at Arifin Achmad Hospital from May 2024 to June 2024, totaling 30 samples the sampling technique used was total sampling, the total sampling technique is a sampling determination technique where the

entire population is used as a sample. The samples used are those that meet the inclusion and exclusion criteria. The research procedure began with blood sampling, then a quantitative CRP level examination was carried out using the Architect c4000 automatic tool and a leukocyte count examination using the XN Xysmex 1000 tool. The data obtained were processed using SPSS and continued with univariate analysis.

Results

Characteristics of Research Subjects

Table1
Characteristics of Research Subjects

Variable	f (%)	Average	SD	Median (Min-Max)
Gender				
Male	21 (70)			
Female	9 (30)			
Age		42,4	16,75	44,5 (15-65)
Male		45,2	16,30	49 (18-68)
Female		35,8	16,88	29 (15-65)

Based on Table 1, it is known that the majority of respondents are male, 21 people (70%), while female respondents are 9 people (30%). The age characteristics of the subjects of this study are the youngest age is 15 years, female gender, and the oldest is 65 years, female gender.

Univariate Analysis

Average of CRP Levels

Table 2
CRP Levels

Variable	f (%)	Average	SD	Median (Min-Max)
CRP Levels (mg/L)		84,14	91,59	57,77 (0,71-316,7)

Based on Table 2, the Characteristics of Quantitative CRP levels in the research subjects showed that the average Quantitative CRP level was 84.14 ± 91.59 mg/L. The lowest Quantitative CRP level was 0.71 mg/L in female respondents aged 49 years, while the highest Quantitative CRP level was 316.7 mg/L in male respondents aged 49 years.

Average leukocyte count

Table 3
Leukocyte count

Variable	f (%)	Average	SD	Median (Min-Max)
Leukocyte count (mm³)		10.481	4.625,53	10.450 (3.190 -21.310)

From Table 3, it can be explained that the characteristics of the number of leukocytes in the research subjects obtained an average number of leukocytes of 10,481 ± 4,625.53 mm³. The lowest number of leukocytes was 3,190 mm³ in male respondents aged 23 years, while the highest number of leukocytes was 21,310 mm³ in male respondents aged 38 years.

Bivariate Analysis

Data Normality and Linearity Test

1. **CRP Outcome Variable**

Normality Test

Table 4
Results of the CRP Variable Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CRP Outcome	.200	30	.004	.833	30	.000

Lilliefors Significance Correction

The results of the normality test of the CRP outcome variable are not normally distributed because the significance value of Shapiro Wilk is 0.878 greater than alpha 5% or 0.05.

Linearity Test

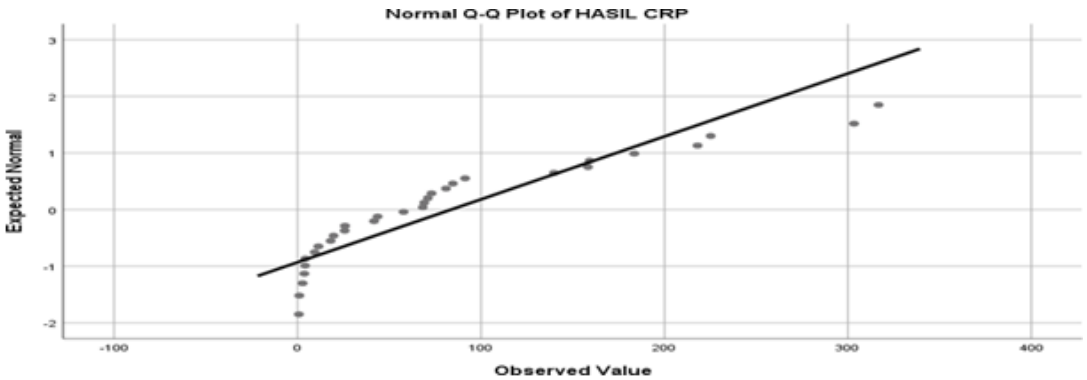

Figure 1 Results of Linearity Test of CRP Result Variables

The results of the linearity test of the CRP result variables are not linear because the

plot does not follow the linear line in the graph.

2. Leukocyte Result Variable

Normality Test

Table 5
Leukocyte Variable

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
RESULT LEUKOCYTE 1	.077	30	.200*	.982	30	.878

*. This is a lower bound of the true significance.

Lilliefors Significance Correction

The results of the normality test of the leukocyte result variable are normally distributed because the significance value of Shapiro Wilk is 0.878, greater than alpha 5% or 0.05.

Linearity Test

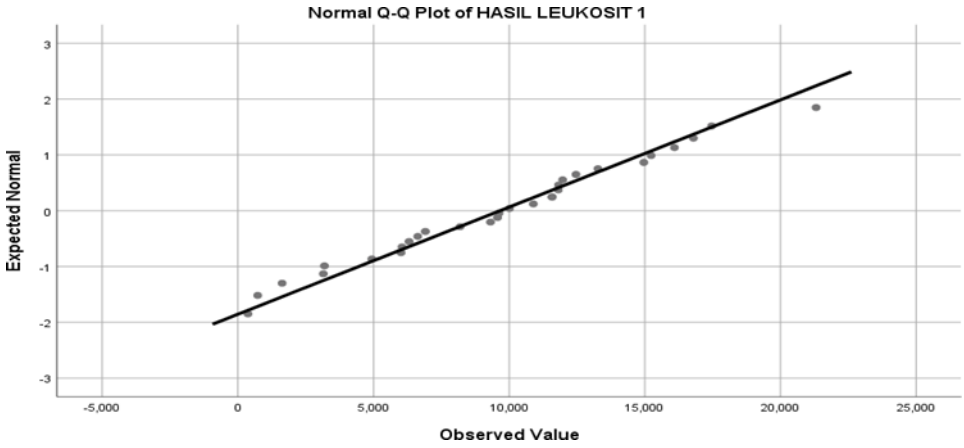

Figure 2 Results of Linearity Test of Leukocyte Result Variables

The results of the linearity test of the leukocyte result variables are linear because the plot follows the linear line in the graph.

Results of Data Homogeneity Test

Table 6
Homogeneity Test Results

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	4552.115	784.784		5.800	.000
	HASIL CRP	-6.552	6.442	-.189	-1.017	.318

a. Dependent Variable: ABS_RES

The results of the heteroscedasticity test using the Glejser Test show that the

significance value is 0.318 greater than 0.05, so there are no symptoms of heteroscedasticity in the data or the data is homogeneous.

Linear Regression Analysis Results

Coefficients

Table 7
Results of Linear Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	8853.160	1312.649		6.744	.000
	HASIL CRP	9.659	10.775	.167	.896	.378

a. Dependent Variable: LEUKOCYTE RESULTS 1

Hypothesis Ho: There is no influence between Leukocyte Levels and CRP

Based on Table 7, the results of multiple linear regression show that quantitative CRP levels and the number of leukocytes in patients with pulmonary tuberculosis infection obtained a significance value of 0.378, greater than alpha 5% or 0.05, which means there is no influence between quantitative CRP levels and the number of leukocytes in patients with pulmonary tuberculosis infection.

Discussion

Univariate Analysis

Based on the results of research conducted at the Arifin Achmad Hospital, Riau Province, the results of the analysis showed that the Characteristics of the Research Subjects, most of the respondents with Pulmonary TB who met the inclusion and exclusion criteria were male, 21 people (70%) and some were female, 9 people (30%). This shows that men suffer from Pulmonary TB more than women. This is by research conducted by (Ergiana et al., 2022) that men suffer from Pulmonary TB more than women, namely 16 men (53.5%) and 14 women (46.5%).

This is because TB sufferers are more in men than women. After all, in men there are several factors including the habit of smoking and consuming alcoholic beverages which can reduce the immune system so that it is easier to be infected with the bacteria M. tuberculosis (Ergiana et al., 2022).

The researcher's assumption, the results of the study show that TB sufferers tend to be more male than female, this is in line with research by (Sutrisna and Elsi

Rahmadani, 2022) and (Lestari et al., 2022). Smoking and alcohol consumption factors are common causes but can also be caused by outside interaction activities in men compared to women in the population studied, which contributes to the higher prevalence of Pulmonary TB in men.

Average Quantitative CRP Levels

Quantitative CRP levels in the study subjects obtained an average Quantitative CRP level of 84.1431 ± 91.59206 mg / L. The lowest Quantitative CRP level was 0.71 mg / L in female respondents aged 49 years, while the highest Quantitative CRP level was 316.7 mg / L in male respondents aged 49 years.

C- Reactive Protein is an acute-phase protein produced by the liver in response to increased levels of inflammatory cytokines, especially interleukin 6 (IL-6) and tumor necrosis factor-alpha (TNF-α). C-Reactive Protein levels are known to increase in response to tissue damage, infection, and inflammation and its concentration will increase in circulation during inflammatory events. C-Reactive Protein is not only a marker of inflammation but also plays an active role in the inflammation process (sproston and Ashworth, 2018).

The results of Shameem et al's study (2017), a history of smoking in TB patients is one of the supporting factors causing high CRP levels in serum.

The researcher's assumption, From the study it was found that high CRP levels were obtained from a 49-year-old male patient, where from the results of the search on the medical record it turned out that there were complications suffered by the patient, namely Diabetes Mellitus, HIV, and a history of long-term smoking, and taking certain drugs such as narcotics. This can be associated with inflammation due to mycobacterium Tuberculosis infection which causes severe lung damage, due to lifestyle such as smoking, free social life, alcohol, etc. This is evident from the highest CRP results found in male respondents who have a history of complications such as HIV and diabetes mellitus. Which can contribute to high CRP levels, because there is damage to the lungs.

Average Leukocyte Count

The number of leukocytes in the study subjects obtained an average of leukocytes of 10,481 ± 4,625.536 mm^3. The lowest number of leukocytes was 3,190 mm^3 in male respondents aged 23 years, while the highest number of leukocytes was

21,310 mm³ in female respondents aged 15 years.

Based on the results of the study, the number of leukocytes varied, where the highest number of leukocytes was found in female patients aged 15 years. From the search for medical records, it was found that this patient had not consumed OAT drugs. Meanwhile, the lowest leukocyte count was obtained in a 23-year-old male patient who had undergone intensive treatment for 6 months. The researcher assumes that OAT therapy can affect the number of leukocytes and suppress the growth of mycobacterium Tuberculosis bacteria, but an increase in the number of leukocytes during therapy indicates an active infection or has not been completely resolved.

Bivariate Analysis

The normality test results of the CRP result variable are not normally distributed because the significance value of Shapiro Wilk is 0.878 greater than alpha 5% or 0.05. The results of the normality test of the leukocyte result variable are normally distributed because the significance value of Shapiro Wilk is 0.878 greater than alpha 5% or 0.05. Based on Table 7, the results of multiple linear regression, quantitative CRP levels with the number of leukocytes in patients with pulmonary tuberculosis infection obtained a significance value of 0.378 greater than alpha 5% or 0.05, which means that there is no influence or no relationship between quantitative CRP levels and the number of leukocytes in patients with pulmonary tuberculosis infection. Meanwhile, this study found that there was no correlation between quantitative CRP levels and the number of leukocytes in tuberculosis patients due to infection or other factors such as at the time of sampling and when the sample was examined, causing no relationship between quantitative CRP levels and the number of leukocytes. This is similar to the results of research conducted by (Magdalena Kase, 2023), stating that there is no significant relationship between CRP and the number of leukocytes. Research conducted by (Bastian, 2023) also found that there was no correlation between the number of leukocytes and CRP levels in patients with pulmonary tuberculosis. In examination of tuberculosis patients, CRP binds directly to microorganisms as opsonins for the complement, activates neutrophils, and inhibits platelet aggregation. The greater the stimulation in the body, the higher the CRP levels will last. After the stimulation is removed, the CRP value will drop rapidly and

immediately return to normal (Mega. J., Sari D. (2019).

Examination of the total number of leukocytes in TB patients before treatment above normal by 25%. Examination of the number of leukocytes shows resistance from the human body to fight mycobacterium tuberculosis germs. Neutrophils are the first line of defense against bacterial infections by lysing and phagocytosing bacteria (Khasanah, 2016).

The researcher's assumption is that the results of the study obtained have no relationship between CRP levels and the number of leukocytes in patients with pulmonary TB infection. This is because the increase in CRP levels is influenced by inflammation or stimulation in the body, namely damage to the lungs. Changes in CRP levels are greatly influenced by the reaction of drug therapy carried out and depend on the success of the treatment. If the drug given is successful, the CRP level will gradually decrease. The number of leukocytes is influenced by the reaction of the drug given which is useful for killing Mycobacterium Tuberculosis bacteria. Leukocytes function as the body's defense during infection, and the number of leukocytes increases if the body is infected with bacteria. And if the number of leukocytes returns to normal, it means that the bacterial infection has subsided (Giyartika, F., & Keman, S., 2020).

Conclusion

Based on the results of data processing and analysis, the following conclusions can be drawn:

1. The average quantitative CRP level in tuberculosis infection patients at Arifin Achmad Hospital was 84.14 mg/L.
2. The average number of leukocytes in tuberculosis infection patients at Arifin Achmad Hospital was 10,481 mm^3.
3. From the results of multiple linear regression, the quantitative CRP level with the number of leukocytes in pulmonary tuberculosis infection patients obtained a significance value of 0.378 greater than alpha 5% or 0.05, which means there is no influence or no relationship between quantitative CRP levels and the number of leukocytes in pulmonary tuberculosis infection patients at Arifin Achmad Hospital.

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Analysis of Nutritional Status of Adolescent Girls: Challenges, Interventions, and Health Implication (Literature Review)

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Abstract

This study aims to analyze the nutritional status of adolescent girls, focusing on the prevalence of anemia, malnutrition, and obesity, as well as the factors influencing them. Data used were derived from previous research conducted in various regions of Indonesia, including West Java and Depok, as well as a literature review from sources such as the 2021 Basic Health Research (Riskesdas). Additionally, this study examines the effectiveness of nutritional education interventions in improving adolescent knowledge and attitudes toward nutrition and anemia prevention. The results indicate that the prevalence of anemia among adolescent girls reaches 27.3% nationally and 30% in West Java. Nutritional education delivered through social media and interactive methods such as PAKEM (Active, Creative, Effective, and Fun Learning) has proven effective in increasing knowledge. These findings emphasize the importance of educational interventions and increased physical activity to address nutritional issues among adolescent girls.

Keywords: adolescent girls, anemia, nutritional education, nutritional status, obesity.

Introduction

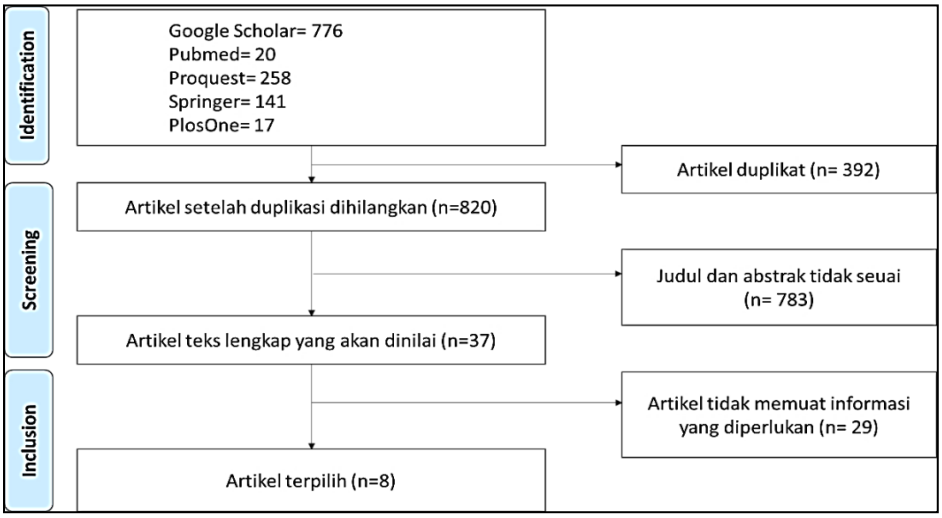
The nutritional status of adolescent girls is a crucial aspect of public health in Indonesia. Adolescent girls are in a critical developmental phase, requiring proper nutrition to support their physical and mental growth. However, various reports indicate that nutritional problems such as anemia, malnutrition, and obesity remain serious challenges in Indonesia. Based on data from the 2021 Basic Health Research

(Riskesdas), around 27.3% of adolescent girls in Indonesia suffer from anemia. Meanwhile, the prevalence of anemia in West Java was reported to reach 30% in 2022, with around 15-20% of adolescents experiencing overweight or obesity (Utami et al., 2022).

This study was conducted, reflecting the nutritional status of adolescent girls in an urban area with various nutritional challenges. Factors such as an unbalanced diet, low physical activity, and lack of knowledge about the importance of nutrition affect the nutritional status of adolescent girls. The objective of this research is to identify the prevalence of nutritional problems among adolescent girls and to examine the effectiveness of nutritional education interventions in improving adolescent knowledge regarding nutrition and anemia prevention.

Method

This study used a descriptive quantitative approach with a pre-test and post-test method to evaluate the effectiveness of nutritional education interventions. The study population consisted of female adolescents aged 15-18 years attending. Data were collected using a questionnaire covering knowledge about nutrition, eating habits, and physical activity. Nutritional status measurements included Body Mass Index (BMI), hemoglobin (HB) levels, and Mid-Upper Arm Circumference (MUAC). Nutritional education was delivered through the PAKEM method (Active, Creative, Effective, and Joyful Learning), utilizing media such as educational videos and leaflets. Articles used in the analysis were selected following PRISMA guidelines (preferred reporting items for systematic reviews and meta-analysis) (Page et al. 2021). The research questions were formulated using the PICO method (Population, Intervention, Comparison, Outcome). Here, the population represents the subjects receiving the intervention, the intervention refers to the treatment provided, the comparison is the control group, and the outcome is the response to the intervention’s effect (Cook and West 2012). Literature sources were collected from Google Scholar, PubMed, Proquest, and SpringerLink using keywords such as adolescent nutrition, adolescent body image, adolescent physical activity, anemia, and nutrition knowledge. The literature included studies from 2019 to 2024.



PRISMA Flow Diagram

Results

Results of this study indicate that the prevalence of anemia is 28-30%, aligning with national data that records a rate of 27.3% (Riskesdas 2021). Factors contributing to anemia and other nutritional issues include low nutritional knowledge and unbalanced dietary habits. Research in various regions also found that modern lifestyles characterized by low physical activity and poor dietary habits increase the risk of obesity among adolescent girls.

Nutritional education interventions have shown significant results in improving adolescents' knowledge. For instance, a study by Febrianti et al. (2023) found that the use of the PAKEM method can enhance knowledge about anemia and iron tablet consumption. Additionally, education through social media platforms like TikTok has proven effective in reaching adolescents and raising their awareness of the importance of nutrition (Pasaribu et al., 2023). Other studies, such as those conducted by Bharti et al., (2021), emphasize that school-based nutrition education can improve students' understanding of iron-rich food sources and the importance of food fortification. This increase in knowledge can lead to behavioral changes, such as increased frequency of consuming nutritious food and reduced consumption of fast food.

Discussion

Factors such as parental education, socioeconomic status, and access to nutritious food also play significant roles in adolescents' nutritional status. A study in Ethiopia Fentie et al., (2020) found that maternal education and dietary diversity significantly impact the prevalence of anemia among adolescent girls. This finding is relevant to conditions in Indonesia, where limited access to nutritious food often poses a challenge.

Conclusion

The nutritional status of adolescent girls presents serious challenges with high rates of anemia and obesity. Nutritional education has proven effective in improving adolescent knowledge about nutrition, but more comprehensive interventions are needed to change dietary habits and increase physical activity. The role of schools and families is crucial in creating an environment that supports adolescent health, through both continuous nutrition education programs and increased access to nutritious food. This study recommends the implementation of digital-based nutrition education programs in schools, as well as increased collaboration between schools, health departments, and parents to ensure that adolescents' nutritional needs are met. These steps are expected to reduce the prevalence of anemia and improve the overall well-being of adolescent girls.

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Conflict of Interest

The study was conducted independently, and no external financial or personal influences affected the design, analysis, or interpretation of the research. All funding sources and institutional supports have been properly acknowledged, and the authors have no competing interests that could impact the findings or conclusions presented in this article.

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Factors Related to The Incident of Preeclamsm in Pregnant Women in The Working Area of The Batujaya PUSKESMAS Karawang District

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Abstract

Pre-eclampsia is the main cause of maternal and fetal death due to hypertension in pregnancy which is typical of pregnancy and is characterized by symptoms of edema, hypertension, and proteinuria that occur after 28 weeks of gestation and the cause is unknown. To determine the factors related to the incidence of preeclampsia of pregnancy in the Working Area of the Batujaya Health Center, Karawang Regency in 2024. This study used a case-control study design. The study population is mothers who live in the working area of the Batujaya Health Center and who conduct antenatal care examinations. The research sample used the total sampling technique and the inclusion and exclusion criteria, the number of samples was obtained from as many as 126 pregnant women with a 1:1 ratio of control cases. Medical records from the Maternal and Child Health (KIA) book and questionnaires. Data analysis using the Chi-Square test. The results of this study showed that there was a significant relationship between nutritional status p value=0.017, history of preeclampsia p value=0.001, diabetes p value=0.013, knowledge p value = 0.009 with the incidence of preeclampsia while multiple pregnancies had no relationship with the incidence of preeclampsia p value=1. There is a significant relationship between nutritional status, history of preeclampsia, diabetes, and knowledge of the incidence of preeclampsia while multiple pregnancies are not related to the incidence of preeclampsia in pregnant women in the Working Area of the Batujaya Health Center, Karawang Regency in 2024. Pregnant women need regular ANC examinations so that they can reduce the impact of complications so that if preeclampsia occurs, it can be treated quickly and appropriately.

Keywords: Diabetes, Multiple pregnancies incidence of preeclampsia knowledge, History of preeclampsia, Nutritional status.

Introduction

According to the World Health Organization (WHO), the incidence of preeclampsia ranges between 2% and 10% of pregnancies worldwide. About 1.8-16.7% of incidents are reported in developing countries, while in developed countries, the figure is 0.4% (Khan et al., 2022). In 2020, WHO estimated that there were 934 cases of preeclampsia occurring

worldwide every day. Around 342,000 pregnant women experience preeclampsia. The incidence rate of preeclampsia in Indonesia is estimated at 3.4% to 8.5%. In Indonesia, severe preeclampsia and eclampsia are the cause of maternal mortality ranging from 15-25% (Indonesia Health Profile, 2019). In West Java province in 2022, there were 20,352 pregnant women who experienced preeclampsia/eclampsia (West Answer Health Profile, 2023). According to data from the Karawang Regency Health Office, the incidence of pre-declaration in 2023 reached 1,338 cases and is the most common type of pregnancy complication after anemia cases. In the same year, at the Batujaya Health Center, the incidence of preeclampsia was 38 cases (Health Profile of Karawnag Regency, 2023).

Preeclampsia with or without severe deformity, is a pregnancy disorder associated with new hypertension, usually accompanied by proteinuria, which most often occurs after 20 weeks of gestation and often before term. The disease represents a spectrum of hypertension in pregnancy, starting with gestational hypertension and progressing to severe symptoms, which ultimately lead to more severe manifestations, such as eclampsia and HELLP (Haemolysis, Elevated Liver Enzyme, and Low Platelet) syndrome. The disease accounts for 2% to 8% of pregnancy-related complications, more than 50,000 maternal deaths, and more than 500,000 fetal deaths worldwide. Preeclampsia and eclampsia cause >50,000 maternal deaths annually worldwide (Karrar & Hong, 2023). The incidence of preeclampsia is increasing worldwide, and the prevalence of this condition is greater in developing countries compared to developed countries.

Preeclampsia is one of the serious health problems during pregnancy that can threaten the life of the mother and fetus. The specific syndrome is reduced organ perfusion due to vasospasm and endothelial activity which manifests as increased darag pressure and proteinuria. Preeclampsia can develop into moderate to severe preeclampsia, which can continue to be eclampsia. In severe conditions, preeclampsia can be accompanied by severe headache, visual impairment, cramping pain in the regiohypochondria, vomiting, sudden swelling of the face, legs, and hands (Lalenoh, 2018a). Preeclampsia has negative consequences on maternal and fetal health during pregnancy, including increased perinatal mortality, premature birth, small babies for gestational age, high rates of cesarean births, and other adverse effects even in the later postnatal period (Alonso-Ventura et al., 2020).

Preeclampsia is the leading cause of maternal and perinatal mortality and pain, especially in low- and middle-income countries. Several clinical risk factors for this

condition have been reported including nuliparity, prior history of preeclampsia, multiple pregnancies, diabetes, nutritional status/body mass index, and pre-existing diseases such as antiphospholipid antibody syndrome, chronic hypertension, and kidney disease (Lin et al., 2021).

Education can have an effect on the incidence of preeclampsia. Pregnant women with higher education have a wider knowledge of pregnancy and care, so they can prevent preeclampsia early. Health education about preeclampsia can also increase pregnant women's knowledge about the dangers of preeclampsia for the mother and fetus. Research by Bardja (2020) has proven that education levels are related to the incidence of preeclampsia (p-value: 0.000). Although the relationship between nutritional status and preeclampsia is not yet fully understood with certainty, some studies have shown that there is a correlation between certain nutritional status and preeclampsia risk. Deficiencies in certain nutrients, such as calcium, vitamin D, and magnesium deficiencies, have been linked to an increased risk of preeclampsia. Deficiencies in these nutrients can affect blood vessel function and blood pressure regulation, which can contribute to the development of preeclampsia.

The results of Aulya, Silawati, & Safitri (2021) also prove that nutritional status has a significant relationship with the incidence of preeclampsia. A history of preeclampsia in previous preeclampsia is one of the risk factors for preeclampsia. A literature review conducted by Utami, Utami, & Siwi (2020) revealed that the history of preeclampsia is related to the occurrence of preeclampsia.

In addition to these aspects, twin pregnancies (gemelli) and diabetes are also causes of preeclampsia. In multiple pregnancies, the incidence of preeclampsia is higher than that of single pregnancies and the overall rate is about 9.5%, or about two to three times the increased risk compared to single pregnancies. In addition, preeclampsia in twins is reported to occur at an earlier gestational age and has a more severe form. It has been suggested that the pathogenesis of preeclampsia in twin pregnancies may be due to a higher immunological response and placental mass (Chantanahom & Phupong, 2021). Uncontrolled diabetes before pregnancy can worsen health conditions during pregnancy, increasing the risk of preeclampsia. The risk of preeclampsia in mothers with diabetes mellitus is higher than in non-diabetic mothers which is only 2% to 7% incidence, the incidence of preeclampsia is diagnosed 15% to 20% in pregnant women with type I DM.

Also 10% to 14% in pregnant women with type II DM (Sugianto, 2023). The literature review research of Tendean & Wagey (2021) proves that DM has a significant relationship with preeclampsia.

Although many studies have been conducted to understand the factors that affect the incidence of preeclampsia, the incidence rate of preeclampsia is still high, especially in areas with limited access to adequate health services. The Batujaya Health Center, located in Karawang Regency, is one of the areas that needs special attention related to the incidence of preeclampsia. Factors such as the social, economic, and demographic environment may contribute to the high incidence rate of preeclampsia in the region. By understanding these factors, it is hoped that more effective prevention strategies and appropriate interventions can be developed to reduce the incidence of preeclampsia and improve maternal and fetal health in the region

Based on this, the researcher is interested in conducting a study with the title of factors related to the incidence of preeclampsia in pregnant women in the Batujaya Health Center Area, Karawang Regency. The purpose of this study is to determine the factors related to the incidence of preeclampsia in pregnant women in the Batujaya Health Center Area, Karawang Regency in 2024.

Method

The method of this research is observational analysis with a Case-Control approach. The population in this study is pregnant women in the second and third trimesters in the Batujaya Health Center Area, Karawang Regency, based on data from January – March 2024 as many as 126 pregnant women in the second and third trimesters. The sample in this study is pregnant women in the second and third trimesters in the Batujaya Health Center Working Area as many as 126 pregnant women. In the case-control study, a case sample and a control sample were used, namely 1:1 each of the results of the calculation of the research sample obtained by the number of samples divided into 63 pregnant women who experienced preeclampsia (case) and 63 pregnant women who did not experience preeclampsia (control), using the total sampling technique or saturated sampling. The variables of this study were the level of knowledge, nutritional status, history of hypertension, pregnancy disorders, and diabetes of independent variables and the incidence of preeclampsia of the dependent variables.

Result

1. Univariate Analysis

Respondent characteristics

Variable	Incidence of Preeclampsia				Total	
	Case		Control			
	n	%	n	%	n	%
Level of Knowledge						
- Less	14	22,2	3	4,8	17	13,5
- Good	49	77,8	60	95,2	108	86,5
Nutritional status						
- Less	24	38,1	11	17,5	35	27,8
- Good	39	61,9	52	82,5	91	72,2
History of preeclampsia						
- Yes	2	3,2	16	25,4	18	14,3
- Not	61	96,8	47	74,6	108	85,7
Pregnancy						
- Double	4	6.3	4	6,3	8	6,3
- Single	59	93,7	59	93,7	118	93,7
Diabetes						
- Diabetes	15	23,8	4	6,4	19	15,1
- Not	48	76,2	59	93,7	107	84,9
Sum	**63**	**100**	**63**	**100**	**126**	**100**

The table above shows that pregnant women in the control group as many as 60 (95.2%) have a good level of knowledge, while in the case group, as many as 14 (22.2%) have poor knowledge, pregnant women in the control group as many as 52 (82.5%) have good nutritional status while in the case group as many as 24 (38.1%) have poor nutritional status, pregnant women in the control group as many as 47 (74.6%) have no history of preeclampsia, Meanwhile, as many as 2 (3.2%) had a history of preeclampsia, pregnant women in the control group as many as 59 (93.7%) with single pregnancies, while in case of group 4 (6.3%) with multiple pregnancies, pregnant women in the control group as many as 59 (93.7%) did not have diabetes, while in the case group, as many as 15 (23.8%) had diabetes.

2. Bivariate Analysis

Analysis of factors related to the incidence of Preeclampsia

Sub Variables	Incidence of Preeclampsia				Total		P value	OR
	Yes		Not					
	n	%	n	%	n	%		
Level of Knowledge								
- Less	14	22,2	3	4,8	17	13,5	0,009	5,714
- Good	49	77,8	60	95,2	109	86,5		
Nutritional status								
- Less	24	38,1	11	17,5	35	27,8	0,017	2,909
- Good	39	61,9	52	82,5	91	72,2		
History of preeclampsia								
- Yes	2	3,2	16	25,4	18	14,3	0,001	0,096
- Not	61	96,8	47	74,6	108	85,7		
Pregnancy								
- Double	4	6.3	4	6,3	8	6,3	1	1
- Single	59	93,7	59	93,7	118	93,7		
Diabetes								
- Diabetes	15	23,8	4	6,4	19	15,1	0,013	4,609
- Not	48	76,2	59	93,7	107	84,9		
Sum	**63**	**100**	**63**	**100**	**126**	**100**		

The data in the table above shows the results of statistical tests using a significant level or p-value of < α 0.05, it was found that there was a relationship between the level of knowledge and the incidence of preeclampsia P value 0.009. There was a relationship between nutritional status and the incidence of preeclampsia P value 0.017. There was a relationship between the history of preeclampsia and the incidence of preeclampsia P value 0.0001. There was a relationship between diabetes and the incidence of preeclampsia, P value of 0.013. While multiple pregnancies were not associated with the incidence of preeclampsia p value 1

Discussion

1. Relationship of knowledge level with incidence of Preeclampsia

Based on the results of this study, it was shown that pregnant women who had more knowledge did not experience preeclampsia by 96.5% of good knowledge. Bivariate analysis showed that there was a meaningful relationship between knowledge and the incidence of preeclampsia, where pregnant women who had good knowledge were 5.714 times more likely not to experience preeclampsia than those who had less knowledge. Knowledge is the result of knowing, and this occurs after people sense a particular object.

Sensing occurs through the five human senses, namely: sight, hearing, smell, taste and touch. Knowledge or cognition is an important domain for the formation of a person's actions (Notoatmodjo, 2014).

Mothers' knowledge about pregnancy and child health is one of the supporting factors, the higher the knowledge, the wider the knowledge obtained. Pregnant women's knowledge is very important because it can help pregnant women in living their pregnancy well, as well as help mental readiness, prevent hypertension in pregnancy and the mother's physical in facing the delivery process. More and more information can affect or increase a person's knowledge. Knowledge gives rise to awareness that eventually, a person will behave or behave in accordance with the knowledge obtained from learning, experience or instruction. The attitude of a pregnant woman greatly determines the development of the fetus, if a mother is diligent in checking or controlling her health, checking blood pressure during pregnancy, then the mother can find out what happens or what happens later during pregnancy (Mustari *et al.,* 2022).

The results of this study are in line with Mustari *et al.,* (2022). Which states that knowledge can be said to be an experience that leads to intelligence and will increase interest and attention. So that the higher the level of knowledge of pregnant women about matters related to hypertension, it will be very helpful for the person concerned in behaving and acting positively. This study is in line with the results of Faiqoh's (2014) research, there is a relationship between the knowledge of pregnant women and the management of preeclampsia ($p = 0.033$). The information referred to in this study aims to increase maternal knowledge about preeclampsia so that it can prevent or avoid the continuation of preeclampsia.

According to the assumption, knowledge is very important for our lives, and knowledge about health and health problems is very influential for pregnant women, especially preeclampsia because preeclampsia can affect the mother and fetus so that socialization and information about the signs and symptoms of preeclampsia are needed so that mothers can detect it as early as possible.

2. Relationship between nutritional status and incidence of Preeclampsia

Based on the results of this study, it was shown that pregnant women who had more nutritional status did not experience preeclampsia by 82.5% of good nutritional status. Bivariate analysis showed that there was a meaningful relationship between nutritional

status and the incidence of preeclampsia where pregnant women who had good nutritional status had a 2,909 times chance of not experiencing preeclampsia compared to those who had poor nutritional status. The impact of poor nutritional status can increase the high risk of pregnant women, especially the increasing incidence of preeclampsia. During pregnancy, it is necessary to monitor calcium intake to reduce the occurrence of preeclampsia (Apriza, 2022).

The impact of poor nutritional status can increase the risk of high in pregnant women, especially the increasing incidence of preeclampsia. According to the theory, nutritional status is an expression of the state of equilibrium in the form of a definite variable or the embodiment of nutrients in the form of a certain variable. Poor nutrition will cause fetal growth to be disrupted either directly or by insufficient or indirect nutrition due to impaired placental function. Thus there will be competition between the mother, fetus, and placenta to get nutrients and this will affect the growth of the placenta and fetus which will have an impact on the birth weight of the baby and the weight of the placenta (Wulandari, 2016).

The results of this study are in line with the results of the research of Habibullah *et al,* (2023) based on the results of *chi-square* analysis and OR value that there is a relationship between the nutritional status of pregnant women and the incidence of preeclampsia P *value* = 0.002 Pregnant women with undernourished status are at risk of experiencing preeclampsia 5.133 times. According to Fransiska (2020), showing the results of 29 respondents with malnutrition status, there were 11 (19.0%). Based on the results of bivariate analysis with statistical tests using C*hi-Square*, the result of p was obtained. *value* = 0.000 means that the hypothesis states that there is a meaningful relationship between Nutritional Status and pre-eclampsia events is proven.

Research conducted by Anjel (2019) said that in the United States women of childbearing age showed that 24.5% of women aged 20-44 years had overweight nutritional status and 23% of them were obese. The results of this study reveal that mothers who do not experience obesity are not impossible to experience preeclampsia, this is possible there is a relationship between the nutrients contained in the food consumed by the mother, which although does not cause weight gain that makes the mother obese, but the food contains substances that are difficult to absorb by the body and settle in the blood vessels so that it blocks blood flow to the heart which causes the

mother's blood pressure to increase which triggers preeclampsia. In obese mothers, it is likely to consume foods that contain substances that are difficult for the body to absorb and digest, thus blocking blood flow to the heart which causes blood pressure in the mother to increase so that it can trigger preeclampsia.

According to the researcher's assumption, the nutritional status of preeclampsia mothers will undergo changes in the physical, including the cardiovascular system including the urinary system. If the mother has nutritional problems, it will cause problems for the mother and the fetus. The impact of poor nutritional status can increase the risk of pregnant women, especially the increasing incidence of preeclampsia. During pregnancy, it is necessary to monitor calcium intake to reduce the occurrence of preeclampsia.

3. Relationship between the history of hypertension and the incidence of Preeclampsia

Based on the results of this study, show that pregnant women who have a history of preeclampsia experience more preeclampsia 96.8% who have never experienced preeclampsia. Bivariate analysis showed that there was a significant relationship between the history of preeclampsia and the incidence of preeclampsia where pregnant women who did not have a history of preeclampsia had a 0.096 times chance of not experiencing preeclampsia compared to those who had a history of preeclampsia

A history of preeclampsia is a major risk factor that needs to be considered during antenatal visits for pregnant women. This factor is associated with a high incidence of severe preeclampsia, premature preeclampsia, and adverse effects on the perinatal. Women with a history of preeclampsia are a predisposing factor for preeclampsia, likely because the cardiovascular system cannot recover from preeclampsia, because women with recurrent preeclampsia have worse cardiovascular conditions than women after a normal pregnancy. Women with recurrent preeclampsia experienced increased intima-media carotid thickness, cardiac output, and left ventricular mass compared to normal pregnant women (Sudarman *et al.,* 2021).

The results of this study are in line with the research of Hasliani (2018) which stated that there was a relationship between the history of preeclampsia and the incidence of preeclampsia from the results of the bivariate analysis test, obtained from 36 respondents, 19 respondents who did not have a history of hypertension, as many as 15 respondents

had preeclampsia and 4 respondents did not experience preeclampsia. While 17 respondents with a history of hypertension, 3 respondents experienced preeclampsia and 14 respondents did not experience preeclampsia. From the results of the Chi-Square Test analysis, the value of $p=0.001 < \alpha = 0.05$ was obtained, which means that there was a significant relationship between the history of hypertension and preeclampsia in pregnant women.

Research Kartika *et al.,* (2017) One of the predisposing factors for severe preeclampsia is a history of preeclampsia, previous vascular hypertension disease, or essential hypertension. Hypertension suffered before pregnancy results in disorders/damage to important organs of the body. Pregnancy itself causes weight gain it can result in more severe disorders/damage, which is indicated by edema and proteinuria. From this data, the frequency of mothers who have a history of preeclampsia is very at risk of experiencing preeclampsia. To determine the relationship between preeclampsia history and preeclampsia using odd ratio and obtained a value of $p = 0.003$ and an OR value = 6.693 which can be concluded that there is a relationship between preeclampsia history and preeclampsia.

According to the researcher's assumption, a previous history of preeclampsia is related to the reaction or response of each pregnant woman's body. Every pregnant woman has a different response, so adaptation is needed to deal with pregnancy and subsequent childbirth. This factor can also be related to the psychological situation of the mother in previous pregnancies. If the previous psychological pressure is not able to be managed properly, it will have a bad impact on pregnancy and subsequent childbirth.

4. Relationship of multiple pregnancies with the incidence of Preeclampsia

Based on the results of statistical analysis, this study shows that multiple pregnancies with the incidence of preeclampsia with a statistical test obtained a p-value of 1, meaning that there is no significant relationship between multiple pregnancies and the incidence of preeclampsia. Mothers who experience twin pregnancies are at risk of developing preeclampsia. According to Winkjosastro's theory (2016), preeclampsia is more likely to occur in multiple pregnancies. In addition, hypertension is aggravated because pregnancies are common in multiple pregnancies. In terms of hyperplacentaosis theory, multiple pregnancies have a risk for developing preeclampsia, the incidence of preeclampsia in twin pregnancies increases to 4-5 times compared to single pregnancies.

This research is not in line with the research of Saputri (2021) who said that multiple pregnancies 5,135 times have a greater risk of pregnancy with preeclampsia than non-multiple pregnancies. This research is in line with Tendean research (2021) which said that multiple pregnancies 5,135 times have a greater risk of pregnancy with preeclampsia than non-multiple pregnancies.

Previous research conducted by Grum *et al.,* (2017) has identified that the incidence of preeclampsia is 8.22 times higher in mothers with multiple pregnancies compared to mothers without multiple pregnancies have a nearly triple risk of developing preeclampsia. In twin pregnancies there are greater cardiovascular changes, with more than one fetus being able to worsen the mother's physiological response to pregnancy.

According to the researcher's assumption, multiple pregnancies are at an increased risk of almost all pregnancy complications when compared to single pregnancies. Preeclampsia is more common in mothers who are pregnant with twins, the increased risk of preeclampsia in twin pregnancies is related to the mass of the larger placenta, and also the level of circulation of the placenta.

5. Relationship between diabetes and the incidence of Preeclampsia

Based on the results of this study, it shows that pregnant women who experience more diabetes do not experience preeclampsia by 93.7% do not have diabetes. Bivariate analysis showed that there was a meaningful relationship between diabetes and the incidence of preeclampsia, where pregnant women who did not have diabetes had a 4,609 times chance of not experiencing preeclampsia compared to those who had diabetes.

According to Nurhasanah (2017), it is proven that pregnant women with a history of chronic disorders such as diabetes and kidney disease have a 2 times very high prediction in the occurrence of preampsa from pregnant women who do not have a chronic history, because the placental blood flow has had problems before. Women are chronically disorderly and have the tragedy of high preeclampsia. Existing kidney problems increase the risk of obtaining a pregnancy which is detrimental to the increase in the risk of preeclampsia.

The results of this study are in line with the research conducted by Anna Rufaidah at RSU PKU Muhammadiyah Bantul in 2017, which found the results of the statistical test *chi square* p value = 0.030 which means that there is a significant relationship between diabetes and the incidence of preeclampsia in pregnant women (Ana, 2017). This

is in line with a study conducted by Dila, Rodiani and Risti at DR. H. Abdul Moeloek Lampung Hospital, in 2018 which stated that there was a critical relationship between diabetes and the incidence of preeclampsia with a p value = 0.018. These results explain that there is a significant relationship between obesity and the incidence of preeclampsia (Moeloek *et al*, 2019) Based on these results, it can be explained that diabetes is one of the factors that cause preeclampsia. This is done during pregnancy, the placenta plays a role in meeting all the needs of the fetus. Preeclampsia occurs in mothers with diabetes mellitus due to an increase in the production of deoxycorticosterone (DOC) produced from progesterone in the plasma blood and increases sharply during the third trimester (Kenny, et al, 2015)

The results of this study support the theory that obesity is one of the risk factors that cause pre-eclampsia/eclampsia. Diabetes mellitus is a hereditary disorder characterized by infection or absence of insulin in the blood circulation, high blood sugar concentrations, and reduced glycogenesis. Diabetes in pregnancy will cause a lot of difficulties.

The effects of diabetes in pregnancy are abortion and partus premature, hydramnion, preeclampsia, fetal misposition, and placental insufficiency. In mothers with diabetes mellitus, the pathophysiology is pure preeclampsia, but it is accompanied by primary renal/vascular abnormalities due to diabetes mellitus. In diabetes, there is a change in blood vessel permeability to protein, so that there is a lack of protein in the tissues. Extravascular proteins attract water and salts cause edema. Blood hemoconcentration that interferes with the body's metabolic function. Preeclampsia tends to occur in women who suffer from diabetes mellitus because diabetes is a disease that can be a triggering factor for preeclampsia. Almost 50% of diabetes mellitus that occurs in pregnant women develops into preeclampsia. Mothers with gestational diabetes have an increased incidence of hypertension and preeclampsia which will worsen the course of childbirth and increase the risk of type II diabetes later in life. Hypertension is often found in diabetic women with kidney disease so that they are at high risk of preeclampsia (Kenny *et al*, 2015),

According to the researcher's assumption, diabetes is related to the incidence of preeclampsia occurring due to a history of chronic disorders before it causes problems in the placental blood vessels before pregnancy. So that the value of the incidence of

preeclampsia will later increase in pregnant women who have chronic disorders such as DM and kidneys.

Conclusion

Based on the results of the research and discussion that has been carried out, it can be concluded that the factors related to the incidence of preeclampsia in pregnant women in the Batujaya Health Center Area, Karawang Regency in 2024 are as follows:

1. Most of the pregnant women in the second - third trimester were mostly with good nutritional status as many as 91 (72.2%), most had no history of preeclampsia as many as 108 (85.7%), most had a single pregnancy as many as 118 (93.7%), most did not have diphtheria as many as 107 (84.9%), most of them had good knowledge as many as 109 (86.5%)
2. There was a significant relationship between the level of knowledge, nutritional status, history of preeclampsia, diabetes, and the incidence of preeclampsia in pregnant women in the Batujaya Health Center Area, Karawang Regency
3. There is no relationship between multiple pregnancies and the incidence of preeclampsia in pregnant women in the Batujaya Health Center Area, Karawang Regency

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The Effect of Health Promotion Using Audio Visual Media on Increasing Knowledge Children About The Risk of Overnutrition at State Primary School Plawad IV District Karawang

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Abstract

Obesity occurs in Indonesia in children aged 5-12 years, as many as 18.8% are overweight and 10.8% are obese. Children who are overnourished are at high risk of obesity, which can lead to various health problems such as type 2 diabetes, hypertension, heart disease, and respiratory disorders. The level of children's nutritional knowledge is one of the factors that can affect the occurrence of obesity in children. Video is an audio-visual medium that can reveal objects and events such as real situations. Through video media, students can understand learning messages in a more meaningful way so that the information conveyed through video can be understood as a whole. This study aims to evaluate the effect of health promotion using audio-visual media on increasing children's knowledge about the risk of overnutrition at Plawad IV State Elementary School, Karawang Regency. This study used a quasi-experimental design of One Group Pretest-Posttest Only with 54 elementary school children selected through purposive sampling. The instrument used is a knowledge questionnaire. The data was analyzed using the Paired Sample T-Test. The average children's knowledge score increased from 10.13 before the intervention to 11.17 after the intervention, with a significant increase (p-value < 0.05). The Paired Sample T-Test showed a significant difference in the score before and after the promotion (p-value 0.000). Health promotion using audio-visual media significantly increased children's knowledge about the risks of overnutrition at Plawad IV State Elementary School, Karawang Regency.

Keywords: Children, Audio Visual, Health Promotion, More Nutrition Risks.

Introduction

Overnutrition in children is a condition in which children have excessive calorie intake over their body's needs, which usually results in unhealthy weight gain. This condition is often measured using a body mass index (BMI) adjusted for age and gender. Overnutrition in children can develop into obesity if not handled properly. Obesity, also known as overnutrition, is a serious problem among school-age children (6-12 years old) because it can develop into adults and increase the risk of metabolic and degenerative diseases such as type 2 diabetes mellitus and cardiovascular disease.

In 2016, the number of children around the world, including in Indonesia, with severe obesity reached 41 million. Children who are overweight or obese are more likely to live in developing countries, where the rate of increase is 30% higher than in developed countries. Of the children aged 5 to 12 years in Indonesia, 18.8% are severely obese and 10.8% have severe dental caries. The latest data shows that the obesity situation is not under control3. According to the West Java Health Profile in 2019, of the 3,297,304 people identified as obese in 2018, 291,064 were found to be overweight. The prevalence of obesity in children in Karawang Regency in 2017 was 27.90%.

More nutrition in children is caused by several factors, including socioeconomic and demographic, parents' employment and income, eating patterns and habits, physical activity and lifestyle, parenting styles, and other factors (Banjarnahor et al., 2022). According to research conducted by Sarah1, several different factors contribute to obesity, including genetic, health, psychological, environmental, and dietary factors. Dietary patterns that contribute to obesity and obesity are excessive food consumption.

Prevention and Treatment of Excess Nutrition According to the Ministry of Health of the Republic of Indonesia in 2012, the prevention of overnutrition which includes overweight and obesity can be done by approaching all children indiscriminately, both in children at risk of overweight and obesity and those who are not. In the successful efforts to prevent and handle malnutrition in children, the role of parents at home in the family environment plays a very crucial role but also requires help from teachers to supervise and control children's growth in the school environment. Research by Novianti et al.4 found that the level of children's nutritional knowledge is one of the factors that can affect the occurrence of obesity in children. In health education activities, learning media that

can describe physical concepts in real life is needed. One of the media that can be used is video.

The urgency of this research raises a problem that occurs in Indonesia and research will be carried out on health promotion using audio-visual media to increase children's knowledge about the risk of overnutrition at Plawad IV State Elementary School Karawang Regency, later it will be followed up related to the findings obtained at the Plawad IV State Elementary School Karawang Regency. This study aims to determine the effect of health promotion using audio-visual media on increasing children's knowledge about the risk of overnutrition at Plawad IV State Elementary School, Karawang Regency.

Method

The design of this research uses a quantitative approach, the method used in this research is quasi-experiment or pseudo-experiment. The design quasi-experiment uses One Group Pretest-Posttest Design. The population in this study is all students at SD Negeri Plawad IV Karawang in grades 4 – 6 totaling 116 people, the number of samples is 54 people with purposive sampling as the technique used to take samples. The initiative sampling from June to July 2024. The intervention given is to provide a questionnaire to respondents to assess knowledge before health promotion. After 10 minutes, the researcher provides health promotion with audiovisuals about THE RISKS OF OVERNUTRITION to respondents. One week later, the researcher gave the questionnaire back to the respondents to fill out. After all, respondents are evaluated, all data is measured to see the effect of health promotion using audio-visual media on increasing children's knowledge about the risks of overnutrition at SDN PLAWAD IV Karawang. The data analysis used was using univariate and bivariate tests The reliability test on children's knowledge showed that Croncbach's Alpha was higher at 0.771. Data analysis using Paired Sample T-Test.

Result

Table 1.
Average Level of Children's Knowledge about Riziko Nutrition More

	N	Min	Max	Mean	SD
Pre-test	54	5	14	10,13	2,299
Post-test	54	5	15	11,17	2,393

The results of the descriptive analysis showed that there was a difference in the children's nutritional risk scores in the pretest which was marked by an average value of 10.13 while in the posttest group, there was a difference in the score of the child who was marked with the average score was 11.17 (Table 1).

Table 2.
The Effect of Health Promotion on Children's Knowledge Level about the Risk of Overnutrition

Variable	*Pre-test*		*Post-test*		*Mean Difference*	*P-value*
	Mean	**SD**	**Mean**	**SD**		
Children's Knowledge Score	10,13	2,299	11,17	2,393	1,04	0,0000

Based on the paired T-test conducted (Table 2), a *p-value* of 0.000 was found, so it was assumed that Ho was rejected and Ha was accepted. So there is an effect of health promotion using audio media on increasing children's knowledge about the risk of overnutrition at SD Negeri Plawad IV, Karawang Regency.

Discussion

The results of the study showed that the increase in nutrition risk was increased by the promotion of the nutrition risk of the child compared to the increase in the number of students who were involved in the animation of the student. IV, V, and VI SDN Plawad IV. In this study, there is a significant change in data on the pretest and post-test, but there is still 1 student in the post-test who gets a score of 5 there is no improvement, so in this study, there is no improvement. The average increase is only 1-3 points.

The results of the Fitria for students to the fourth class of SDN 08 Kota Bengkulu indicate that the child's score is 1.81 increase in the number of children in the child who is in the same level of knowledge as a result of the child's involvement in the child's education and the child can improve the understanding of the healthy diet and nutritional risks.

In this study, providing education in videos to educate. Educational videos are a form of audiovisual media that cannot be separated as an indoctrination method for viewing. Auxiliary visual media can convey information more realistically through moving images and sound. Educational videos have a greater appeal than other media because they have certain symbols to increase curiosity. I do this to utilize the senses of

hearing and vision. The more senses that are used to record information, the greater the likelihood of receiving the information conveyed (Simanjuntak, 2020).

According to research by Andriyani et al., the combination of visual and audio in educational media is proven to increase information retention in children. The sense of touch (skin) can be activated so that children can remember the interactive tools implied in some audio-visual media, such as touch screens. The senses of smell and taste (tongue), although less directly involved in audio-visual media, can be linked to additional activities such as cooking exercises or cooking the food discussed in the media.

The effectiveness of the information in this program is that the program is considered effective in improving the understanding of children who can convey information in a way that is understood and understood. To visualize clearly and the audio that is listened to the child can more easily remember and understand the information provided, but there is still one child who got a score of 5 both in the pretest and in the post-test, this is something that is noted for this student to be more disciplined again.

Conclusion

The average value of children's knowledge level about nutritional risks before being given health promotion with audiovisual media is 10.13 and after being given health promotion with audiovisual media is 11.17. The Paired Sample T-Test showed a significant difference in the score before and after the promotion (p-value 0.000). Health promotion using audio-visual media significantly increased children's knowledge about the risks of overnutrition at Plawad IV State Elementary School, Karawang Regency.

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Nutritional Status of Toddler in Agricultural Areas

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Abstract

Introduction: Nutritional status in toddlers has an important role in the growth and development of toddlers, which is related to health and intelligence. Nutritional status in toddlers involves measuring height, weight, and age. Providing insufficient or excessive nutrition can cause poor nutritional status. Objective: Find out the nutritional status of toddlers and the problems of malnutrition that occur in toddlers in agricultural areas. Method: This research uses the literature review method or literature review. Literature sources were collected from research journal databases and the internet, focusing on Google Scholar, Science Direct, and Pubmed for publications between 2019 and 2024. Results: The nutritional status of toddlers is influenced by various factors, including parenting patterns, family roles, nutritional consumption, and the environment. Balanced nutrition education can increase understanding among mothers of toddlers. Toddlers in farming families and non-fishing communities have a higher prevalence of stunting. Conclusion: The nutritional status of children under five in agricultural areas still needs to improve. Comprehensive interventions need to always be carried out by ensuring that toddlers receive nutritional intake and a healthy environment for optimal growth and development.

Keywords: toddler, agriculture, nutritional status

Introduction

The toddler years are a critical period in human formation and development. During this critical period, toddlers will be susceptible to growth disorders. The problem of nutritional status is a problem that often arises during childhood. Nutritional status is

a measure of success in providing adequate nutrition. Nutritional status in toddlers is important in their growth and development, which is related to health and intelligence. Nutritional status in toddlers involves measuring height, weight, and age. Providing insufficient or excessive nutrition can cause poor nutritional status1. 2(Wijayanti, 2023; Kurniyawan, et al., 2023).

The problems of nutritional status in toddlers, or as we know that malnutrition or stunting is a frightening thing for all citizens of the world because the problem of malnourished or stunted toddlers can impact the development and growth of a country. According to the WHO, in 2023, the prevalence of cases of malnourished children under five will reach 54 million to 144,5 million children under five, or 28,7% of the world's population. The country in first place for cases of malnourished children under five is an African country with a prevalence of 32.2%. Followed by Southeast Asian countries at 30,9%, South America at 22%, and Europe at 16,5%.3 (World Health Organization, 2023). Meanwhile, the prevalence of under-five children experiencing malnutrition or stunting is 21,6%, according to the Indonesian Ministry of Health in 2022, which has decreased by 2,8% from 2021. From 2023 to 2024, the Indonesian state is targeting a reduction in the incidence of malnutrition and stunting to 14%. In Indonesia, most stunting cases occur in West Java, East Java, Central Java, North Sumatra, and Banten4 (Rokom, 2023). The incidence of malnourished or stunted toddlers in the East Java region in 2022 has a prevalence of 19,2%, with three districts being the highest contributors to stunting cases in East Java, namely Jember district with 34,9%, Situbondo district with 30,9%, and Bondowoso district with as much as 32%. 5(Tim Percepatan Penurunan Stunting Sekretariat Wakil Presiden, 2023).

The occurrence of nutritional status problems can be influenced by several factors, not only unbalanced nutritional consumption but also parenting patterns, family roles, and environmental factors. Parenting style is how parents interact with their children through behavior and attitudes. This method also includes how parents show their emotions when treating, guiding, and disciplining children. Apart from that, the role of the family is also important in influencing the nutritional status of toddlers. An active and supportive family role can minimize nutritional status problems in toddlers 6,7(Rahmawati et al., 2019; Nurprastiwi, et al., 2024).

Malnourished or stunted toddlers can be managed through several prevention

programs that are synergized by the village government in collaboration with the local health center and health service in the form of providing access to basic sanitation such as clean water, clean latrines, household waste disposal facilities, preventing the incidence of malnourished children under five can be done by providing access to health in the form of providing KIA facilities and equipment, providing health insurance for underprivileged residents, providing health education and parenting patterns children to their parents, providing routine check-up facilities through Posyandu and improving nutrition for stunted toddlers. Nurses as caregivers can provide care by providing health promotion8,9 (Hadijah et al., 2022; Afandi, et al., 2023). Therefore, we are interested in raising this topic because of the high long-term impact of malnutrition, which can be used as an important step in optimizing children's health and development.

Method

This research uses the literature review method. Literature sources were collected from research journal databases and the internet, focusing on Google Scholar, ScienceDirect, and Pubmed for publications between 2019 and 2024. Search keywords in English and Indonesian were used to find relevant literature. The literature search used Indonesian with the keywords used in the search, namely "*Gizi Balita*" AND "*Agri*cultural." When searching for literature in English, use the keywords "Toddler," "Agriculture," AND "Nutritional Status."

The journal search process begins by identifying specific keywords. During the search phase, 17,900 journals were found that matched the keywords listed. The next stage is to carry out screening on the journal's publication year, which aims to ensure alignment with research requirements. During the screening stage, 14,202 journals were found that met the criteria. Next, the publication enters the screening stage based on research criteria for inclusion and exclusion, with inclusion criteria, namely those that match the keywords "Toddler" and "Agriculture," while exclusion criteria, namely journals that are not relevant to the keywords. A total of 988 journals were found that met the inclusion and exclusion criteria obtained in the search. In the next stage, there were a total of 80 journals that met the criteria for full free text. Furthermore, the 80 selected journals were screened again based on language, research methodology, results, and

other predetermined factors. After screening, ten journals were selected that met the predetermined criteria and were deemed worthy of further research.

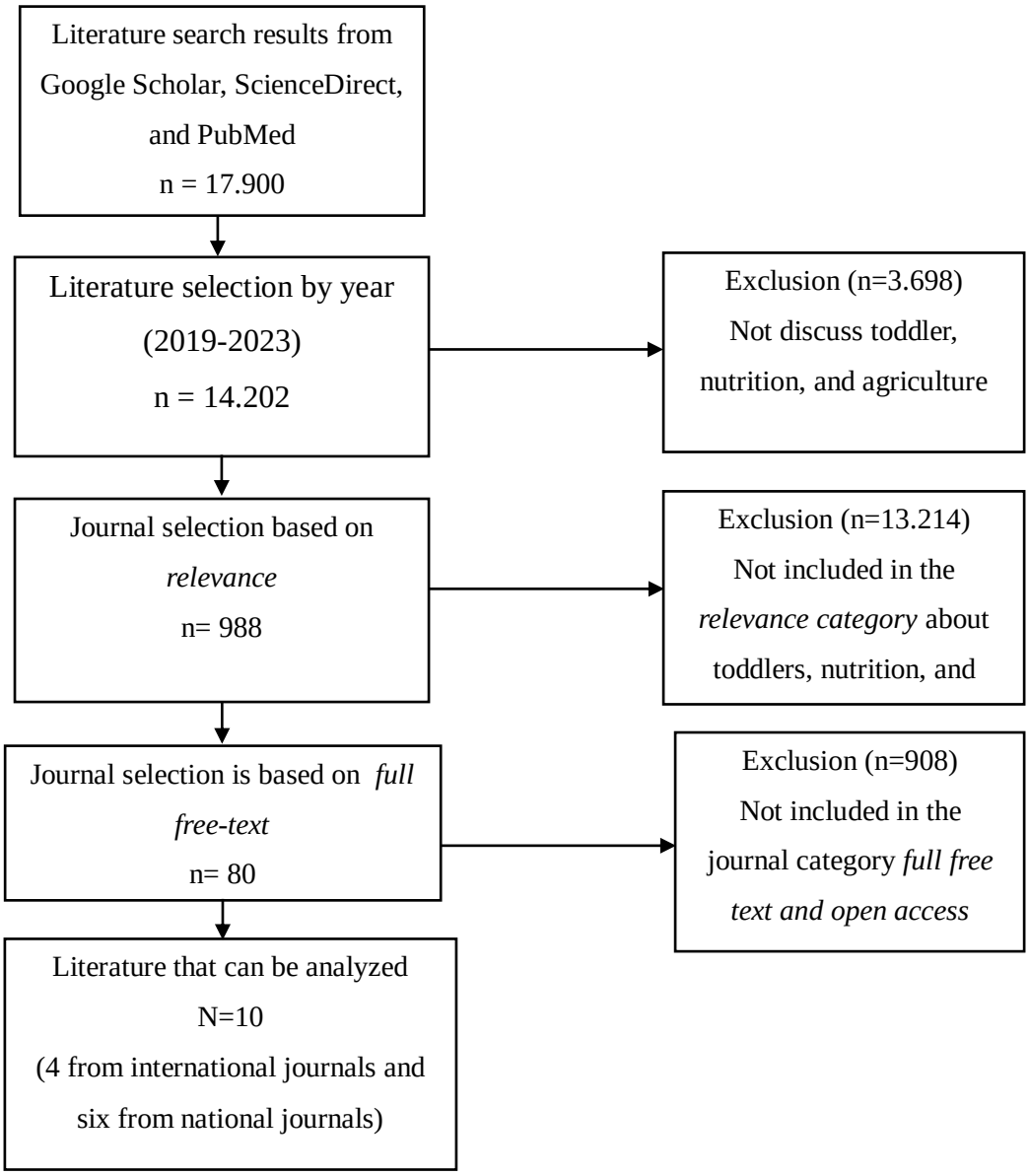

Figure 1. Flow Diagram of Analysis Literature

Results

Of the ten articles examined, it was found that four articles discuss the relationship between malnutrition and stunting in toddlers. This shows that malnutrition is one of the main factors causing stunting. In addition, three articles discuss the nutritional status of children, two articles discuss balanced nutrition, and the rest discuss nutritional deficiencies in general. Check Table 1 for the following literature analysis result for more detailed information.

Table 1. Table Literature Review

ID Number	Author and Journal Identity	Journal Title	Objective	Population and Sample	Method	Summary and Results
A1	**Author:** Fatkuriyah & Sukowati **Journal Identity:** Adi Husada Nursing Journal, Volume. 8 No 2, Halaman 129. e-ISSN: 2502-2083 DOI: https://doi.org/10.37036/ahnj.v8i2.357 [Accessed on Friday, 10 May 2024]	Parenting Patterns and Toddler Nutritional Status in Jember Regency10	This research aims to determine the relationship between maternal parenting patterns and the nutritional status of toddlers.	Toddlers who permanently reside in the research location and mothers who are literate served as the research samples for this study. The mothers and toddlers were drawn from the working area of Posyandu Catleya 85, 86, and Catleya 87 Karangrejo Subdistrict.	This research used a cross-sectional method. The subjects studied were mothers and children under five years old (toddlers) who were in the area of Posyandu Catleya 85, 86, and Catleya 87 in Karangrejo Village. The criteria for being part of the sample were toddlers who must be permanent residents in the study location, and mothers must be able to read and write. The criteria that were not included in this study were toddlers with physical disabilities and toddlers who were not handled directly or not cared for by their own mothers.	This study produced a p-value of 0.023, which means a relationship exists between maternal parenting and the nutritional status of toddlers. Mothers who apply an authoritative parenting style will have high responsiveness and demands for the eating process. Children by placing limits on the types of food they can or cannot consume. Children can build a dining atmosphere that supports their healthy eating patterns by preparing a schedule for their meals, serving highly nutritious food choices, and allowing them to decide how much food they eat.
A2	**Author:** Kartika., et al	Improving Mothers' Knowledg	This research aims to increase the	Thirty-eight moms of toddlers at Posyandu Catleya	The method used in this research is a community service	The results of this research on balanced nutrition counseling show that there

	Journal Identity: Journal of Community Development, Volume. 2 No. 2, Halaman 91–96 DOI: https://doi.org/10.47134/comdev.v2i2.52 [Accessed on Friday, 10 May 2024]	e About Balanced Nutrition to Prevent Nutritional Problems in Toddlers in Jember Regency11	knowledge of mothers of toddlers regarding balanced nutrition in preventing nutritional problems in toddlers.	19 made up the research sample.	method where the activities will use pre-tests and post-tests to determine the results to be obtained and evaluate the implementation of activities.	has been an increase in understanding of balanced nutrition among mothers of toddlers. So this outreach activity is effective in increasing mothers' knowledge about nutrition balance for toddlers. Implementation of nutrition education in community efforts to prevent nutritional problems must continue to be carried out comprehensively. Therefore, community service programs need to be implemented. The next step is practicing how to arrange a balanced nutritional menu and processing food ingredients by implementing balanced nutrition according to children's nutritional adequacy (RDA). Meeting these nutritional needs must also pay attention to the principle of diversity. Food, physical activity, clean living behavior, and maintaining a normal body weight to prevent nutritional problems.
A3	**Author:** Rahmawati.,	Hubungan Pelaksanaa	This research aims to	A cluster random selection technique,	This study used a cross-sectional	This research produces a p-value=0.002, which

	et al **Journal Identity:** Pustaka Kesehatan, Volume. 7 No. 2, Halaman 112 DOI : https://doi.org/10.19184/pk.v7i2.19123 [Accessed on Friday, 10th May 2024]	n Peran Keluarga dengan Kejadian Stunting pada Balita di Kecamatan Arjasa, Jember6	analyze the relationship between the implementation of family roles and the incidence of stunting among toddlers in Arjasa District, Jember Regency.	the research sample comprised 117 respondents from the Arjasa District in the Jember Regency.	research design with sampling techniques and cluster random sampling techniques.	means a relationship exists between the implementation of family roles and the incidence of stunting in toddlers in Arjasa District, Jember Regency. It cannot be denied that the family form can provide. The influence on the incidence of stunting is in line with the characteristics of the number of children in the family because the number of children determines whether a family is large or small. By implementing good family roles, families can provide nutrition to children under five.
A4	**Author:** Kusuma., et al **Journal Identity:** Jurnal Peduli Masyarakat, Volume. 5 No.1, Halaman 203–208. e-ISSN : 2721-9747 DOI : https://doi.org/10.37287/jpm.v5i1.1625	Optimizing Media Literacy in Creating Nutrition-Aware Families (SADARZI) in Agricultural Communities12	The aim of this research is to increase knowledge in the community regarding the balanced nutritional status of children and toddlers.	Twenty-five people participated in the research activities conducted at the Mojoparon Village Village Hall in the Rembang District of the Pasuruan Regency.	In the health literacy research documented in this journal, the methods used were lectures and discussions, which have been proven to effectively increase community understanding and knowledge. The supporting media used in the literacy activities were X-banners and leaflets. Evaluation was conducted to measure	After providing health education about balanced nutrition guidelines, there was a significant increase in participants' knowledge, where literacy was provided about balanced nutrition guidelines, which are expected to be able to create conscious families. Nutrition (awareness) in agricultural communities to prevent and reduce the incidence of stunting in agriculture areas.

	[Accessed on Monday, 6 May 2024]				participants' ability to absorb and understand the material presented. Questionnaires were used to measure the increase in participants' knowledge about good and balanced nutrition before and after the material was delivered.	
A5	**Author:** Ningrum, V. **Journal Identity:** Jurnal Pangan, Volume. 28 No. 1, Halaman 73–82 DOI: https://doi.org/10.33964/jp.v28i1.424 [Accessed on Friday, 10 May 2024]	Food Access and the Incidence of Toddler Stunting: A Case of Agricultural Villages in Klaten13	The aim of this research is to determine the analysis of household resilience in accessing food, which is influenced by cultural, social, and economic factors, as well as the impact on stunting conditions in 4 villages of Klaten Regency, Central Java.	The study population comprised all families in four villages within Klaten Regency with toddlers between the ages of two and five. The research targets included ten mothers in Sumyang Village who had stunted toddlers and 62 houses chosen by the purposive snowballing technique.	Data was collected using quantitative and qualitative methods, including household surveys, detailed interviews, direct observation, and focus group discussions.	The programs carried out by researchers to restore the nutritional status of toddlers who experience stunting have resulted in changes in consumption behavior in accessing and managing family food, which is influenced by modernization in rural areas, namely the increasing culture of buying cooked food and changes in agricultural production becoming monoculture. However, access to food in this respondent's household has many factors that influence limitations in meeting the nutritional needs of their toddlers, namely due to the subsistence farming

						culture, economic limitations, parenting patterns for their toddlers, and the lack of creative ideas of parents in utilizing the land to cultivate food for their children. Meet the nutritional needs of toddlers.
A6	**Author:** Purba., et al **Journal Identity:** Jurnal Kesehatan Lingkungan Indonesia, Volume. 21 No. 3, Halaman 320–328. e-ISSN : 2502-7085 DOI : https://doi.org/10.14710/jkli.21.3.320-328 [Accessed on Monday, 6th May 2024]	Stunting Incidence in Toddlers Exposed to Pesticides in Agricultural Areas14	This research aims to analyze the relationship between pesticide exposure and the incidence of stunting in toddlers in agricultural areas.	Cluster sampling, a sample of 136 mothers of toddlers exposed to pesticides in Sekayu District, Lumpatan 1 Village, and Lumpatan 2 Village was taken.	This research uses quantitative analytical methods with a cross-sectional study approach. A cross-sectional study is used to analyze the relationship between pesticides and the incidence of stunting in toddlers.	The programs carried out by researchers to restore the nutritional status of toddlers who experience stunting have resulted in changes in consumption behavior in accessing and managing family food, which was influenced by modernization in rural areas, namely the increasing culture of buying cooked food and changes in agricultural production becoming monoculture. However, access to food in this respondent's household has many factors that influence limitations in meeting the nutritional needs of their toddlers, namely due to the subsistence farming culture, economic limitations, parenting patterns for their toddlers,

						and the lack of creative ideas of parents in utilizing the land to cultivate food for their children. Meet the nutritional needs of toddlers.
A7	**Author:** Nassreddine., et al **Journal Identity:** Nutritional Epidemiology and Public Health, Volume. 6 No. 5 DOI: https://doi.org/10.1093/cdn/nzac080 [Accessed on Wednesday, 15 May 2024]	Total Usual Nutrient Intakes and Nutritional Status of United Arab Emirates Children (<4 Years): Findings from the Feeding Infants and Toddlers Study (FITS) 2021 15	The research aims to investigate the eating habits and nutritional status of children under 4 years old in the United Arab Emirates (UAE), as well as their compliance with dietary and nutritional guidelines.	A cross-sectional survey aimed at 525 children aged 0–47.9 months was carried out in three significant emirates: Abu Dhabi, Dubai, and Sharjah.	In a cross-sectional study, data are collected from a population or a sample at one point. The researchers in this study used a stratified random cluster sampling framework to recruit participants.	This research shows that there are three burdens on toddlers experiencing malnutrition in the United Arab Emirates, where almost all toddlers fail to meet adequate fiber intake as well as micronutrient deficiencies, especially calcium, zinc, folate, and vitamins A and D. In children aged 0–4 years, as many as 10% experience stunting, 6% are thin, 17% are at risk of being overweight, 5% are overweight, and 3% are obese. This research also shows low compliance with recommendations for nutrient-dense foods, so more attention needs to be paid to policies and strategies to improve the quality of dietary patterns among children under five in the United Arab Emirates.
A8	**Author:** Okidi., et al	Disparity in	This research aims to find	In the Karamoja sub-region of	This research applied a cross-sectional	The prevalence of underweight, stunting, and

	Journal Identity: BMC Pediatrics, Volume. 22 No. 1, Halaman 1–16 DOI: https://doi.org/10.1186/s12887-022-03363-6 [Accessed on Thursday, 9 May 2024]	prevalence and predictors of undernutrition in children under five among agricultural, pastoral, and agro-pastoral ecological zones of Karamoja sub-region, Uganda: a cross-sectional study16	out whether the factors of malnutrition in children under five are related to their agroecological location.	Uganda, the research population consisted of all children under five years old who lived in three agroecological zones: agricultural, agro-pastoral, and pastoral. Phased sampling from each of the three agroecological zones yielded 240 children under the age of five and their mothers/caregivers.	approach in its design. It was conducted in pastoral, agro-pastoral, and agricultural ecosystems in the Karamoja sub-region, located in the northeastern sector of Uganda, from October to December 2019.	wasting ranges from 36 to 58% but varies according to agroecology regarding peak age, which ranges from 6 to 37 months. Child characteristics, feeding practices, home economics factors, sanitation factors, and caregiver characteristics that predict malnutrition in children under five were identified as much as ($p \leq 0.05$). This form of malnutrition is associated with contextual characteristics of the household, such as unhygienic food handling, feeding children, and poor diet.
A9	**Author:** Fatch., et al **Journal Identity:** Scientific African DOI: https://doi.org/10.1016/j.sciaf.2023.e01569 [Accessed on Wednesday,	Agricultural diversity linkage to income, wealth, diets and nutrition: Case of Lilongwe district in Malawi17	This study aims to ascertain how agricultural diversity affects wealth, income, nutrition, and diet.	The study's population comprised all farming households with children under five in Malawi's Lilongwe district. In November 2016, 424 households were polled to form the research sample.	The study employed a repeated cross-sectional study design. Researchers used statistical techniques to measure variables and examine their impacts. A solitary questionnaire was utilized to test both independent and dependent variables	This research did not find a significant relationship between agricultural diversity and the nutritional status of children, women, and men. However, agricultural diversity is a reasonable strategy to improve farming households' welfare in Malawi.

	15 May 2024]				simultaneously.	
A10	**Author:** Marinda., et al **Journal Identity:** Scientific African DOI : https://doi.org/10.1016/j.sciaf.2022.e01527 [Accessed on Thursday, 9 May 2024]	Dietary diversity and nutritional status of children aged 6–59 months from rural fishing and non-fishing communities in Zambia18	This study aims to explore dietary diversity, fish consumption, and nutritional status of children in Luapula.	The study's participants comprised all mother-child pairs residing in Luapula Province with children between 6 and 23 months. The study's target population consisted of 203 mother-child couples who were chosen through a progressive selection procedure and fulfilled the inclusion criteria.	This research uses a cross-sectional method and a semi-structured questionnaire that will be used to collect socio-economic characteristics, food intake, and anthropometric data. Then, descriptive statistical methods and Bivariate associations were also used in this study.	Children in fishing communities often need more fruits, vegetables, and animal protein despite access to fish. While food variety does not directly improve nutrition, promoting diverse local foods like fish can improve children's health.

Discussion

From the journal review that has been carried out, it was found that parental parenting patterns, unbalanced nutritional consumption, and environmental factors can influence nutritional status problems in toddlers. Research by Fatkuriyah and Sukowati (2022) explains that parenting patterns can influence the nutritional status of toddlers. Inappropriate parenting patterns can increase the risk of malnutrition by 12.6 times. The majority of parents with permissive or authoritarian parenting styles tend to have children with poor nutrition. In contrast, authoritative parenting styles that involve two-way communication and clear rules have been proven to support better nutrition. Apart from parenting patterns, the nutritional status of toddlers can be influenced by the role of the family.

This is supported by the results of research by Rahmawati et al. (2019), which

state that the role of the family is optimal in supporting the improvement of nutritional status in toddlers so that it can reduce the incidence of stunting. The role of the family can be carried out well so that the family can increase its role, especially in providing nutrition to children under five years old. In research by Kartika et al. (2021) and Kusuma et al. (2023), education was carried out to prevent nutritional status problems, namely stunting. The education provided is about providing balanced nutrition for toddlers. The results of this balanced nutrition education activity show an increased understanding of balanced nutrition among mothers of toddlers. Apart from providing balanced nutrition to overcome nutritional status problems, the environment around toddlers can also influence their nutritional status.

In Ningrum's (2019) research, food access is related to nutritional status problems in toddlers, namely stunting. It was stated that mothers who were used to buying ready-to-eat food had toddlers with nutritional status problems, namely stunting. The culture of buying ready-to-eat food is because women in the village also work outside the home, reducing the time needed for activities at home. Apart from that, research by Nassreddine et al. (2021) states that unhealthy eating patterns can also contribute to the nutritional status of toddlers. However, toddlers in farming families have nutritional status problems, namely stunting with a prevalence of more than 30% and toddlers with underweight above 5%.

This is also supported by research by Marinda et al. (2023), which explains that toddlers in non-fishing communities have a higher prevalence than toddlers in fishing communities. Apart from that, research by Fatch et al. (2023) states that no significant relationship exists between agricultural diversity and nutritional status. Research by Okidi et al. (2022) also states that environmental cleanliness influences the nutritional status of toddlers. Meanwhile, research by Purba et al. (2022) shows no significant relationship between exposure to pesticides in mothers of toddlers and the incidence of stunting in toddlers. Exposure to pesticides in toddlers also does not show a significant relationship with the incidence of stunting in toddlers.

Conclusion

The nutritional status of children under five in agricultural areas still needs to

improve. The main factors influencing toddlers' nutritional status include parenting patterns, unbalanced nutritional consumption, and environmental factors. The importance of comprehensive interventions, such as education about parenting patterns and balanced nutrition, increasing access to nutritious food, improving sanitation, and limiting exposure to pesticides, emphasizes the need for cooperation from various parties to ensure that toddlers receive optimal nutritional intake and a healthy environment for optimal growth and development.

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Conflict of Interest

None.

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Example:

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