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COVID-19 VACCINE DURING PREGNANCY RESULTS OF TRANSPLACENTAL ANTIBODY TRANSFER TO INFANTS AND THROUGH BREAST MILK: A LITERATURE REVIEW

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Abstract

Background: This comprehensive literature review investigates the outcomes of administering the BNT162B2 COVID-19 vaccine during pregnancy, focusing on transmitting antibodies through both the placenta and breast milk to infants. The study evaluates existing research findings to provide a nuanced understanding of the immunological implications for newborns born to vaccinated mothers.

Methods: This literature review employed the PICO method to develop the review question, focusing on studies published between 2020 and 2023, identified through PubMed, Google Scholar, ScienceDirect, and Scopus using specific keywords related to antibody transfer, COVID-19 vaccine, neonatal immunity, and pregnancy. **Result:** Nine articles met the inclusion criteria. The review found that COVID-19 vaccination during pregnancy promoted transplacental antibody transfer to infants and the presence of antibodies in breast milk. **Conclusion:** The results of this study of the literature show that administering the mRNA vaccination in the latter half or third of pregnancy boosts IgA along with IgG levels through transplacental transmission or breastfeeding. BNT162b2 vaccination of mothers in the second trimester is recommended. Breastfeeding has advantages, but limited evidence suggests significant SARS-CoV-2 antibody transfer postpartum. Prospective mothers are urged to vaccinate pre-delivery and consider breastfeeding for antibody transfer.

Keywords: antibodies transfer, COVID-19 vaccine, neonatal immunity, pregnancy, SARS-CoV 2 antibodies

INTRODUCTION

On December 31, 2019, the World Health Organization (WHO) received notification of several pneumonia cases. That were connected to Wuhan, China. Subsequent investigation identified a new coronavirus, named Coronavirus 2 that causes severe acute respiratory syndrome (SARS-CoV-2). In January 2020, officially the epidemic was deemed a public health emergency of global significance. Pregnancy-related problems, death, and severe sickness are all increased when SARS-CoV-2 is contracted. It is strongly advised by both public health authorities and professional organizations that expecting moms should receive the COVID-19 vaccination (Cassidy *et al.*, 2023). Increasing evidence has



shown that receiving the COVID-19 messenger RNA (mRNA) immunization while pregnant is both safe and effective (Nir *et al.*, 2022)

While the recommendation is for COVID-19 immunization to be given to expectant mothers, there are instances where some individuals may opt for vaccination antepartum or choose not to get vaccinated altogether. Recent investigations propose that expectant mothers demonstrate a proficient humoral in reaction to SARS-CoV-2 vaccination (Collier *et al.*, 2021). Furthermore, studies indicate that vaccinating during pregnancy offers advantages to infants by reducing hospitalization rates due to COVID-19 (Halasa *et al.*, 2022).

Nevertheless, understanding Passive Immunity development through maternal vaccination against COVID-19 remains limited, along with characterization of maternal antibodies generated by vaccination in babies is insufficient. In light of the capability of maternal antibodies to SARS-CoV-2 IgG towards pass antepartum fetus (Treger *et al.*, 2022) and the existence of antibodies specific to SARS-CoV-2 in infant milk (Perl *et al.*, 2021). Based on the description above, The objective of this review is to investigate the location and outcome of antibodies produced by the SARS-CoV-2 vaccination in mothers of young children through transplacental antibody transfer and breast milk.

METHOD

This literature review implemented the PICO (Population, Intervention, Comparison, and Outcome) guideline to develop the review question.

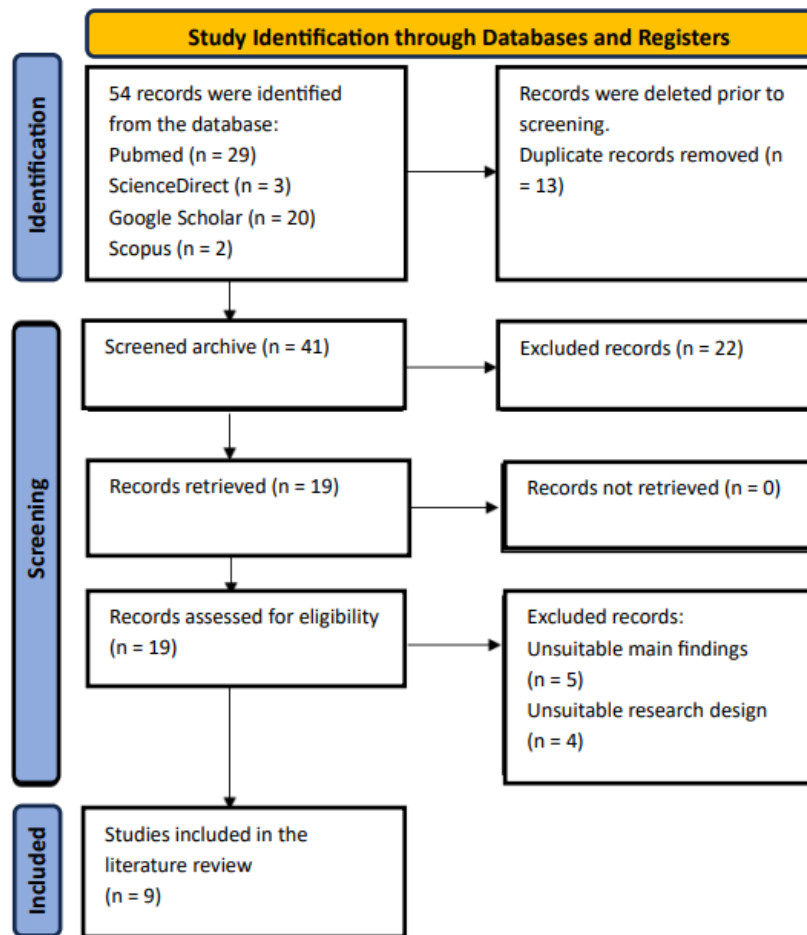
The question for this review: What is the result of COVID-19 vaccination during pregnancy on the transplacental transfer of antibodies to infants and through breast milk?

The breakdown of the PICO from the developed question is as follows.

Population	Intervention	Comparison	Outcome
Pregnant women who received the COVID-19 vaccine.	COVID-19 vaccination administered during pregnancy.	Pregnant women who did not receive the COVID-19 vaccine or antibodies	1. Presence of COVID-19 antibodies in infants through transplacental transfer. 2. Presence of COVID-19 antibodies in breast milk.

		through natural infection.	
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The researchers performed a literature review of ScienceDirect, Scopus, PubMed, and Google Scholar databases. Keywords were used to conduct a literature search such as "antibody transfer", "COVID-19 vaccine", "newborn immunity", "pregnancy", and "SARS-CoV 2 antibodies". Searches were limited to publications from 2020 to 2023 and screened based on predefined inclusion and exclusion criteria. Only English-language literature that was fully accessible or freely available online was included. A total of 54 articles were identified: 29 from PubMed, 3 from ScienceDirect, 20 from Google Scholar, and 2 from Scopus. After deduplication using the Elicit program, 13 duplicate records were removed, leaving 41 articles. Title and abstract screening resulted in the exclusion of 22 articles that did not meet the eligibility criteria, leaving 19. Of these, 18 were fully accessible to the researchers, and one was freely available online. Full-text screening excluded an additional 9 articles, 5 for addressing unrelated main findings and 4 for employing inappropriate research methodologies. The data were concisely synthesized and presented using narrative text and tables. To meet the study goals, descriptive there were analyzed along with group discussions, utilizing the retrieved data as well as pertinent references.



Picture 1. PRISMA Diagram Cycle

RESULT AND DISCUSSION

Nine literary works that have been considered share the following characteristics: they were released between 2020 and 2023. English was utilized in the nine literary works, eight of them were full texts accessible to researchers, and one can be summarized at no cost through the website. The nine included literature were case reports, cohort studies, cross-sectional, rapid reviews, and systematic reviews. By looking at the findings and discussion of each piece of included literature, this literature review design qualitatively descriptively analyzed the material. The researchers devised a table for the systematic extraction of pertinent data, in alignment with the specific themes under consideration in this overview of the literature. The compiled data within the table encompassed details such as the journal title, authorship, publication year, study design, geographical region, intervention/setting, and the primary outcomes derived from each study. While all the studies incorporated keywords such as pregnancy, the COVID-19 vaccination, the conveyance of antibodies, neonatal immunity, along SARS-CoV-2 antibodies, it is noteworthy that a subset of the included studies did not explicitly delve into

these topics. Nevertheless, it is imperative to underline that all studies retained the requisite data sought by the researchers.



Table 1. Data Extraction of Literature Search Results

No	Author	Title	Objective	Population	Intervention	Outcome and Result
1.	(Kugelman et al., 2022)	Maternal and Neonatal SARS-CoV-2 Immunoglobulin G Antibody Levels at Delivery After Receipt of the BNT162b2 Messenger RNA COVID-19 Vaccine During the Second Trimester of Pregnancy.	Cohort-study to assess antibody transfer in pregnant women vaccinated with two doses of COVID-19 vaccine.	Women with one pregnancy beyond 24 weeks gestation, vaccinated at least 7 days before, without prior COVID-19 infection.	Received second dose of COVID-19 vaccine at ≥ 24 weeks gestation.	Placental antibody transfer was observed, indicating successful transplacental passage of antibodies following full COVID-19 vaccination during pregnancy. Breast milk antibody presence was not assessed.



2.	(Nir et al., 2022)	Maternal-Neonatal Transfer Of SARS-Cov-2 Immunoglobulin G Antibodies Among Parturient Women Treated With BNT162b2 Messenger RNA Vaccine During Pregnancy.	Cohort-study comparing antibody transfer between vaccinated and COVID-19-recovered pregnant individuals.	Pregnant individuals who received Pfizer-BioNTech (BNT162b2) mRNA vaccine while conceiving compared to COVID-19-recovered pregnant females.	Pfizer-BioNTech (BNT162b2) mRNA vaccine during pregnancy.	Placental antibody transfer was present in vaccinated individuals, comparable to or greater than that in COVID-19-recovered pregnant individuals. Breast milk antibody presence was not evaluated.
3.	(Gray et al., 2021)	COVID-19 Vaccine Response In Pregnant And Lactating Women: A Cohort Study.	Cross-sectional study to determine antibody transfer after COVID-19 vaccination during various trimesters of pregnancy.	Pregnant women who received Pfizer or Moderna; first dose at mean 23.2 weeks, mostly in 2nd trimester (46%), 1st (13%), and 3rd (40%).	COVID-19 mRNA vaccination during 1st, 2nd, or 3rd trimester.	Antibodies were detected both in cord blood and breast milk, with measurable transplacental transfer and secretion into breast milk, regardless of trimester at the time of vaccination.

4.	(Muyldermans et al., 2022)	The Effects of COVID-19 Vaccination on Lactating Women: A Systematic Review of the Literature.	Systematic review to investigate antibody presence following various COVID-19 vaccines during pregnancy or lactation.	Pregnant or nursing women vaccinated with multiple COVID-19 vaccine types.	Pfizer, Moderna, AstraZeneca, Johnson & Johnson, or inactivated SARS-CoV-2 vaccines	Breast milk samples contained antibodies following various types of COVID-19 vaccination during pregnancy or lactation, but no data was provided on placental antibody transfer.
5.	(Cassidy et al., 2023)	Assessment of Adverse Reactions, Antibody Patterns, and 12-month Outcomes in the Mother-Infant Dyad after COVID-19 mRNA Vaccination in Pregnancy.	Cohort-study to study antibody transfer via breast milk following COVID-19 vaccination during pregnancy and postpartum booster.	Women vaccinated with COVID-19 mRNA vaccine during any pregnancy stage; some received third dose after delivery.	Pfizer-BioNTech (BNT162b2) or Moderna (mRNA-1273) during pregnancy, with possible postpartum booster.	Breast milk was shown to contain antibodies following mRNA vaccination during pregnancy and/or postpartum booster, but placental antibody transfer was not reported in this study.

6.	(Beharier et al., 2021)	Efficient Maternal To Neonatal Transfer Of Antibodies Against SARS-Cov-2 And BNT162b2 Mrna COVID-19 Vaccine.	Cohort-study to compare maternal and fetal humoral response following antenatal BNT162b2 vaccination versus natural SARS-CoV-2 infection.	Pregnant women grouped into vaccinated (n=86), infected (n=65), and unvaccinated controls (n=62) across 8 Israeli medical centers; blood samples taken at delivery.	BNT162b2 mRNA vaccination during pregnancy.	Maternal IgG (anti-S, RBD) from BNT162b2 crossed placenta with near-maternal levels in fetus within 15 days; transfer lower in 3rd vs. 2nd trimester infection; fetal IgM only detected in infection group; breast milk data not reported.
7.	(Sajadi et al., 2023)	Maternal Transfer Of Iga And Igg SARS-Cov-2 Specific Antibodies Transplacentally And Via Breast Milk Feeding.	Cross-sectional study to evaluate antibody transfer in vaccinated breastfeeding mothers.	Mother-infant pairs; mothers breastfed and were vaccinated before or after delivery.	COVID-19 vaccination before or after delivery during breastfeeding.	Both placental and breast milk antibody transfer were confirmed, with antibodies detected in cord blood and breast milk of mothers vaccinated during pregnancy or postpartum.

8.	(Ghorbani et al., 2023)	Effectiveness, Immunogenicity and Safety of COVID-19 Vaccination in Pregnant Women: A Rapid Review Study.	Rapid review study to determine antibody transfer from mRNA and inactivated vaccines during pregnancy.	Pregnant women who received Sinopharm BIBP (inactivated), Pfizer-BioNTech (BNT162b2), or Moderna (mRNA-1273).	Vaccination with mRNA or inactivated COVID-19 vaccines during pregnancy.	Antibodies were present in both the placenta and breast milk following administration of either mRNA or inactivated COVID-19 vaccines during pregnancy, supporting dual routes of passive immunity.
9.	(Kigel et al., 2023)	Maternal Immunization During the Second Trimester with BNT162b2 mRNA Vaccine Induces a Robust IgA Response in Human Milk: A Prospective Cohort Study.	Cohort-study to compare antibody levels in breast milk between vaccinated postpartum women and pre-pandemic controls.	73 women vaccinated with Pfizer-BioNTech (BNT162b2) during 2nd or 3rd trimester; compared to 16 breast milk samples from pre-pandemic controls.	Pfizer-BioNTech (BNT162b2) during 2nd or 3rd trimester of pregnancy.	Antibodies were detected in the breast milk of women vaccinated with mRNA vaccines during the second or third trimester, whereas pre-pandemic control samples lacked such antibodies. Data on placental transfer was not reported.

Before delving into the data regarding the placenta and breast milk as routes for the transmission of maternal antibodies, it is crucial to underscore that as of now, there is no proven correlation to immunity towards COVID-19 disease or SARS-CoV-2 infection (Krammer, 2021). Vaccines and natural infections both provide protection through various mechanisms. The assessment of individual elements, like the antibody response, is more straightforward compared to measuring cellular immune responses. As a result, much of the research in this field has predominantly concentrated on studying antibody responses (Jorgensen, Burry and Tabbara, 2022). The vaccination's efficacy may be correlated with quantities of antibodies that specifically neutralize SARS-CoV-2, based on many published research (Khoury *et al.*, 2021). Based on the literature reviewed, the safety of COVID-19 vaccination during pregnancy is examined efficacy administration while expecting to transfer immunity from mother to baby through both transplacental transmission and breast milk.

From Table 1. Research studies exploring the concept of antibody transfer from mothers to infants, as depicted in Table 1, were conducted in various countries, including Israel ($n = 4$), the USA ($n = 1$), Iran ($n = 2$), Spain ($n = 1$), Brazil ($n = 1$), Italy ($n = 1$), Poland ($n = 1$), Portugal ($n = 1$), Singapore ($n = 1$), and The Netherlands ($n = 1$). These studies investigated the effectiveness of administering the COVID-19 vaccine's efficacy on the presence of antibodies in infants.

A total of nine studies were identified that evaluated transplacental antibody transfer and the transfer via breast milk to infants. The initial discussion related to research reports that exclusively mention the transfer of antibodies to infants through the transplacenta includes studies numbered 1, 2, and 6. Studies numbered 3, 7, and 8 reported both transplacental and breast milk antibody transfer. Studies numbered 4, 5, and 9 exclusively reported the transfer of antibodies through breast milk without discussing transplacental transfer. In addition, study number 6 reported fetal IgM response detected only in the infection group.

The first study demonstrated that mothers who obtained the COVID-19 mRNA vaccination from Pfizer-BioNTech (BNT162b2) in a double dose during their second trimester developed antibodies against COVID-19. These mother's

antibodies were passed through the placenta and into the newborns, as evidenced by antibody levels in newborns that were on average 2.6 times higher than in their mothers at delivery. All mothers in the study had positive COVID-19 antibody levels at delivery. Additionally, a favorable association was shown between mother as well as newborn antibody levels, meaning that mothers with higher antibody levels tended to have newborns with higher antibody levels as well. This data shows that mRNA vaccination during pregnancy confers protection for both mothers and infants through placental antibody transfer.

The second investigation's findings by Nir et al. align with the first study's findings. Nir's study looked at females who got the Pfizer BioNTech mRNA (BNT162b2) vaccination in two doses within 14 days before giving birth. It furthermore found efficient transmission of the mother's SARS-CoV-2 antibodies (IgG) towards the newborn via the placenta. Similar to the first study, a favorable association was seen between the concentrations of mother blood and neonatal cord blood of these antibodies. Additionally, vaccinated mothers were found to have significantly higher levels of their blood samples including cord blood from neonates with SARS-CoV-2 IgG opposed to mothers who had simply recovered from COVID-19 naturally. This reinforces the conclusion that mRNA vaccination during pregnancy confers high levels of antibody protection against COVID-19 in newborns.

In the sixth study, the multivariable analysis indicated that babies conceived to third-trimester individuals carrying the SARS-CoV-2 virus, as opposed to early pregnancy, were less likely to be born with neutAb or anti-S IgG+. Conversely, maternal vaccination before delivery was associated with increased odds of infants possessing neutAb or anti-S IgG+ from birth, as opposed to those not vaccinated (Lacourse et al., 2023)."

Next, research numbers fourth, fifth, and ninth exclusively report the sole way that antibodies are given to babies via breast milk. As reported by Muyldermans *et al.* (2022), a pregnant woman injected along mRNA-1273 (Moderna) or BNT162b2 (Pfizer-BioNTech) or ChAdOx1 nCoV-19 (Oxford - AstraZeneca) or JNJ-78436735 (Johnson & Johnson) as or the SARS-CoV-2 entire virus inactivation, with no specific dosage and semester of pregnancy, at least



during pregnancy has great potential to transfer antibodies to infants through breast milk. In the fifth research, expectant mothers were immunized with COVID-19 mRNA using Moderna's mRNA-1273 nor Pfizer-BioNTech's BNT162b2 at any time while gestation, with 2-3 doses (Cassidy *et al.*, 2023).

The ninth study examined 62 breastfeeding women who had gotten the COVID-19 mRNA vaccination while in the third or second trimester of pregnancy. Notably, the study found that vaccination with two doses regarding the Pfizer-BioNTech vaccination (BNT162b2) prompted high levels of IgA antibodies against COVID-19 in breast milk, especially colostrum milk produced shortly after birth. The highest IgA levels were seen when, in the subsequent trimester, the second vaccination dosage was administered. Since IgA antibodies protect mucous membranes and are present in milk throughout lactation, this implies that vaccination during pregnancy could offer defense to infants via breastfeeding. These IgA antibodies are being transferred underscoring the importance of maternal vaccination for infant health.

In contrast to studies exclusively reporting antibody transfer via either the transplacental or breast milk routes, evidence was uncovered indicating that pregnant women receiving the vaccine during the 1st, 2nd, or 3rd trimester, or throughout the gestational phase, demonstrated antibody transfer through both transplacental and breast milk pathways to infants, as seen in studies numbered 3, 7, and 8, as delineated in Table 1.

In the third study it is reported, that the umbilical cord with the lowest levels of RBD along with SARS-CoV-2 spike resistance of IgG antibodies proteins belonging to a mother whose two initial vaccinations were administered in between, having obtained her first dosage just seventeen days before giving birth. This indicates that having both doses may be crucial for maximizing the transfer of immune protection to the baby (Gray *et al.*, 2021). Notably, the amount of S-specific IgG1 transferred increased noticeably to the cord over time after the booster dose. IgA and IgM antibodies against RBD in breastmilk did not increase significantly after either vaccine dose. However, IgG1 antibodies against RBD rose significantly from baseline (V0) to after the second dose (V2), but not from baseline to following the initial dosage (V1). This suggests that the subsequent vaccine dose

boosts the transfer of IgG antibodies to breast milk, while IgA antibody transfer remains consistent but unboosted (Gray *et al.*, 2021). However, other research reported, that high-titer anti-spike IgA presence was actually present in the nares of babies whose moms had antepartum vaccinations was also an unexpected finding (Sajadi *et al.*, 2023).

The primary outcomes from the seventh study conducted by Sajadi *et. al.* (Table 1) regarding the transfer of antibodies through both transplacental and breast milk routes suggest that infants who are fed with breast milk develop anti-spike IgG antibodies throughout the body only become mothers are present received the vaccination during pregnancy. As a result, the most effective approach for providing both systemic and local anti-SARS-CoV-2 antibodies to babies seems to involve immunization during pregnancy, then nursing.

The eighth study by Ghorbani *et al.* (2023), it is reported that vaccination against COVID-19 throughout pregnancy poses not at danger of virus transmission to babies throughout breastfeeding, since the vaccines do not contain live virus. Moreover, antibodies produced after breast milk may guard newborns against vaccinations. Overall, the study demonstrated that vaccination is effective in pregnant women - it helps them develop strong COVID-19 immunity, enabling the transmission of shielding antibodies to young children through breastfeeding and the placenta.

Maternal IgG by attaching to newborn Fc receptors, antibodies are transported from the mother to the fetus through the placenta. (FcRn) (Borghi *et al.*, 2020). This literature review demonstrated this transplacental antibody transfer - mothers vaccinated against SARS-CoV-2 antepartum passed anti-spike IgG and IgA antibodies to their infants. Additionally, consistent with prior research, the review found that vaccination during pregnancy can elicit suppressing SARS-CoV-2-related antibodies in infant milk, thereby conferring protection to infants (Narayanaswamy *et al.*, 2022).

This is one of the few literature reviews that examine the effects of the SARS-CoV-2 vaccine and the transfer of antibodies to infants via placenta and breast milk. The included studies had geographically diverse populations spanning 10 countries globally. They examined the transmission of antibodies across the



placenta as well as breastmilk, demonstrating the existence alongside the capacity of antibodies to fend against SARS-CoV-2 in newborns. This review provides real-world answers to pressing questions from physicians and mothers about The COVID-19 vaccine during gestation. The implications extend beyond just this pandemic - the objective evidence generated can guide strategies to optimize maternal and infant health outcomes in potential future disease outbreaks. These globally representative data lay the groundwork for evidence-based pandemic planning and management.

This research has flaws too. Reporting bias could skew findings since COVID-19 cases in babies and breastmilk get more attention. Also, cherry-picking some examples to support hypotheses is questionable.

CONCLUSION AND SUGGESTION

This study offers supporting evidence indicating that the administration of giving pregnant women an mRNA vaccination in either the second or third trimesters increases vaccine-specific IgA and IgG levels through either transplacental transmission or breastfeeding. Therefore, thus recommend the BNT162b2 mRNA vaccination administered to mothers in the subsequent trimester as the most advisable approach. While breastfeeding holds numerous advantages for infants, there is a lack of substantial evidence suggesting a significant transmission of SARS-CoV-2-specific antibodies from mothers who received vaccinations to their offspring if vaccination occurs postpartum. Therefore, prospective mothers are encouraged to consider receiving the vaccine before delivery and contemplate breastfeeding if parents wish to give their babies antibodies particular to SARS-CoV-2.

DECLARATION

Conflict of Interest

The authors confirm that there are no conflicts of interest to disclose.

Authors' Contribution

The author designed the study, selected and reviewed the relevant literature, and synthesized the findings. The manuscript was entirely drafted, critically reviewed, and edited by the author.

Ethical Approval

This study did not use Ethical Approval.

Funding Source

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Data Availability

All data discussed in this study are included in the manuscript. The analyzed datasets can be obtained from the corresponding author upon reasonable request.

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FAMILY-RELATED DETERMINANTS SHAPING EMOTIONAL BEHAVIOR IN CHILDREN

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Abstract

Background: Emotional behavior in children is rarely addressed through early screening, despite its importance in child development. The family plays a central role; however, prior studies vary in the family aspects they examine, with some factors receiving more attention than others. This review aims to synthesize which family-related determinants are most frequently studied about children's emotional behavior. **Method:** A literature search was conducted using the keywords “family” AND “child*” AND “emotional OR behavior” AND “internalizing OR externalizing,” limited to English-language, full-text, open-access articles published between 2020 and 2025. Databases included ScienceDirect, PubMed, and Google Scholar. The PICO framework guided the research question. A total of 1,449 articles were initially identified. Elicit (elicit.com) was used to assist the screening and selection process. After applying inclusion and exclusion criteria, seven articles were eligible for review. **Result:** The seven studies examined various family-related factors influencing children's emotional and behavioral outcomes. Recurring themes included parenting style, family conflict, parenting stress, parental mental health, and family structure. Supportive parenting, consistent routines, and a positive emotional climate were associated with better emotional regulation, while harsh discipline, conflict, and poor parental mental health were linked to greater emotional and behavioral problems. Some studies identified mediating or moderating factors such as resilience, sleep quality, and neural responses, reflecting the complex interplay between family environments and child development. **Conclusion:** Children's emotional and behavioral development is shaped by multiple interrelated family factors. Interventions should be multidimensional, addressing parenting practices, caregiver mental health, and household stability to support child well-being.

keyword: family factors, children, emotion, behavior

INTRODUCTION

Children's emotional behavior refers to how they express, regulate, and understand emotions in daily interactions—abilities that are influenced by both their innate temperament and the quality of attachment with their primary caregivers. Emotional and behavioral problems in children are characterized by patterns that are extreme, persistent, and developmentally inappropriate, potentially disrupting social, academic, and family functioning (Ogundele, 2018; Malik and Marwaha, 2022). In Indonesia, 1.9% of children aged ≥ 1 year (equivalent to

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863,402 children) were reported to have developmental delays in physical, mental, or sensory functions, including 0.1% with ADD/ADHD/ODD and 0.1% with conduct disorder (Badan Kebijakan Pembangunan Kesehatan, 2023).

Family is a key determinant of children's emotional and behavioral development, as it serves as the primary environment for early socialization (Thümmeler, Engel and Bartz, 2022). However, the term "family factors" is often used broadly, encompassing various aspects such as parenting style, parent-child relationships, and parental mental health. Prior studies have assessed different components. Pritchett et al. (2010) included discipline, beliefs, and marital quality; Morris (2007) emphasized parenting practices and emotional climate; Wu (2024) focused on parenting styles and family support systems; and the National Academies of Sciences, Engineering, and Medicine (2019) highlighted attachment, mental health, and housing (Morris *et al.*, 2007; Pritchett *et al.*, 2011; National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Board on Children, Youth, 2019; Wu, 2024). This variation reflects both the richness and the inconsistency in defining family factors. Therefore, this review aims to synthesize what specific aspects have most commonly been referred to as "family factors" in recent studies, and to identify the dominant themes related to children's emotional and behavioral outcomes.

METHOD

The literature search was conducted using the following keywords: "family" AND "child*" AND ("emotional OR behavior") AND ("internalizing OR externalizing"). The search using these keywords was limited to the years 2020 - 2025 (the last 5 years). In addition, the literature search was limited to literature that used English and could be accessed in full text.

This literature review implemented the PICO (population, Intervention, Comparison, and Outcome) guidelines to develop the review question guidelines. The question for this review: What are the most commonly studied aspects referred to as "family" or "family factors" that influence children's emotional and behavioral well-being?

Table 1 Breakdown of the PICO Elements Based on the Review Question

Population	Intervention	Comparison	Outcome
Children aged 0–17 years (with a focus on studies discussing emotional and behavioral development).	Family-related factors (e.g., parenting style, parenting stress, parent-child relationship, family conflict, housing, parental mental health).	Not always applicable in a literature review, but where relevant: comparison between different family factors or between different levels of exposure (e.g., high vs. low parenting stress).	Emotional and behavioral outcomes in children (e.g., emotional regulation, internalizing / externalizing problems, social competence, resilience).

During the search process, 1449 relevant articles published since 2020 were identified. The literature search process was conducted through ScienceDirect, PubMed, and Google Scholar databases. The selection process of the article included in this review was conducted using the Elicit (elicit.com) to identify relevant articles. The articles reviewed are open access, published between 2020 and 2025. Seven relevant articles meeting the criteria were identified.

Table 2 Inclusion and Exclusion Criteria for Selecting Studies in the Literature Review

Criteria	Inclusion	Exclusion
Population	Children and adolescents (0–18 years old)	Adults or unrelated populations
Exposure / Interest	Studies examining family-related factors (e.g., parenting style, parental mental health, attachment, housing, family functioning)	Studies focusing solely on non-family factors (e.g., school, peers, biological/genetic factors)
Outcome	Emotional and/or behavioral outcomes in children (internalizing/externalizing symptoms, emotional regulation, etc.)	Physical health outcomes only (e.g., nutrition, stunting, obesity)
Study Type	Empirical studies (quantitative, qualitative, or mixed methods); systematic/narrative reviews if relevant to the aim	Editorials, commentaries, protocols, or case reports
Publication Year	Published between 2020–2025	Published before 2020
Language	English	Non-English
Accessibility	Open access, full-text articles available	Abstract-only or paywalled articles

A total of seven articles were selected and included in this review, all published between 2020 and 2025. All the literature was written in English, available in full text, and open access. The included studies consisted of observational cross-sectional research and systematic reviews. This literature review used a qualitative descriptive approach by analyzing the results and discussions of each study.

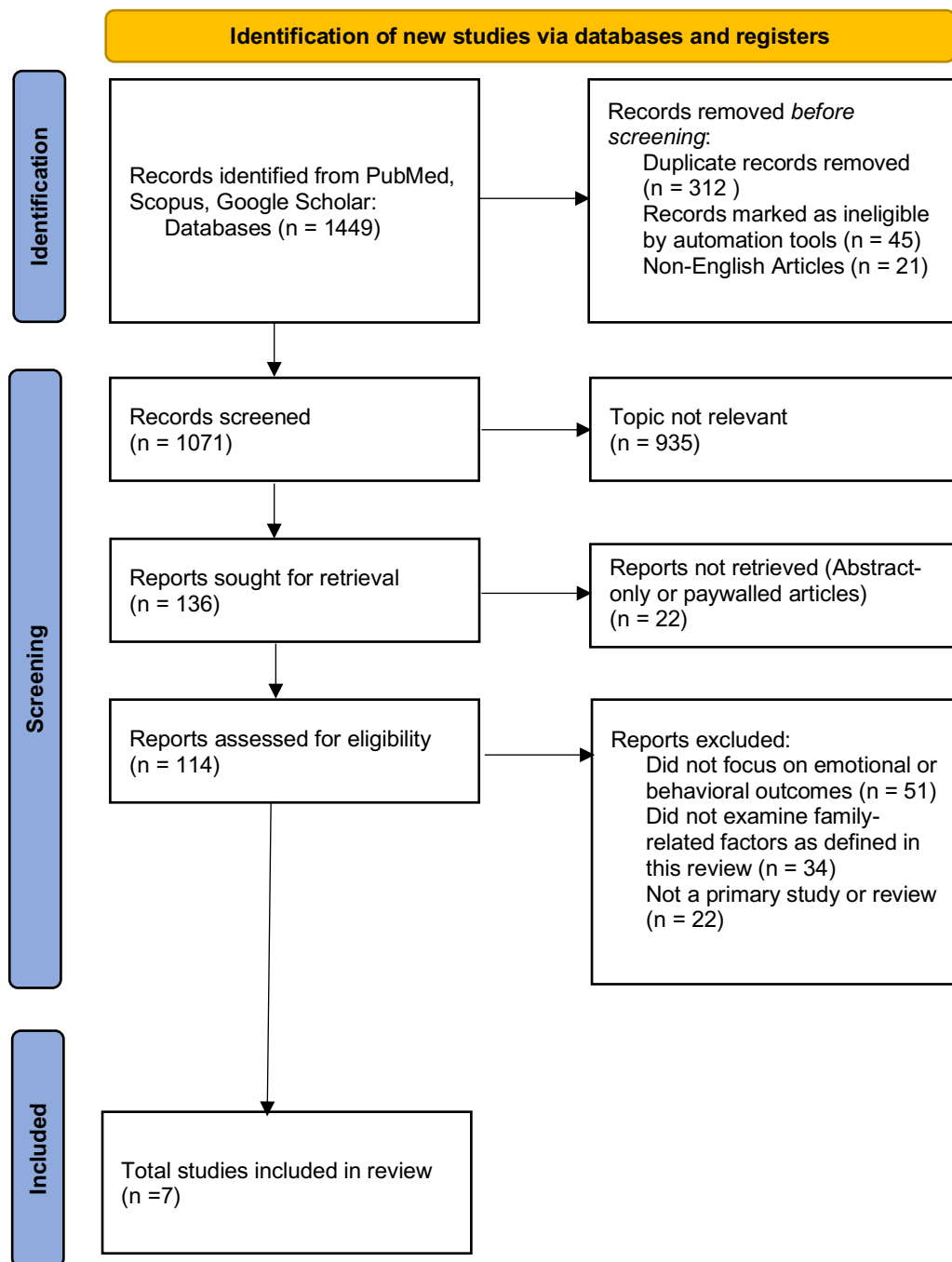


Figure 1 PRISMA 2020 Flow Diagram of the Study Selection Process

Duplicate records were removed based on identical titles, authors, publication years, and study objectives appearing across multiple databases. Records marked as ineligible by automation tools refers to articles excluded using automated screening on Elicit.org based on abstract content. The tool was configured to exclude studies whose abstracts did not mention key concepts relevant to this review, such as 'emotional and behavioral problems,' or 'children.' Articles that lacked any of these core terms were automatically filtered out at the abstract screening stage.

RESULT AND DISCUSSION

A data extraction table was created by the researcher, containing information such as the study title, author(s), year of publication, and key findings. All included studies identified "family factors" as variables influencing children's emotional and behavioral outcomes. However, each study defined and interpreted "family factors" differently. Therefore, this review aims to explore which specific family aspects are most commonly referred to as influencing children's emotional and behavioral development.

Table 3 Review Table of Articles Included in This Study

Author	Title	Objective	Method	Result
Chen <i>et. al</i> (2022)	How do Family Factors Impact Children's Emotional Regulation?	To investigate how different family factors, including relationships and environment, influence children's ability to regulate their emotions and to highlight the importance of family dynamics in emotional development.	The study is a review of previous research, analyzing various family-related influences such as parental relationships, family conflicts, violence, and emotional climate, and their effects on children's emotional regulation.	The review concludes that positive qualities of the parent-child relationship, parental responses, and emotional regulation significantly promote better emotional regulation in children. Conversely, family conflicts, violence, and insecure attachments tend to impair children's emotional regulation abilities.
Wu, Shu (2024)	The Influence of Family Nurturing Environment on Children's Emotions and Behaviors	To explore how the family upbringing environment influences children's emotional and behavioral development, and to analyze the underlying theoretical frameworks and research evidence	Systematic literature review; proposes future intervention strategies to enhance children's emotional and behavioral development through improvements in family atmosphere, parenting styles, and support systems.	the family upbringing environment significantly influences children's emotional and behavioral development. supportive parenting styles, warm family atmospheres, healthy interaction patterns, and strong social support systems—promote emotional well-being and positive behavior in children.
Song, <i>et al.</i> (2023)	Family Function and Emotional Problems in Chinese Children and Adolescent: a moderated mediation model	this study aims to examine how resilience mediates the relationship and how sleep quality moderates it through a moderated mediation model.	A cross-sectional survey of 6363 children and adolescents in Anhui Province, China, using self-administered questionnaires to measure family function, resilience, sleep quality, and emotional behavior	This study suggest that family function, which was referred as family cohesion and communication) is related with emotional and behavioral problem in children and adolescent
Ma, <i>et. al</i> (2022)	Family Correlates of Emotional and Behavioral Problems in Nepali School Children	This study aims to assess children's internalizing and externalizing problems and how it's related to their family backgrounds, that are parental	Cross-sectional observational study among 3840 Nepali children aged 6–18 years using the CBCL/6-18 and a background questionnaire to assess	Parental mental/physical illness, family conflict, disagreement in child-rearing, and physical punishment were positively associated with both internalizing and externalizing

		education, family structure, parental mental illness, family conflict, and physical punishment which is part of parenting style	family factors; analyzed with bivariate correlations and multiple regression.	problems; parental education, family structure, and migrant worker mothers were associated with externalizing problems, though effect sizes were small.
Peovska, Natasha (2022)	Family Factors and Their Effects on Child Violent Behavior	To discuss and examine family characteristics that may serve as risk factors for children's violent behavior, drawing on findings from recent criminological research, with particular emphasis on the presence of antisocial or criminal behavior in one of the parents as a major contributing factor.	A narrative review of previous research studies on family-related factors associated with children's aggressive and violent behavior.	Research on resilience and vulnerability highlights that although factors such as parental substance abuse, antisocial or criminal behavior, domestic violence, poor parent-child relationships, and adverse family events are strongly associated with increased violent behavior in children, their impact may vary depending on the presence of other mitigating influences.
Sylvia C. Lin et al. (2024)	Family and parenting factors are associated with emotion regulation neural function in early adolescent girls with elevated internalizing symptoms	To examine the relationships between family and parenting factors, neural correlates of emotional reactivity and regulation, and internalizing symptoms in early adolescent girls with elevated anxiety and depression symptoms.	The study employed functional magnetic resonance imaging (fMRI) to assess brain activity during emotional reactivity and regulation tasks, specifically focusing on early adolescent girls aged 10-12 years who were identified as having elevated internalizing symptoms. The researchers analyzed how maternal emotion regulation, maternal emotion socialization behaviors, and the family emotional climate affected neural activity related to emotion processing.	Findings indicated that a positive family emotional climate was associated with increased activation in brain regions crucial for emotional processing, such as the anterior cingulate and middle temporal cortices. Maternal difficulties in emotion regulation correlated with greater brain activation in areas connected to affect labeling. However, the study did not find significant mediation effects of brain function in the relationship between family/parenting factors and adolescent internalizing symptoms, suggesting a complex interplay that warrants further investigation.



Rikuya Hosokawa et al. (2023)	Associations between Family Routines, Family Relationships, and Children's Behavior	To examine the associations between family routines, family relationships, and the behavior of elementary school children.	The study involved a survey of parents (N = 1515) of third-grade students (8–9 years old) in Japan, where they completed a self-administered questionnaire in 2017. A path analysis was conducted to assess the relationships between family routines (predictor), family relationships (mediator), and children's behavior (criterion).	The findings indicated that family routines were significantly correlated with children's behavior, showing a positive relationship with internalizing problem behaviors, externalizing problem behaviors, and prosocial behaviors through the mediating factors of family relationships (cohesiveness, expressiveness, and conflict). Specifically, cohesive and expressive family relationships were associated with lower levels of externalizing and internalizing behaviors, while family conflict was linked to higher levels of these problems
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Parenting Style And Children's Emotional Behavior

Parenting style, shaped by parents' emotional bond and responses to their children, plays a key role in shaping children's values and behavioral standards (Kochanska *et al.*, 2015). Wu (2024) found that supportive parenting promotes emotional well-being and positive behavior, while Ma *et al.* (2022) showed that authoritarian practices such as physical punishment are linked to increased internalizing and externalizing problems (Ma *et al.*, 2022; Wu, 2024). These findings highlight the important role of parenting style in children's emotional health and behavioral adjustment.

Authoritative parenting balances firm rules with child participation in decision-making, using discipline as guidance rather than punishment (Sanvictores and Mendez, 2022; Wu, 2024). It emphasizes warmth, support, and open communication, fostering independence. Though demanding effort from both sides, this style is linked to positive emotional and behavioral outcomes in children (Sanvictores and Mendez, 2022). Authoritarian parenting emphasizes strict control, obedience, and harsh punishment, often with little warmth or communication. Parents expect unquestioned compliance, discourage independence, and use one-way communication (Ma *et al.*, 2022; Sanvictores and Mendez, 2022; Wu, 2024). Though it may result in temporary obedience, it is linked to low self-confidence, poor decision-making, and increased aggression in children. In contrast, permissive parenting involves high responsiveness but low demands for discipline and responsibility (Sanvictores and Mendez, 2022). These parents impose few rules and allow children significant freedom. While it may promote social confidence, it is associated with impulsivity, selfishness, and poor self-regulation. (Coulacoglou and Saklofske, 2017; Sanvictores and Mendez, 2022).

These reviewed studies show that parenting style significantly influences children's emotional and behavioral outcomes. Authoritative parenting is linked to better emotional regulation and fewer behavioral issues, while authoritarian and permissive styles are more often associated with emotional difficulties and problem behaviors. This positions parenting style as a central aspect among the family-related factors affecting children's development.



Parent-Child Relationship

The parent-child relationship is a dynamic bond shaped by ongoing interactions, whether in biological or adoptive families (Mihalec-Adkins, 2020). It is intersubjective and influenced by multiple factors, including caregiver traits, emotional mindset, parenting practices, and parental mental health (Sroufe and Rutter, 1984; Cicchetti, Toth and Lynch, 1995; Speranza *et al.*, 2020). While parenting style and parental mental health affect this relationship, they are often studied separately due to their distinct and measurable impacts on children's emotional and behavioral outcomes. Meanwhile, the parent-child relationship itself serves as an independent indicator of emotional bonding, communication, and attachment quality.

The quality of the parent-child relationship plays a vital role in children's emotional and behavioral development. Secure attachments are associated with better emotional regulation, while insecure bonds may lead to emotional difficulties (Chen *et al.*, 2022). Poor relationships increase the risk of violent behavior, whereas strong parental involvement helps foster emotional well-being and prosocial behavior (Peovska, 2022; Wu, 2024). Disagreements between parents in child-rearing practices have been linked to more internalizing and externalizing problems, indicating the importance of consistent and cooperative parenting. Additionally, family routines shared daily activities can either protect or elevate the risk of emotional and behavioral issues depending on their quality and consistency (Chen *et al.*, 2022; Ma *et al.*, 2022). Overall, the parent-child relationship serves as a core foundation for children's emotional and behavioral adjustment, with its quality shaped by attachment security, parental involvement, consistency, and shared routines, being closely linked to both protective and risk factors in child development.

Family Structure

Housing refers to residential living spaces that function as shelters, encompassing not only the physical structure of a home but also the supporting infrastructure and environment (Oxford University, 2011). It includes various measurable aspects such as residential mobility, the physical quality of housing,

household density or family composition, housing ownership and cost, and access to necessities (Clair, 2019). Similarly, O'Donnell and Kingsley (2020) outlined that housing factors consist of household density or composition, residential mobility, type of housing, neighborhood conditions, and housing-related expenditures (O'Donnell and Kingsley, 2020).

Among these various housing aspects, family structure is one of the most frequently discussed about child development, particularly emotional and behavioral outcomes. Ma et al. (2022) found that family structure is associated with externalizing behavioral problems, although the effect size was small (Ma *et al.*, 2022). In addition to family structure, household composition, specifically the number of family members living under the same roof, can also influence children's emotional behavior. Children in families with multiple siblings may experience increased competition, potentially affecting their emotional regulation and social dynamics. Furthermore, in multigenerational households, where grandparents or other extended family members co-reside, caregiving responsibilities are often shared among adults beyond the biological parents. This caregiving arrangement can shape the child's emotional development and socialization in both supportive and complex ways (Pilkauskas, Garfinkel and McLanahan, 2014; O'Donnell and Kingsley, 2020; Ma *et al.*, 2022).

Parenting Stress and Parental Mental Health

Parenting stress refers to the psychological strain experienced when parenting demands exceed available resources, often triggered by children's difficult behaviors (Coulacoglou and Saklofske, 2017). Prolonged stress can disrupt parent-child interactions and deteriorate parental mental health, increasing the risk of anxiety, depression, and emotional dysregulation (Neece, Green and Baker, 2012). As mental health declines, parents may struggle to provide consistent and sensitive care, potentially reinforcing children's emotional and behavioral problems. Thus, parenting stress affects child outcomes both directly and indirectly through its impact on parental mental well-being (Coulacoglou and Saklofske, 2017).



Parental mental illness is a key risk factor for children's emotional and behavioral problems, driven by genetic and socio-environmental influences. Beyond heredity, strained parent-child relationships, poor parenting skills, social isolation, and poverty can increase children's vulnerability (Ma *et al.*, 2022). Children exposed to a parent's internalizing or externalizing symptoms may lack emotional guidance and imitate maladaptive behaviors. In contexts like Nepal, underreporting due to stigma suggests the actual prevalence may be higher. When left untreated, parental mental illness can lead children to internalize distress and confusion, increasing their risk of poor emotional adjustment (Ma *et al.*, 2022).

Parental mental health issues are often accompanied by substance abuse, antisocial behavior, or criminal activity, which further destabilize the caregiving environment (Peovska, 2022). These challenges hinder parents' ability to provide emotional support and consistent care. As a result, children may experience neglect, emotional unavailability, or exposure to conflict, increasing their risk of anxiety, depression, aggression, and delinquency. Such environments not only harm children's immediate well-being but can also perpetuate emotional and behavioral problems across generations (Peovska, 2022).

In general parental stress and mental health play a pivotal role in shaping children's emotional and behavioral outcomes. When parents experience chronic stress or mental health challenges, especially in the absence of coping resources, their ability to offer stable, sensitive care is compromised. This can lead to strained parent-child interactions and increase the likelihood of children developing emotional or behavioral problems.

Family Conflict and Cohesion

Family functioning is typically assessed through cohesion, expressiveness, and conflict (Hosokawa, Tomozawa and Katsura, 2023). *Cohesion* reflects emotional bonding and support among family members, *expressiveness* refers to how openly emotions are shared, and *conflict* indicates the level of anger and disagreement within the family. Additionally, structured and repetitive daily interactions, which form family routines, provide consistency and stability in children's lives, supporting emotional regulation and overall family organization.

Several studies underscore the strong impact of family dynamics, especially conflict, cohesion, and emotional climate on children's emotional and behavioral development. Chen et al. (2022) found that family conflict and violence impair children's emotional regulation. In contrast, Wu (2024) emphasized that warm family environments, healthy interaction patterns, and strong social support promote emotional well-being and positive behavior. Song et al. (2023) also linked family functioning, particularly cohesion and communication to children's emotional and behavioral problems. Similarly, Ma et al. (2022) and Wang et al. (2024) reported associations between family conflict and both internalizing and externalizing issues. Lin et al. (2024) found that a positive family emotional climate was linked to greater activation in brain regions tied to emotional processing. Additionally, Hosokawa et al. (2023) showed that family routines, through their influence on cohesion, expressiveness, and conflict, were significantly related to children's behavioral outcomes (Chen *et al.*, 2022; Ma *et al.*, 2022; Song *et al.*, 2023; Lin *et al.*, 2024; Wu, 2024).

These findings demonstrate that the quality of family functioning, including cohesion, expressiveness, conflict, and daily routines plays a vital role in shaping children's emotional and behavioral development. Supportive and emotionally warm family environments foster healthier outcomes, while conflictual or disorganized dynamics are consistently linked to emotional difficulties and behavioral problems in children.

CONCLUSION AND SUGGESTION

This literature review highlights that children's emotional and behavioral development is significantly influenced by various interrelated family factors, including parenting style, parental mental health, parenting stress, quality of parent-child attachment, family conflict, and family structure. These factors do not operate in isolation, but rather interact and contribute collectively to a child's emotional well-being, particularly in early childhood when developmental sensitivity is high.

Given the complexity of these interrelationships, effective interventions should adopt a multidimensional approach. Strategies that solely focus on one aspect, such as parenting style or mental health may not be sufficient if other

influential factors like housing instability or family conflict are left unaddressed. Therefore, integrated interventions that simultaneously address parenting practices, caregiver well-being, and living environments are essential for fostering healthier emotional and behavioral outcomes in children.

In addition, public health strategies and early childhood programs should prioritize holistic family support. Early, family-centered prevention and intervention programs have the potential to break the cycle of emotional and behavioral problems in children by strengthening family functioning as a whole.

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MINDFUL MOTHERHOOD: HYPNOBREASTFEEDING AS A NATURAL SOLUTION TO INCREASE BREAST MILK PRODUCTION

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Abstract

Background: For newborns, especially in their early years of life, breast milk is the primary and optimal source of nutrition. Stress, anxiety, and fatigue are often experienced by mothers postpartum, which can affect the let-down reflex and breast milk production. Many breastfeeding mothers worry about their milk supply, it can make mental pressure and exacerbate the condition. Therefore, interventions aimed at reducing stress and increasing confidence in breastfeeding can help enhance milk production. Hypnobreastfeeding is one method that has started to gain recognition in recent years as an alternative approach to support the breastfeeding process. Hypnobreastfeeding can establish mental environments that facilitate the release of oxytocin, which is essential for both the let-down reflex and the production of milk. The purpose of this study is to investigate the impact of hypnobreastfeeding on nursing moms' ability to produce breast milk. **Method:** Using a pre-test and post-test approach, this study uses a quasi-experimental design to assess how hypnobreastfeeding affects the production of breast milk. Purposive sampling was used to choose 25 nursing moms who had kids between the ages of 0 and 6 months for the research sample. **Result:** This study uses a quasi-experimental design to assess how hypnobreastfeeding affects the production of breast milk. Purposive sampling was implemented to choose 25 breastfeeding moms who had babies between the ages of 0 and 3 months for the research sample. This research showed a varying increase in breast milk production, with an average increase of around 30-35 ml every pumping. **Conclusion:** This study suggests that hypnobreastfeeding can help breastfeeding moms produce more breast milk.

keyword: hypnobreastfeeding, milk production, breastfeeding

INTRODUCTION

For newborns, especially in their early years of life, breast milk is the primary and optimal source of nutrition. The complete nutritional content and its easily digestible nature make breast milk an ideal food for a baby's development. For the first six months of a baby's life, the WHO advises exclusive breastfeeding to promote healthy growth and development. (Fitriasnani *et al.*, 2023). However,





various factors can affect breast milk production, including the physical and psychological condition of the mother.

Stress, anxiety, and fatigue are often experienced by mothers postpartum, which can affect the let-down reflex and breast milk production. Many breastfeeding mothers worry about the adequacy of their milk supply, which can add mental pressure and exacerbate the condition (Sandriani et al., 2023). Therefore, interventions aimed at reducing stress and increasing confidence in breastfeeding can help enhance milk production (Widayanti et al., 2022). Hypnobreastfeeding is one method that has started to gain recognition in recent years as an alternative approach to support the breastfeeding process. Hypnobreastfeeding utilizes relaxation techniques and positive suggestions to help mothers feel calmer and more confident during the breastfeeding process (Dağlı & Aktaş Reyhan, 2024).

Hypnobreastfeeding may be a hypnotherapy strategy utilized to assist increase breastmilk production in postpartum moms. Be that as it may, in addition to its impact on breast drain generation, Hypnobreastfeeding is additionally related to maternal brain research. Thinks about appears that Hypnobreastfeeding can offer assistance in decreasing pain and uneasiness levels in postpartum moms. In addition, Hypnobreastfeeding can also offer assistance in increasing the self-efficacy or self-confidence of moms in giving breastfeed to their babies. This is often exceptionally vital since knowledge about the benefits of breastfeeding alone isn't sufficient in the event that the mother isn't beyond any doubt she can do it successfully. In this way, mesmerizing as a portion of Hypnobreastfeeding can be an elective way to attain unwinding and decrease stress levels for postpartum moms, which increases their milk production. (Trianasari et al., 2024)

The goal of this method is to build mental environments that facilitate the release of oxytocin, which is essential for both the let-down reflex and the production of breastmilk. Research conducted by Trianasari et al., (2024) Shows that mothers who participated in the hypnobreastfeeding program experienced a significant increase in milk production compared to the control group that did not use this technique. The study included sixty breastfeeding moms, and after two weeks of hypnobreastfeeding sessions, the participants in the intervention reported

an average 30% increase in breast milk production. In addition, a decrease in anxiety and stress levels was also reported by the majority of participants, which contributed to the smoothness of the breastfeeding process.

Another study conducted by Rangkuti et al. (2022) also supports this finding, where mothers who received hypnobreastfeeding showed an increase in oxytocin levels in their blood, which directly correlated with an increase in breast milk volume. According to the study's research, 75% of moms in the hypnobreastfeeding group were able to satisfy their baby's exclusive needs for breastfeeding during the first six months of life. Although there are several anecdotal reports supporting the effectiveness of hypnobreastfeeding, the studies mentioned provide scientific evidence that this technique can enhance milk production through mechanisms of increased relaxation, reduced stress, and hormonal stimulation. However, further research with a larger design and longer duration is still needed to strengthen these results.

This research aims to further explore the effect of hypnobreastfeeding on breast milk production in breastfeeding mothers. With stronger scientific evidence, it is hoped that hypnobreastfeeding can become one of the effective non-pharmacological interventions in increasing breast milk production, thereby supporting the achievement of more optimal exclusive breastfeeding.

METHOD

This study utilized a quasi-experimental plan with a pre-test and post-test approach to assess the impact of hypnobreastfeeding on expanding breast milk production. The investigative test was chosen by purposive sampling with the criteria, moms who have babies matured 0-6 months, don't have noteworthy medical complications, and babies don't have an equation drain. The number of tests in this study was 25 breastfeeding moms.

The intervention given was a one-month hypnobreastfeeding program, with sessions conducted once a week for 30 minutes each session and moms were too given hypnobreastfeeding unwinding sound that moms had to tune in to each day at domestic and propose to themselves by saying a few sentences of recommendation: "My breast drain is streaming easily, sufficient for my baby's

needs," "I feel upbeat to be able to breastfeed my child", "I am pleased to be able to grant the most excellent for my infant", "I continuously feel calm and loose when I begin pumping" and so on.

Using a breast milk volume measurement device, the amount of breast milk produced each day, both before and after the intervention, is calculated in milliliters. The Kolmogorov-Smirnov normality examination was used in SPSS data analysis, and the results showed that the data were normally distributed. The variations in breast milk production before and after the intervention were further examined using a paired t-test. With a p-value < 0.05 , the test results indicate a significant increase in breast milk production.

RESULT AND DISCUSSION

The following are the characteristics of the respondents obtained from 25 respondents, which can help provide a comprehensive overview of their characteristics. We present the results in Table 1 below:

Table 1. Distribution of Respondent Characteristics

No.	General Data		Frequency	Percentage (%)
1.	Age	20-25 years	6	24
		26-30 years	10	40
		31-35 years	7	28
		>35 years	2	8
2.	Level Education	Elementary school	1	4
		Junior High School	3	12
		Senior High School	14	56
		Higher Education	7	28
3.	Occupation	Housewife	18	72
		Employed	5	20
		Entrepreneur	2	8
4.	Breastfeeding Experience	Never	15	60
		Have	12	40
5	Number of Children	1	15	60
		2	7	28
		>2	3	12
6	Duration of Breastfeeding	< 1 month	5	20
		1 month	8	32
		2 months	14	56

Based on the respondent characteristics table, the majority of breastfeeding mothers participating in this study are aged between 26-30 years (40%). More than half of the participants possess a high school degree (56%) and are housewives (72%). Additionally, the majority of respondents have no previous breastfeeding experience (60%), and most have 1 child (60%).

In terms of breastfeeding duration before the intervention, 56% of respondents had breastfed for 2 months. These characteristics indicate that most respondents are of productive age with a secondary education level and have sufficient breastfeeding experience, which can affect the effectiveness of the hypnobreastfeeding intervention in increasing breast milk production.

Next is the distribution table of results from 25 respondents who reported an increase in breast milk production after being given hypnobreastfeeding for one month:

Table 2 Breast milk production distribution: before and after hypnobreastfeeding

No.	respondent	Before Hypnobreastfeeding (ml/pumping)	After Hypnobreastfeeding (ml/pumping)	improvement (ml/pumping)
1	respondent 1	100	130	30
2	respondent 2	110	145	35
3	respondent 3	95	125	30
4	respondent 4	120	150	30
5	respondent 5	105	140	35
6	respondent 6	100	135	35
7	respondent 7	115	145	30
8	respondent 8	90	120	30
9	respondent 9	130	160	30
10	respondent 10	85	115	30
11	respondent 11	110	140	30
12	respondent 12	95	125	30
13	respondent 13	105	135	30
14	respondent 14	100	130	30
15	respondent 15	120	150	30
16	respondent 16	110	145	35
17	respondent 17	95	125	30
18	respondent 18	105	140	35
19	respondent 19	100	135	35
20	respondent 20	115	145	30
21	respondent 21	90	120	30
22	respondent 22	130	160	30
23	respondent 23	85	115	30
24	respondent 24	110	140	30
25	respondent 25	95	125	30

The table above illustrates an increase in breast milk production among 25 respondents after participating in the hypnobreastfeeding program for one month. Each respondent showed a varying increase in breast milk production, with an average increase of around 30-35 ml/pumping. To analyze the data on the increase in breast milk production obtained from the 25 respondents after participating in the hypnobreastfeeding program, a paired t-test was used, which will be displayed in the following table.

Table 3: The average amount of breast milk produced before and after hypnobreastfeeding differs

	Mean of rank	Milk production Sum of rank	p-value
Before hypnobreastfeeding	104,6	12,49	0,003
After hypnobreastfeeding	135,8	12,72	

From the results of the table above, it can be concluded that there is a significant increase in breast milk production after participating in the hypnobreastfeeding program, with a p-value < 0.05 indicating statistically valid results. Additionally, the statistical test results show that there is an increase in breast production before and after hypnobreastfeeding was administered.

The results of this study indicate a significant increase in breast milk production among mothers who participated in the hypnobreastfeeding program. Based on the paired t-test, there is a difference in the average breast milk production before and after the intervention, with a p-value < 0.05 , suggesting that hypnobreastfeeding is a useful method for boosting the supply of breast milk. These findings are in line with the research conducted by Asih & Nyimas (2020) Who also found that mothers who received the hypnobreastfeeding relaxation technique experienced a greater increase in breast milk volume compared to the control group that did not undergo the intervention.

Physiologically, hypnobreastfeeding is thought to work through mechanisms that reduce stress and anxiety in breastfeeding mothers, which ultimately increases the production of oxytocin and prolactin hormones. Oxytocin plays a crucial role in stimulating the milk ejection reflex, while prolactin functions to maintain milk production. (Kharisma Virgian, 2022). A study Hutabarat &

Sihombing (2021) Also supports this finding, where relaxation through hypnosis methods has been proven to lower the stress hormone cortisol levels that can inhibit the milk ejection reflex. Thus, hypnobreastfeeding indirectly facilitates optimal conditions for increasing milk production through maternal emotional control.

In terms of respondent characteristics, the majority of participating mothers were aged 26-30 years and had a secondary education (high school), which is generally considered a productive age and an age range with a better understanding of intervention techniques such as hypnobreastfeeding. According to Zaen (2022), the success of lactation is significantly influenced by the mothers' degree of education and expertise, where mothers with higher education are more likely to accept and practice new techniques that support breastfeeding. This indicates that the implementation of the hypnobreastfeeding program for mothers with higher secondary education can be more effective.

The duration of breastfeeding before the intervention is also an important factor. Most respondents (52%) had been breastfeeding for 1-3 months before receiving hypnobreastfeeding, and this could affect the program's effectiveness. A study by Sari et al. (2022) Shows that interventions given during the early breastfeeding period (0-3 months) have a greater impact on breast milk production, because during this period, the mother's body is in the adaptation phase for optimal breast milk production. This may explain why the large majority of this study responded to the hypnobreastfeeding intervention with significant improvement.

Hypnobreastfeeding works by utilizing hypnosis techniques to help breastfeeding mothers achieve a deep state of relaxation, which can physiologically enhance breast milk production. During the breastfeeding process, the production of the hormones oxytocin and prolactin is crucial. Oxytocin aids the let-down reflex, which is the process where breast milk flows from the mammary glands to the nipple, while prolactin is responsible for the actual production of breast milk. When breastfeeding mothers experience stress or anxiety, elevated cortisol levels can inhibit the production of oxytocin, which ultimately negatively impacts breast milk production. The hypnobreastfeeding technique aims to reduce stress and increase oxytocin hormone production through deep relaxation conditions. (Asih & Nyimas, 2020) Showed that hypnobreastfeeding can increase the amount of



oxytocin, which subsequently smooths the let-down reflex in breastfeeding mothers. This explains how a calm state of mind can directly affect breast milk production. Additionally, hypnobreastfeeding provides positive suggestions to mothers, which can boost their confidence in their breastfeeding abilities. This confidence is also an important psychological factor in the success of breastfeeding.

Another study also found that mothers who underwent the hypnobreastfeeding technique experienced a reduction in anxiety and an increase in breast milk volume. Mothers who feel relaxed tend to be more patient during the breastfeeding process, allowing the baby to nurse longer and more effectively (Rohmah et al., 2021). Thus, more consistent breast stimulation also helps maintain high levels of prolactin, which ultimately increases milk production.

In the context of breastfeeding, the mother's psychological state has a significant impact on the efficient production of breast milk.. Hypnobreastfeeding provides a holistic approach that not only focuses on the physiological aspect but also the psychological one. Hanum et al., (2021) State that the hypnobreastfeeding method offers an effective, non-invasive approach to improving the well-being of breastfeeding mothers, which ultimately supports the success of lactation. The relaxation condition obtained through this technique allows the mother's body to work optimally in producing breast milk, without the hindrance of stress or other emotional pressures. (Awaliyah et al., 2019).

Overall, the relationship between hypnobreastfeeding and increased breast milk production is proven through various mechanisms, both from a physiological and psychological perspective. This technique helps mothers achieve the hormonal balance necessary to increase and maintain breast milk production, as well as provide important emotional support for the success of breastfeeding.

In addition, this research provides important implications for midwifery practice, particularly in efforts to support breastfeeding mothers. Hypnobreastfeeding can be one of the inexpensive, easy-to-implement, and minimally side-effect non-pharmacological intervention methods to increase breast milk production. Education for breastfeeding mothers on relaxation techniques and hypnobreastfeeding can be one of the lactation education programs in healthcare facilities. A study by also Lydiani et al. (2020) Recommends the application of this

method in lactation clinics to help mothers who experience obstacles in breast milk production due to stress.

Implementation of hypnobreastfeeding in clinics includes preparing and mentoring breastfeeding moms in utilizing unwinding methods and positive assertions to extend milk production and smooth breastfeeding. Clinics or healing centers can give individuals or groups hypnobreastfeeding sessions, as well as give instructive materials and sound recordings to bolster autonomous practice at domestic.

Based on the researcher's coordinated involvement in this investigation, there are a few impediments experienced and a few components to be considered more by future analysts to encourage refining their investigation, since this investigation itself certainly has deficiencies that ought to be continually improved in future research. A few restrictions within the consideration include a really small number of tests, not employing a control group, hence increasing the chance of inquire about inclination.

CONCLUSION AND SUGGESTION

This study suggests that hypnobreastfeeding can help breastfeeding moms produce more breast milk. There was a substantial increase in breast milk production after the hypnobreastfeeding intervention over one month. The hypnobreastfeeding technique helps mothers achieve a deep state of relaxation, reducing stress and anxiety, which ultimately increases the production of oxytocin and prolactin, two important hormones in the breastfeeding process.

Additionally, hypnobreastfeeding provides emotional and psychological support that helps breastfeeding mothers feel more confident and comfortable during the breastfeeding process. This confidence plays a role in increasing the duration and frequency of more consistent breastfeeding, which supports optimal breast stimulation and enhances milk production.

These results suggest that hypnobreastfeeding should be taken as a non-pharmacological intervention method in lactation programs at healthcare facilities, particularly to support mothers experiencing issues with milk production due to stress or anxiety. Through the comes about of this thinking, it is trusted that all



wellbeing offices that give maternal and child wellbeing checks can execute Hypnobreastfeeding exercises and increase educational exercises for both moms and families so that the accomplishment of elite breastfeeding is accomplished by the National target.

DECLARATION

Conflict of Interest

There is no conflict conflict of interest in this study.

Authors' Contribution

The author contributed to the preparation of the article starting from research design, data collection, data processing, and analysis.

Ethical Approval

This research has received an ethical clearance letter from the Bhakti Wiyata Kediri Health Sciences Institute, which ensures that all protocols comply with ethical guidelines (04/FKes/TK/VI/2024).

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Data Availability

The data supporting the findings of this study are available upon reasonable request from the corresponding author, with restrictions due to participant confidentiality

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RELATIONSHIP BETWEEN PARITY AND INFANT WEIGHT WITH BIRTH CANAL TEARING IN EMPAT LAWANG REGIONAL HOSPITAL

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Abstract

Background: According to data from the World Health Organization (WHO), 2.7 million cases of perineal rupture occurred in mothers giving birth. This figure is estimated to reach 6.3 million in 2050. Ordinary perineal rupture can turn into a more severe case of perineal rupture and cause death in women giving birth if management is not carried out properly and responsively. This study aims to determine the relationship between parity and birth weight of babies with birth canal tears in mothers giving birth at Empat Lawang Regional Public Hospital, Empat Lawang Regency, Indonesia. **Method:** This study used an analytical survey with a case control design involving 72 mothers experienced a tear in the birth canal during October to November 2023, in the Obstetrics Room Empat Lawang Regional Public Hospital. Data collection analysis techniques use secondary data and analysis uses univariate and bivariate analysis, using chi-square. **Results:** The results showed that from 144 respondents, there were 72 respondents with birth canal lacerations, 66 respondents with primiparous or grandemultiparous parity, 71 respondents with birth weight <2500 gr or >4000 gr. There is a relationship between parity and birth canal tears at Empat Lawang Regional Hospital with a p-value of $0.000 < \alpha 0.05$. There is relationship between the birth weight of the baby and birth canal tears at Empat Lawang Regional Hospital with a p-value of $0.000 < \alpha 0.05$. **Conclusion:** There is a relationship between parity and baby weight with the incidence of birth canal tearing in mothers giving birth at Empat Lawang Regional Hospital.

Keyword : Parity, Baby's Weight, Birth Canal Tear.

INTRODUCTION

The main causes of maternal death in developing countries are direct obstetric factors, namely postpartum hemorrhage, infection and eclampsia. Perineal rupture is one of the causes of postpartum hemorrhage. Postpartum hemorrhage is an important problem because it concerns maternal health. (Hukubun, Budiono and Kurniawati, 2021). Based on the Ministry of Health profile data in 2019, there were 4,221 deaths with the largest number of deaths caused by postpartum hemorrhage, this figure is certainly quite high in an effort to achieve the Sustainable



Development Goals (SDGs) target, namely reducing maternal mortality to less than 70 per 100,000 live births by 2030 (RI, 2019).

One of the causes of maternal death occurs due to complications in the postpartum process that can endanger the mother and fetus. Postpartum complications that can occur in mothers in labor include bleeding due to uterine atony, placental retention, and perineal rupture (Heddy, Marfuah and Ananda, 2024). Perineal rupture is bleeding that occurs when the placenta has been born completely and uterine contractions are good, then it can be ascertained that the bleeding that occurs comes from injury to the birth canal, labor with perineal rupture if not handled properly will cause bleeding and infection that is increasingly severe (Fatimah and Prasetya, 2019) (Darmawati, 2022).

Based on data from the World Health Organization (WHO) there are 2.7 million cases of perineal rupture in mothers giving birth. This figure is estimated to reach 6.3 million in 2050. The prevalence of mothers giving birth who experience perineal rupture in Indonesia with the incidence of suture wound infection as much as 5% and bleeding as much as 7% and death in postpartum mothers as much as 8% (Kemenkes RI, 2019).

Perineal rupture that occurs in mothers in labor is related to three important factors for perineal rupture are maternal factors, fetal factors, and delivery procedure factors. Maternal risk factors include older maternal age, ethnicity, long second stage, persistent posterior occiput position, delivery with action (Waldenstrom and Ekeus, 2017). The cause of perineal rupture is due to maternal factors consisting of age, parity, method of pushing (Safitri, Susaldi and Istiana, 2024) (Siantar *et al.*, 2022).

In 2021, the highest number of maternal deaths occurred in Lahat Regency (33 cases) and the lowest in Pagar Alam (7 cases). In Empat Lawang Regency, there were 10 recorded cases, with the causes including bleeding (3 cases), pregnancy-induced hypertension (4 cases), blood disorders (1 case), and other causes (2 cases) (Dinkes Provinsi Sumatera, 2022).

Based on research (Haniyah and Adriani, 2019), which was conducted at the dr. R. Goeteng Taroenadibrata Purbalingga Regional Hospital, the relationship between age and parity with the degree of laceration found that there was a

significant relationship between perineal rupture and maternal age with the results p-value of 0.034 ($p < 0.05$), and there was a significant relationship between perineal rupture and parity, with p-value of 0.000 ($p < 0.05$). This study aims to determine the Relationship between Parity and Baby Weight with Birth Canal Tears in Mothers Giving Birth at Empat Lawang Regional Hospital.

METHOD

The type of research used is observational analytical research with a case control approach. The population in this study were all mothers who gave birth normally registered in the obstetric room in 2022, 72 mothers who experienced lacerations of the birth canal. In this study, the control sample was 1:1 compared to the case sample so that the total sample in this study was 144 respondents, with the number of case samples of 72 respondents and the control sample of 72 respondents.

Inclusion criteria are mothers who give birth normally, mothers who have lacerations of the birth canal, are willing to be research subjects and sign the informed consent form provided. Exclusion criteria are pregnant women with a history of cesarean section. The sampling technique in this study used the Stratified random sampling technique.

In this study, the collection was carried out by looking at data in the obstetric room's annual report on the incidence of lacerations of the birth canal, in 2022. Then the researcher looked at the research variables in the register book/annual report book consisting of parity and baby weight. The data analysis used was univariate and bivariate analysis, using chi-square

RESULT AND DISCUSSION

Table 1. Frequency Distribution of Parity in Mothers Giving Birth at Empat Lawang Regional Hospital

No	Variable	Frequency (f)	Percentage (%)
1	Parity of Laboring Mothers		
	Primipara or Grandmultipara	66	45.8
	Multipara	78	54.2
2	Birth Weight of Newborn		
	< 2500 gr or >4000 gr	71	49.3
	2500-4000 gr	73	50.7
3	Perineal Rupture in Laboring Mothers		

Yes	72	50
No	72	50

Based on Table 1 showing the frequency distribution of parity in laboring mothers, from 144 laboring mothers, it is observed that the majority had multipara parity, with 78 respondents (54.2%), while the minority had either primipara or grandmultipara parity, with 66 respondents (45.8%). According to the research by (Darmawati, 2022), it was found that based on the parity variable, among 115 respondents, the highest percentage of parity was multigravida, with 81 respondents (70.4%), while the lowest percentage was in primigravida, with 34 respondents (29.6%). Darmawati's research also showed that primigravida parity has a 3.93 times higher risk of experiencing perineal rupture compared to respondents with multigravida parity (Darmawati, 2022). The study by (Hastuti, 2019) states that the occurrence of perineal rupture was more common among multipara mothers, with 33 individuals (55.9%), while 26 individuals (44.1%) were primipara mothers (Manuntungi, Irmayanti and Ratna, 2019).

Based on Table 1 showing the frequency distribution of birth weight in laboring mothers, from 144 laboring mothers, it is observed that the majority of babies had a birth weight of 2500-4000 g, with 73 respondents (50.7%), while the minority had a birth weight of < 2500 g or > 4000 g, with 71 respondents (49.3%). The study by (Subriah, Hastuti and Nurjaya, 2022), titled "The Relationship Between Birth Weight and the Incidence of Perineal Rupture in Normal Deliveries Among Primigravida at the Happy Mother and Child Hospital in Makassar," shows that the research found that high birth weight carried a higher risk, with 47 cases, while low birth weight had a lower risk, with 20 cases (Subriah, Hastuti and Nurjaya, 2022).

Based on Table 1 showing the frequency distribution of perineal rupture in laboring mothers, from 144 laboring mothers, it is observed that 72 respondents (50.0%) experienced perineal rupture, while 72 respondents (50.0%) did not. Perineal rupture can result in pain, urinary and fecal incontinence, dyspareunia, and depression, leading to a decrease in women's overall health. Perineal rupture during childbirth is related to risk factors for tears, which are beyond the control of midwives or doctors. Three important factors contributing to perineal rupture are

maternal factors, fetal factors, and delivery procedure factors. Maternal risk factors include older maternal age, ethnicity, prolonged second stage of labor, persistent occiput posterior position, and instrumental delivery. Important fetal factors include macrosomia (large baby), shoulder dystocia, and a large fetal head circumference (Sukarni, 2019).

Table 2. The Relationship Between Parity and Birth Canal Tears in Mothers Giving Birth at Empat Lawang Regional Hospital

Parity	Perineal Rupture						<i>p-value*</i>
	Yes		No		Total		
	f	%	f	%	f	%	
Primipara or Grandmultipara	51	77.3	15	22.7	66	100	0.000
Multipara	21	26.9	57	73.1	78	100	
Total	72		72		144		

Based on Table 2, it is observed that out of 66 respondents with primipara or grandmultipara parity, 51 respondents experienced perineal rupture and 15 respondents did not. Meanwhile, out of 78 respondents with multipara parity, 21 respondents experienced perineal rupture and 57 respondents did not. The Chi-square test (with continuity correction) resulted in a χ^2 value of 34.266 with a *p*-value of $0.000 < 0.05$, which is significant. Therefore, the null hypothesis (*H*₀) is rejected, and the alternative hypothesis (*H*_a) is accepted. This indicates that there is a relationship between parity and perineal rupture at the Empat Lawang Regional Public Hospital. The Contingency Coefficient test yielded a value of *C* = 0.448 with a *p*-value of $0.000 < 0.05$, which is significant. This *C* value is compared with the maximum *C* value (*C*_{max}) = 0.707. Since the value of *C* = 0.448 is not far from *C*_{max} = 0.707, it is considered a moderate relationship.

According to (Priharyanti and Zuhara, 2016), parity is considered to influence rupture when pressure is applied to the soft birth canal during delivery. The soft tissues of the birth canal and surrounding structures will suffer damage during each childbirth. This damage is more pronounced in nulliparous women because their tissue is denser and more fragile compared to multiparous women. The perineal area of some women is elastic, but a stiff perineum can also be found, especially in women who are experiencing their first pregnancy. However, it is also possible for perineal rupture to occur in multiparous women.

The results of this study are consistent with the theory that primiparas have a higher risk of rupture, as they have no prior experience with childbirth, compared to multiparas or grandmultiparas. Perineal tears occur in almost all first deliveries (primipara) and are not uncommon in subsequent deliveries. Mothers with a parity of one, or primiparas, have a higher risk of perineal rupture compared to mothers with more than one parity. This is because the birth canal has been traversed by the baby's head, so the perineal muscles have not yet stretched (Kau, Harismayanti and Retni, 2023).

The results of this study are consistent with the research by (Kau, Harismayanti and Retni, 2023), which shows a significant relationship between maternal parity and the incidence of perineal rupture. The findings also align with the study by (Muliati, 2018), which indicates a relationship between parity and the occurrence of perineal rupture in normal deliveries at Tegalrejo Health Center (Muliati, 2018).

Table 3. Relationship between Birth Weight and Birth Canal Tears in Mothers Giving Birth at Empat Lawang Regional Hospital

Birth Weight	Perineal Rupture						<i>p-value*</i>
	Yes		No		Total		
	f	%	f	%	f	%	
<2500g or >4000g	60	84.5	11	15.5	71	100	0,000
2500-4000 gr	12	16.4	61	83.6	73	100	
Total	72		72		144		

Based on Table 3, it is observed that out of 71 respondents with a birth weight of < 2500 g or > 4000 g, 60 respondents experienced perineal rupture and 11 respondents did not. Meanwhile, out of 73 respondents with a birth weight between 2500-4000 g, 12 respondents experienced perineal rupture and 61 respondents did not. The Chi-square test (with continuity correction) resulted in a χ^2 value of 64.012 with a p-value of $0.000 < 0.05$, which is significant. Therefore, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted. This indicates that there is a relationship between birth weight and perineal rupture at the Empat Lawang Regional Public Hospital. The Contingency Coefficient test yielded a value of $C = 0.448$ with a p-value of $0.000 < 0.05$, which is significant. This C value is compared with the maximum C value (C_{max}) = 0.707. Since the value of $C = 0.563$ is close to the $C_{max} = 0.707$, it indicates a strong relationship.



The results of this study are consistent with the research by (Wijayanti, 2019), which stated that there is a significant relationship between newborn birth weight and the occurrence of perineal rupture in normal deliveries among primigravida mothers at Gemuh 01 Health Center, Gemuh District, Kendal Regency (Wijayanti, 2019). Perineal rupture occurs due to several factors, one of which is the fetal factor, specifically the birth weight of the baby. The larger the baby, the higher the risk of rupture, as the perineum is not strong enough to withstand the stretching caused by the baby's head with a large birth weight. Therefore, during the delivery of a baby with a large birth weight, perineal rupture is more likely to occur. This also impacts the risk of birth trauma through the vagina, such as shoulder dystocia and soft tissue damage to the mother (Utami, Rajab and Munsir, 2023).

(Saifuddin, 2019) stated that the larger the baby's birth weight, the greater the risk of perineal rupture because the perineum is not strong enough to resist the stretching from the baby's head with a large birth weight. Consequently, perineal rupture is more common during the delivery of a baby with a large birth weight. Excessive birth weight can be caused by several factors, including maternal diabetes mellitus, a history of delivering large babies, genetic factors, and nutritional status. A normal birth weight for a baby is around 2500 to 4000 grams.

Parity refers to the number of times a woman has given birth to a baby who reached a viable gestational age. It plays a significant role in the risk of experiencing a perineal rupture during vaginal delivery. Women who are giving birth for the first time, known as primiparous women, are more likely to experience perineal rupture. This is because the perineal tissues in first-time mothers have not previously been stretched during childbirth, making them less flexible and more prone to tearing as the baby passes through the birth canal.

Women who have given birth before, known as multiparous women, generally have lower risk of perineal rupture. Their perineal tissues have adapted to the stretching involved in previous deliveries, making them more elastic and better able to accommodate the baby's passage (Dendini *et al.*, 2024). In women with very high parity, the risk of perineal rupture may increase again. This can happen due to weakened or over-stretched perineal and pelvic muscles from multiple past

deliveries, or because of large babies or fast labors that place sudden pressure on the perineum(Addis *et al.*, 2024).

Therefore, parity affects perineal rupture in a way that first-time births carry the highest risk, moderate parity may offer some protection due to tissue adaptation, and very high parity might increase the risk again due to weakened support structures.

CONCLUSION AND SUGGESTION

There is a relationship between parity and perineal rupture at Empat Lawang Regional Public. There is a relationship between birth weight and perineal rupture at Empat Lawang Regional Public Hospital. Understanding this relationship helps healthcare providers take appropriate preventive steps during delivery to minimize trauma to the mother.

DECLARATION

Conflict of Interest

There is no conflict of interest in this research.

Authors' Contribution

The lead researcher is responsible for the entire research, from planning, implementation, data analysis and dissemination of results. Research member 1 is responsible for data analysis and discussion. Research member 2 is responsible for respondent selection, data collection and discussion.

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RELATIONSHIP BETWEEN KNOWLEDGE AND INTEREST IN USING MENSTRUAL CUPS IN WOMEN OF REPRODUCTIVE AGE

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Abstract

Background: Menstrual cups have many advantages compared to other menstrual products but have not been widely used and are less desirable due to limited knowledge. In Indonesia, the majority of women use disposable sanitary napkins as menstrual products because they can be easily found even though the use of sanitary napkins can have a negative impact on health and the environment. The objective of this research is to analyze the relationship between knowledge and interest in using menstrual cup among women of reproductive age. **Method:** This study was an observational analytic study with a cross sectional approach. The sampling technique used sequential sampling. The sample size studied was 100 women of reproductive age in the service area of Mulyorejo Health Center, Surabaya, Indonesia who met the inclusion criteria. The research instrument used a questionnaire containing a list of questions related to knowledge and interest in using menstrual cups. Data were analyzed using the chi square test. **Results:** The results of this study showed that out of 100 respondents, 52 respondents (52%) had poor knowledge, 31 respondents (31%) had sufficient knowledge and 17 respondents (17%) had good knowledge. A total of 69 respondents (69%) were not interested in using menstrual cups. The results of the chi square test analysis showed a p value of 0.086 ($p > 0.05$). **Conclusion:** There is no significant relationship between knowledge and interest in using menstrual cup.

Keywords: Interest of use, Knowledge, Menstrual Cups, Menstrual Hygiene, Women of reproductive age

INTRODUCTION

Menstrual cups are not widely used and less desirable due to limited knowledge (Rani and Swaminathan, 2023). A study showed that women who have not used menstrual cups still have insufficient knowledge about menstrual cups (Ola, 2022). Lack of knowledge is the main reason why respondents hesitate to switch to menstrual cups from other menstrual products (Lekshmi et al., 2022). Research around the use of menstrual cups is still very few and far between, this sustainable menstrual product has not been widely discussed or studied (Minor et al., 2020) especially in developing countries (Kamira and Rizkalla, 2023). Talking





about menstruation is still considered a sensitive and taboo topic in Indonesia. Due to this condition, Indonesian women's knowledge about menstruation including menstrual products is still lacking (Sato et al., 2021).

The menstrual product that the majority of women in Indonesia use is disposable sanitary napkins, this is because sanitary napkins can be easily found. However, the use of sanitary napkins has a negative impact on health and the environment (Pande and Anjani, 2022). In line with Sustainable Development Goals (SDGs) number 3 of healthy and prosperous life, number 6 of clean water and proper sanitation, and number 12 of responsible consumption and production (Bappenas, 2022), women can switch to menstrual cups to overcome the health and environmental problems caused by disposable sanitary napkins (UNICEF, 2022). Data from the National Socio-Economic Survey (SUSENAS) shows that the total female population of Indonesia is around 135.24 million with the number of women in Surabaya City is 1,496,970 (Badan Pusat Statistik, 2021).

Menstrual cup is a bell-shaped product with a stem that is inserted into the vagina to collect menstrual blood inside. Menstrual cups have many advantages compared to other menstrual products, including being environmentally friendly, minimal risk to health, can be used longer, economical, safe, comfortable, odorless, and compatible (Van Eijk et al., 2019). Knowledge is crucial in shaping women's interest and desire to use menstrual cups. Adequate knowledge can reduce fears, correct misconceptions, and foster positive attitudes towards menstrual cup use (Lekshmi et al., 2022). Based on the description above, the purpose of this study is to analyze the relationship between knowledge and interest in using menstrual cups in women of reproductive age.

METHOD

This study was an observational analytic study using a cross-sectional approach. The population consisted of all women of reproductive age in the service area of Mulyorejo Health Center, Surabaya, Indonesia, who met the inclusion criteria. The sampling technique applied was sequential sampling, resulting in a total of 100 women of reproductive age who were willing to participate as respondents. The study was conducted from November to December 2023. The independent variable was the knowledge of women of reproductive age about menstrual cups, while the dependent variable was their interest in using menstrual cups. The knowledge assessment results were classified into three levels: good (76–100%), moderate or sufficient (56–75%), and poor (<55%). Primary data were collected using a

questionnaire containing items related to knowledge and interest in menstrual cups. The data were then analyzed using the SPSS application with a chi-square test. The analysis included both univariate and bivariate analyses. This study was approved and ethically declared feasible by the Health Research Ethics Committee of Universitas Airlangga with letter number 287/EC/KEPK/FKUA/2023. Informed consent was obtained from all participants prior to their inclusion in the study.

RESULT AND DISCUSSION

The research findings regarding respondents' characteristics are presented in the following table:

Table 1. Frequency Distribution of Respondents' Characteristics

Characteristic	n	%
Age		
≤ 26 years	48	48
> 26 years	52	52
Education		
Elementary School	4	4
Junior High School	12	12
Senior High School	65	65
Higher Education	19	19
Occupation		
Student	17	17
Housewife	45	45
Private Employee	28	28
Teacher	2	2
Unemployed	8	8
Age at Menarche		
8 – 12 years	49	49
> 12 years	51	51
Awareness of Menstrual Cup		
Yes	51	51
No	49	49
Menstrual Products Used		
Disposable Sanitary Pads	100	100
Others	0	0

Based on age characteristics, the average age of respondents was 26.72 years with an age range of 18-40 years. Most of the respondents, namely 65 respondents (65%), have the latest high school education. Based on occupation, almost half (45%) of the respondents were housewives. The average age of menarche of the respondents was 12.8 years with the earliest age of menarche being 8 years old and the latest being 16 years old. There was only a slight difference between the number of respondents who had heard about menstrual cups (51%) and

those who did not know at all (49%), but it was found that all respondents used disposable sanitary napkins.

Univariate Analysis

Table 2. Level of Knowledge About Menstrual Cups

Category	n	%
Good	17	17
Sufficient	31	31
Poor	52	52
Total	100	100

The data presented in Table 2 indicate that the majority of respondents in this study have a poor level of knowledge regarding menstrual cups, with 52 respondents (52%) falling into this category. The average score obtained was 57.60, with a minimum score of 11.1 and a maximum score of 88.8.

Table 3. Frequency Distribution of Knowledge About Menstrual Cups

Knowledge Aspect	Correct		Incorrect	
	n	%	n	%
Knowledge of menstrual cup safety	77	77	23	23
Knowledge of menstrual cup usage mechanism	45	45	55	55
Knowledge of menstrual cup usage duration	55	55	45	45
Knowledge of menstrual cup lifespan	33	33	67	67
Knowledge of menstrual cup material composition	90	90	10	10
Knowledge of menstrual cup sterilization method	16	16	84	84
Knowledge of menstrual cup capacity	73	73	27	27
Knowledge of menstrual cup size	37	37	63	63
Knowledge of the eco-friendliness of menstrual cups	93	93	7	7

As shown in Table 3, the highest percentage of incorrect answers was observed in the question regarding the sterilization method of menstrual cups, with 84% of respondents answering incorrectly. Conversely, the majority of respondents (93%) correctly answered that menstrual cups are more environmentally friendly.

Table 4. Frequency Distribution of Interest in Using Menstrual Cups

Category	n	%
Interested in using menstrual cups	31	31
Not Interested in using menstrual cups	69	69
Total	100	100

As presented in Table 4, the majority of respondents (69 respondents or 69%) expressed no interest in using menstrual cups.

Bivariate Analysis

Table 5. Cross-Tabulation Between Knowledge of Menstrual Cups and Interest in Using Menstrual Cups

Knowledge Level	Interested in Using				Total		<i>p value</i>
	Yes		No				
	n	%	n	%	n	%	
Good	7	41,2	10	58,8	17	17	0,086
Sufficient	13	41,9	18	58,1	31	31	
Poor	11	21,2	41	78,8	52	52	
Total	31	31	69	69	100	100	

Based on Table 5, the chi-square test analysis yielded a p-value of 0.086 ($p > 0.05$), indicating no significant association between knowledge and interest in using menstrual cups among women of reproductive age in the Mulyorejo Health Center working area. Among respondents with a good level of knowledge, only 7 respondents (41.2%) were interested in using menstrual cups, whereas 10 respondents (58.8%) were not interested. Similarly, among those with a sufficient level of knowledge, 13 respondents (41.9%) expressed interest, while 18 respondents (58.1%) were not interested. Furthermore, among respondents with a poor level of knowledge, only 11 respondents (21.2%) were interested, whereas 41 respondents (78.8%) were not interested.

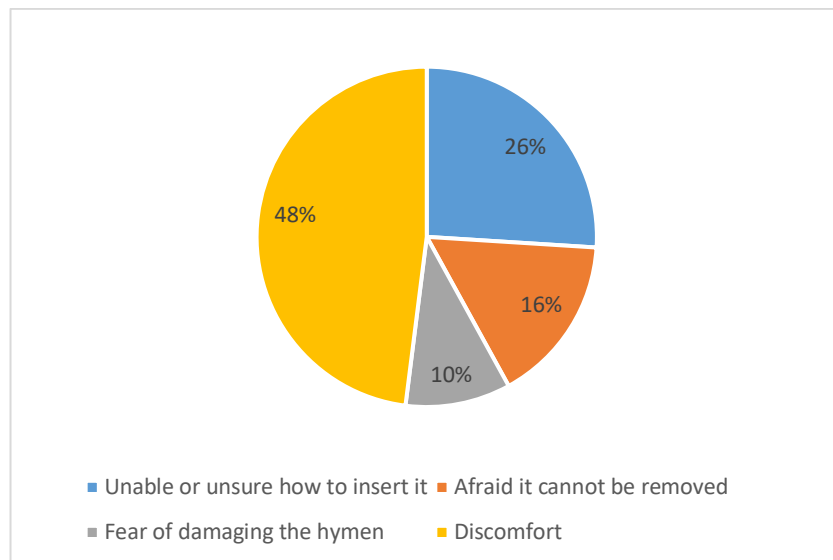


Figure 1. Reasons for Respondents' Lack of Interest in Using Menstrual Cups

Among the 69 respondents who were not interested in using menstrual cups, the majority (48%) reported discomfort as their primary reason for lack of interest.

Discussion



Respondent's Characteristics

The analysis of respondent characteristics based on age shows that 52 respondents (52%) were above the average age of 26 years, while 48 respondents (48%) were 26 years old or younger. A previous study found that younger women tend to have a higher level of knowledge about menstrual cups (Sudevan Devan et al., 2022). In terms of education, two-thirds (65%) of respondents had completed senior high school as their highest level of education. Education plays a significant role in shaping an individual's knowledge (Darsini, Fahrurrozi, and Cahyono, 2019). Women develop different strategies for menstrual management, with education being one of the key factors influencing their choices (Gharacheh et al., 2021). Regarding employment status, the respondents included housewives (45%), private-sector employees (28%), students (17%), and the least represented category was teachers (2%). Another study found that students had the highest level of knowledge about menstrual cups, followed by office workers, who demonstrated better knowledge than housewives (Aishwarya and Tharani, 2019). The average age of menarche among respondents was 12.8 years, which is similar to findings from a previous study involving 79,026 Indonesian women aged 10–59 years, where the average age at menarche was 12.96 years (Sudikno and Sandjaja, 2020). Nearly half of the respondents (49%) had never heard of menstrual cups, which contrasts with a study by Abraham et al. (2023) involving 187 female university students, where 96.3% of participants reported being aware of menstrual cups (Abraham et al., 2023). Despite 51% of respondents in this study having knowledge about menstrual cups, none of them had ever used one, and all respondents (100%) reported using disposable sanitary pads. This finding is consistent with previous research indicating that the majority of Indonesian women use sanitary pads as their primary menstrual product (Saputri, 2021).

Respondents' Knowledge and Interest in Using Menstrual Cups

A total of 52% of respondents in this study had insufficient knowledge. Other studies state that knowledge about menstrual cups is still lacking so that more effective health education about menstrual products is needed (Van Eijk et al., 2019). The minimum value obtained by respondents was 11.1, indicating that there were respondents who only correctly answered one questionnaire question and the

maximum value obtained was 88.8, indicating that none of the total respondents answered all questionnaire questions correctly.

The question regarding menstrual cup sterilization was answered correctly by 16% of respondents. The way to sterilize menstrual cups is by boiling them in water once a month (Pokhrel et al., 2021). The majority of respondents, 93%, answered correctly that menstrual cups are more environmentally friendly than other menstrual products. Other studies also found that the majority of respondents (85.96% (Lekshmi et al., 2022) and 88.3% (Rani and Swaminathan, 2023)) agreed that menstrual cups are environmentally friendly.

Regarding respondents' interest, the results of the analysis showed a considerable gap between the number of respondents who were interested (31%) and not interested (69%) in using menstrual cups. A well-provided education session is the most important factor that can help change a woman's interest in using a menstrual cup (Varghese, Hemachandran and Parvathy, 2023).

Relationship Between Knowledge and Interest in Using Menstrual Cups

According to Bloom cited in Darsini (2019), knowledge is the result of knowing, which is obtained after carrying out the sensing process on a particular object (Darsini, Fahrurrozi and Cahyono, 2019). The results of the chi square test analysis between knowledge and interest in using menstrual cups resulted in a p value of 0.086 ($p > 0.05$), it can be stated that there is no significant relationship between knowledge and interest in using menstrual cups in women of reproductive age in the Mulyorejo Health Center working area. Respondents with a good level of knowledge who felt interested in using menstrual cups were 7 respondents (41.2%) while respondents with good knowledge and felt no interest in using them were more, namely 10 respondents (58.8%). At the level of sufficient knowledge and interested there were 13 respondents (41.9%) while not interested 18 respondents (58.1%), at the level of less knowledge but interested there were 11 respondents (21.2%) and 41 respondents (78.8%) were not interested. Although the statistical test results show that there is no significant relationship between knowledge and interest in using menstrual cups, it can be seen that there is a tendency for the lack of knowledge to increase the number of respondents who are not interested.



There are several previous studies that are in line with the results of this study. Research on 65 respondents found that respondents who had good knowledge and were interested were 13.8% while not interested were 41.5% with a p value of 0.301 so that there was no relationship between knowledge and interest in using menstrual cups (Shelby and Puspitasari, 2022). The results of research by Widya et al. (2022) on 88 respondents showed 48 respondents had good knowledge with 33 respondents (68.8%) interested and 15 respondents (31.3%) were not interested and the p value of the Mann-Whitney test was 0.120 (Widya, Usman and Widowati, 2022). From a total of 97 respondents, it was found that the majority of respondents (74.2%) had a good level of knowledge about menstrual cups but none of them used them. Someone who knows the menstrual cup is not always interested in using it (Putri et al., 2021). Then a study on 350 women found that two-thirds of the respondents (73.7%) had a good level of knowledge and the rest (26.3%) with a poor level of knowledge and only 15.1% had tried using a menstrual cup (Sudevan Devan et al., 2022).

Some other studies found contradictory results to this study. Some studies stated that menstrual cups have not been widely used due to lack of knowledge and promotion. Whereas menstrual cups have many advantages over other menstrual products (Rani and Swaminathan, 2023). Similarly, Lekshmi et al. (2022) on a total of 372 women aged above 15 years which showed that menstrual cups have been around for a long time, but their use is not very common in India, due to lack of knowledge which is the main reason why respondents are hesitant to switch to menstrual cups from other menstrual products, as well as the widespread use of sanitary pads. More than three-quarters of respondents (78%) were not interested in using menstrual cups in the future and it was found that detailed knowledge about menstrual cups was lacking even though the majority (96.3%) of respondents had heard of menstrual cups (Abraham et al., 2023).

Knowledge and acceptance of menstrual cups is still low. Therefore, to increase acceptance and correct existing misconceptions about menstrual cups, there is a need to increase awareness and knowledge (Abraham et al., 2023). None of the respondents in this study used menstrual cups. The same thing was obtained in a study on 372 undergraduate medical students showed that all respondents used

disposable pads because of their popularity and promotion (Eti, Shreya M and Sailakshmi, 2019). The results of research through interviews in all participants agreed that sanitary napkins have a negative impact and menstrual cups are appropriate to replace disposable pads (Angesti, 2020).

There are several factors that can influence differences in knowledge levels. Putri et al. (2021) mentioned that knowledge can be influenced by the information a person gets from various sources, education, age and occupation (Putri et al., 2021). There is a statistically significant relationship between young age, educational status, socioeconomic status and marital status of women of reproductive age with knowledge about menstrual cup (Sudevan Devan et al., 2022).

This study also contains other reasons for respondents not interested in using menstrual cups, which include feeling uncomfortable (48%), not being able or not knowing how to insert a menstrual cup (26%), fear of not being able to remove it (16%) and fear that menstrual cups can damage the hymen (10%). Most respondents who were not interested (48%) felt that menstrual cups were uncomfortable to use. This may be due to the way it is used, which is inserted into the vagina, which is also considered extreme for many people (Ola, 2022). Lekshmi's study (2022) found that 14.47% of respondents found menstrual cups uncomfortable (Lekshmi et al., 2022).

On the other hand, some studies found that more respondents were interested in using menstrual cups than those who were not interested, but only if menstrual cups were provided. As in a study on women of reproductive age at Sri Devaraj University URS found that 65% of respondents expressed interest and willingness to use menstrual cups if available (Meghana and Gomathy, 2021). Almost half of the total respondents (49.1%) were willing (Sudevan Devan et al., 2022), a survey by Rani and Swaminathan (2023) also revealed that the majority of respondents, namely 205 out of 325 respondents, were interested if provided (Rani and Swaminathan, 2023).

CONCLUSION AND SUGGESTION



Based on the results of research on 100 respondents, namely women of reproductive age in the Mulyorejo Health Center working area, the results of the chi square test analysis obtained a p value of 0.086 ($p > 0.05$) which means that statistically there is no significant relationship between knowledge and interest in using menstrual cups. The level of knowledge about menstrual cups shows that more than half, namely 52 (52%) respondents have insufficient knowledge, 31 (31%) respondents have sufficient knowledge and only 17 (17%) have a good level of knowledge. There were 69 (69%) respondents who were not interested in using menstrual cups and the remaining 31 (31%) respondents felt interested in menstrual cups. It is recommended for future researchers to be able to conduct research with other methods, scopes, and variables in order to get more in-depth results from various points of view regarding menstrual cups. It is also recommended for health workers, especially midwives, to be able to help increase public knowledge about menstrual cups by socializing.

DECLARATION

Conflict of Interest

Authors declare no conflict of interest regarding the publication of this research

Authors' Contribution

All authors contributed significantly to all stages of the research, including study design, data collection, analysis, manuscript writing, final revisions and approval

Ethical Approval

The Health Research Ethics Committee of Universitas Airlangga has reviewed and approved this study, deeming it ethically feasible with letter number 287/EC/KEPK/FKUA/2023

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Data Availability

The data underlying this study's findings can be accessed upon reasonable request to the corresponding author, subject to restrictions to maintain participant confidentiality

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RELATIONSHIP BETWEEN ECONOMIC STATUS AND STUNTING INCIDENTS IN TODDLERS AGED 12 - 59 MONTHS IN EAST NUSA TENGGARA, INDONESIA

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Abstract

Background: Toddlers who experience stunting generally experience cognitive and motor developmental delays. The incidence of stunting in Balauring village in February 2021 was 39.1%, in August it was 25%. This study aims to determine the stunting rate, analyze the relationship between economic status and parenting patterns on the incidence of stunting in toddlers aged 12-59 months. **Method:** This type of research is observational analytic using cross-sectional. The sample in this study were parents who had toddlers aged 12 – 59 months who were registered on the register at the Balauring village posyandu, biological parents who cared for the toddlers, lived at home with the toddlers, and were willing to be respondents. The sample size was 60 respondents. Sampling technique. Non Random Sampling atau tidak acak dengan *consecutive sampling*. The related variable is stunting, while the independent variables are economic status and parenting patterns. Bivariate data analysis used the chi square test.

Results: This research showed that there were 18 stunted toddlers with a low economy (54.5%) and 15 stunted toddlers with a low economy (45.5%) in Balauring village. A total of 26 toddlers were stunted (56.5%) toddlers were not stunted with inappropriate parenting patterns in providing food in Balauring village. There was no relationship between economic status and the incidence of stunting in toddlers aged 12 – 59 months in Balauring village with a value of $p < 0.511$ ($p < 0.05$). There is no relationship between the parenting style of giving food and the incidence of stunting in toddlers aged 12 – 59 months in Balauring village with $p = 0.606$ ($p < 0.05$). **Conclusion:** This research shows that there is no relationship between economic status, parenting patterns and the incidence of stunting in toddlers aged 12 - 59 months in Balauring village.



Keywords: Toddlers, Economic Status, Parenting Patterns of Feeding, Stunting

INTRODUCTION

Toddlers who experience stunting will generally experience obstacles in their cognitive and motor development which will affect their productivity as adults because an important period in the process of human growth and development is in infancy. Where for toddler growth, nutritional intake is very much needed. Stunting in toddlers is the result of many factors related to poverty and lack of attention to the quality, quantity and practice of providing food that is adjusted to the age of the toddler. Children with Stunting Indonesia according to the Joint Child Nutrition Elites in 2018 is the highest in Asia (55%). For Indonesia, the stunting rate in 2018 was 30.8% and stunting data for NTT Province according to SSGI in 2021 was 37.8%. The number of stunting for Lembata Regency according to Health Office data in 2021 for the August period was 25.0% and the incidence of stunting at the Balauring Health Center for the February 2021 period was 37.4%, the August 2021 period was 28% and in Balauring village the incidence of stunting for the February period was 39.1%, the August period was 25%. This study aims to determine the relationship between economic status and the incidence of stunting in toddlers aged 12-59 months in Balauring village.

Indirectly, stunting is influenced by economic factors, such as family income and food availability. Food availability is a family's ability to meet adequate food needs in terms of quantity, quality, and safety (Doriza, 2015). A family's economic status will affect the family's ability to fulfill nutritional needs and the ability to access health services (Aziz, 2013). Children in families with low economic levels are at greater risk of stunting because their low ability to fulfill nutritional needs increases the risk of malnutrition (Aziz, 2013). This is evidenced by data from the 2018 Joint Child Malnutrition Estimates, which shows that upper-middle-income countries were able to reduce stunting rates by up to 64%, while lower-middle-income countries only reduced stunting rates by around 24% (Ministry of Health of the Republic of Indonesia, 2018). Family income and economic crises are among the main causes that influence delayed child growth and development and various nutritional problems. Such economic conditions make it difficult for stunted children to obtain sufficient nutritional

intake, so they cannot catch up properly (Mary, 2018). The aim of this study is to analyze Relationship between Economic Status and Stunting Incidents in Toddlers Aged 12 - 59 Months in Balauring Village, Lembata Regency, NTT.

METHOD

This type of research is observational analytic using cross-sectional design. The sample in this study were parents who had children age 12 – 59 months. Inclusion criteria are Children who were registered at the Posyandu in Balauring village, biological parents who cared for the toddlers, lived at home with the toddlers, and were willing to be respondents. The sample size was 60 respondents. Sampling technique is consecutive sampling. Instrument of this study is questioner to measure Economic status and for height of the children use Infantometer and Mikrotols. Data analyze used Chi-Square.

RESULT AND DISCUSSION

A. Mother 's Characteristics of the sample

Table 1 Characteristics of mothers based on age, education, occupation, height and weight during third trimester of pregnancy.

Characteristics	n	%
Age		
< 20 years	2	3,3
20 – 35 years	46	70,0
>35 years	12	26,7
Education		
SD	16	26,7
SMP	13	21,7
SMA	17	28,3
Universities	14	23,3
Work		
Housewife	41	68,3
Self-employed	3	5,0
Honorary staff	7	11,7
Civil servant	9	15,0
Height		
≤ 145 cm	43	71,1
>145 cm	17	28,3
body weight in 3rd Trimester		
Normal	58	96,7
Abnormal	2	3,3
Income of the family		

Low	33	55
High	27	45
Total	60	100

From table 1, The majority of mothers aged 20-35 years have toddlers aged 12-59 months and almost all mothers' height is considered abnormal. The last education of the mothers is mostly high school and almost all mothers work as housewives.

B. Toddlers Characteristic

Characteristics	n	%
Gender		
Male	30	50
Famale	30	50
Age		
12 – 24 months	20	33,3
25 – 36 months	15	25,0
37 – 48 months	11	18,3
49 – 59 months	14	23,3
Height per Age		
Very Short	10	16,7
Short	28	46,7
Normal Total	22	36,7
History of Malnutrition		
Yes	27	45,0
No	33	55,0
Stunting incidence		
Stunting	25	41,7
Not stunting	35	58,3
Total	60	100%

C. Analyze between economic status and the incidence of stunting in toddlers aged 12-59 months

Economic Status	Stunting incidence in toddlers						<i>p value</i>
					Total		
	<i>Stunting</i>		Not <i>stunting</i>				
	n	%	n	%	n	%	
Low	15	45,5	18	54,5	33	100	0,511
Tall	10	7,0	17	63,0	27	100	
Total	25	41,7	35	58,3	60	100	

A large percentage of respondents with low economic status did not have stunted toddlers (54.5%). The results of statistical tests using the Chi-square test obtained a p-value of 0.511. When compared with the α value of 0.005, the p-value

is > 0.05 , indicating there is no relationship between economic status and the incidence of stunting in toddlers aged 12–59 months in Balauring village. This study aligns with research conducted by Ulva Noviana and Heni Ekawati (2018), which found no correlation between economic status and stunting.

Respondents with inappropriate parenting patterns, as many as 56.5%, had toddlers who did not experience stunting. The results of statistical tests using the chi-square test obtained a p-value of 0.606. When compared with the α value of 0.005, the p-value > 0.05 indicates there is no relationship between parenting patterns and stunting. Despite low economic status and incorrect parenting patterns in feeding, with a high level of maternal education, mothers are able to manage food well and consider nutritional value so that stunting does not occur in children.

Despite low economic in providing food, with a high level of maternal education, mothers are able to manage food well and consider nutritional value so that stunting does not occur in children. The low economic status in Balauring village is due to the family's lack of additional income. Although the family's economic status is low, the number of children in the family is small. Therefore, even though the economic status is nominally low, they are able to meet the nutritional needs of children. Several studies contradict the results of the study conducted in Balauring village. Research conducted by (Dina and Rinda, 2020) stated that increasing income will increase the opportunity to purchase food with better quality and quantity, conversely, a decrease in income will lead to a decrease in purchasing power for food, both in quality and quantity. Another contradictory study is research conducted by (Akbar and Ramli, 2022), which states that family income factors influence the incidence of stunting in children aged 6-59 months.

There is no relationship between economic status and stunting in Balauring village, as low-income families are able to prepare nutritious food with simple, inexpensive ingredients to meet their children's nutritional needs. There are still respondents with high economic status in Balauring village whose toddlers experience stunting. This is because high incomes generally consume higher-priced foods, but this does not guarantee good nutrition. High incomes do not always increase the consumption of nutrients needed by the body, but they will increase the opportunity to choose food ingredients and increase the consumption of

preferred foods even though these foods do not contain nutrients. One indirect cause of stunting is the family's socioeconomic status, which is influenced by the level of parental education. Higher education increases the opportunity to earn sufficient income to live in a good and healthy environment. While better jobs mean parents are always busy working so they are not interested in paying attention to the problems faced by their children, even though these children really need parental love (Adriani, 2012).

Income level was not associated with stunting in Balauring village, as most of the respondents' fathers worked as fishermen. Therefore, protein foods are relatively inexpensive in this area. This is because even in low-income families, animal-based foods can still be purchased or obtained through fishing. This allows both high- and low-income families to access these foods, making income a non-risk factor for stunting.

CONCLUSION

Stunting incidents in Balauring village amounted to 25 children under five is still high (41.7%) **and** Economic status is not related to the incidence of stunting among toddlers in Balauring village in East Nusa Tenggara.

DECLARATION

Conflict of Interest

There is no conflict of interest in this research

Authors' Contribution

The author contributed to the preparation of the article starting from research design, data collection, data processing, and analysis.

Ethical Approval

The Health Research Ethics Committee of Universitas Airlangga has reviewed and approved this study, deeming it ethically feasible with letter number No. 135/EC/KEPK/FKUA/2023.

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Data Availability

Based on data from the Health Service for the February and August periods of 2021.

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COMIC MEDIA AS AN EFFORT TO IMPROVE KNOWLEDGE AND ATTITUDES ABOUT MENARCHE

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Abstract

Background: The age of menarche is getting younger, yet many elementary students are not prepared in terms of knowledge and attitudes. Comic media as an interactive educational method can increase understanding about menarche in a fun and easy-to-understand way. **Objective:** To analyze the effect of comic media on improving knowledge and attitudes about menarche in fifth-grade elementary school girls. **Method:** A quasi-experimental study with a pretest-posttest design in the treatment (comic) and control (lecture) groups using total sampling of 66 fifth-grade girls who had not experienced menarche. Data were analyzed using paired t-test and independent t-test. **Results:** There was a significant increase in knowledge in the comic group ($p=0.000$). Although not statistically significant, there was a positive increase in attitudes in the comic group compared to lectures. **Conclusion:** Comic media is effective in increasing knowledge and potentially improving the attitudes of elementary school girls regarding readiness for menarche.

Keywords: *Comic, menarche, knowledge, attitudes, health education*



INTRODUCTION

Menarche marks the beginning of reproductive ability in girls and typically occurs between the ages of 10 and 14. However, global studies show a trend of decreasing age at menarche due to improved nutrition and lifestyle changes, resulting in earlier onset in some children (Lusiana et al., 2023; Shrestha et al., 2025). This condition can affect children's psychosocial readiness, especially if they lack adequate knowledge about the bodily changes that occur during menarche, leading to anxiety, fear, and rejection of this natural process (Hidayah et al., 2021).

Unfortunately, education about reproductive health, particularly about menarche, is often neglected in elementary schools, even though this period is crucial for developing children's reproductive health understanding (Suarniti et al., 2024). Data shows that many girls experience menarche without prior knowledge, thus viewing menstruation as shameful or even a disease (Triana et al., 2023). Therefore, effective and enjoyable educational interventions are needed to help children understand menarche as part of a normal developmental process.

Comics are a health education tool that can be used to provide an understanding of menarche in a visually appealing and easily understood way for children (Bahij & Dzul'arfah, 2022). Research shows that comics can increase children's knowledge and influence attitudes regarding reproductive health in an interactive, enjoyable, and reusable manner (Septialti et al., 2022). The advantage of comics lies in their ability to package health education materials with illustrations and narratives appropriate to the cognitive developmental level of elementary school children.

However, the use of comics as a means of educating school-aged children about menarche is still not widely implemented in Indonesia, despite the significant potential of this medium for increasing girls' knowledge and positive attitudes about menarche (Safitri, 2023). Research on the effectiveness of comics in menarche education is crucial for providing empirical evidence for more innovative reproductive health education strategies in elementary schools, in line with the demands for implementing reproductive health programs that are adaptive to children's characteristics.

This study aims to analyze the effect of comic book media on improving knowledge and attitudes about menarche in fifth-grade elementary school students. It is hoped that the results of this study can serve as a basis for developing more effective visual-based reproductive health education methods and serve as recommendations for schools and health professionals in improving girls' readiness to face menarche with a correct understanding.



METHOD

This study employed a quasi-experimental design with a pretest-posttest control group approach. This design allowed researchers to compare the effectiveness of using comics and lectures in improving students' knowledge and attitudes regarding menarche. The study was conducted in four elementary schools in Malang City and Regency. Researchers considered accessibility and the schools' readiness to support reproductive health education for fifth-grade female students who had not yet experienced menarche.

The population in this study was all fifth-grade female students who had not yet experienced menarche in the four elementary schools, with a total sample of 66 students selected using a total sampling technique. The sample was then divided into two groups: a treatment group, which received education using comics, and a control group, which received education using the same lecture method. The educational material in the comics included information on the definition of menarche, early signs of menarche, how to maintain menstrual hygiene, and what to do when experiencing menarche. The intervention was delivered in one session, lasting approximately 60 minutes for each group.

The research instrument used a knowledge questionnaire consisting of 20 multiple-choice questions and an attitude questionnaire with 15 Likert scale statements that have been validated and have good reliability values with the Cronbach Alpha test. Data collection was carried out by administering a pretest before the educational intervention and a posttest after the intervention was given to measure the increase in knowledge and changes in attitudes after the education was given. Data were analyzed using a paired t-test to determine the differences before and after the intervention in each group and an independent t-test to see the differences in results between the treatment group and the control group. This study has received ethical approval from the Research Ethics Committee of the Faculty of Medicine, Airlangga University, and informed consent was obtained before the study was conducted.

RESULT AND DISCUSSION

This study involved 66 fifth-grade elementary school students who had not yet experienced menarche. They were divided into a treatment group (comic media) of 33 students and a control group (lecture media) of 33 students. Respondent characteristics based on age showed a mean age of 11 years in both the treatment and control groups. All respondents completed the intervention and participated in the pretest and posttest according to the predetermined schedule.

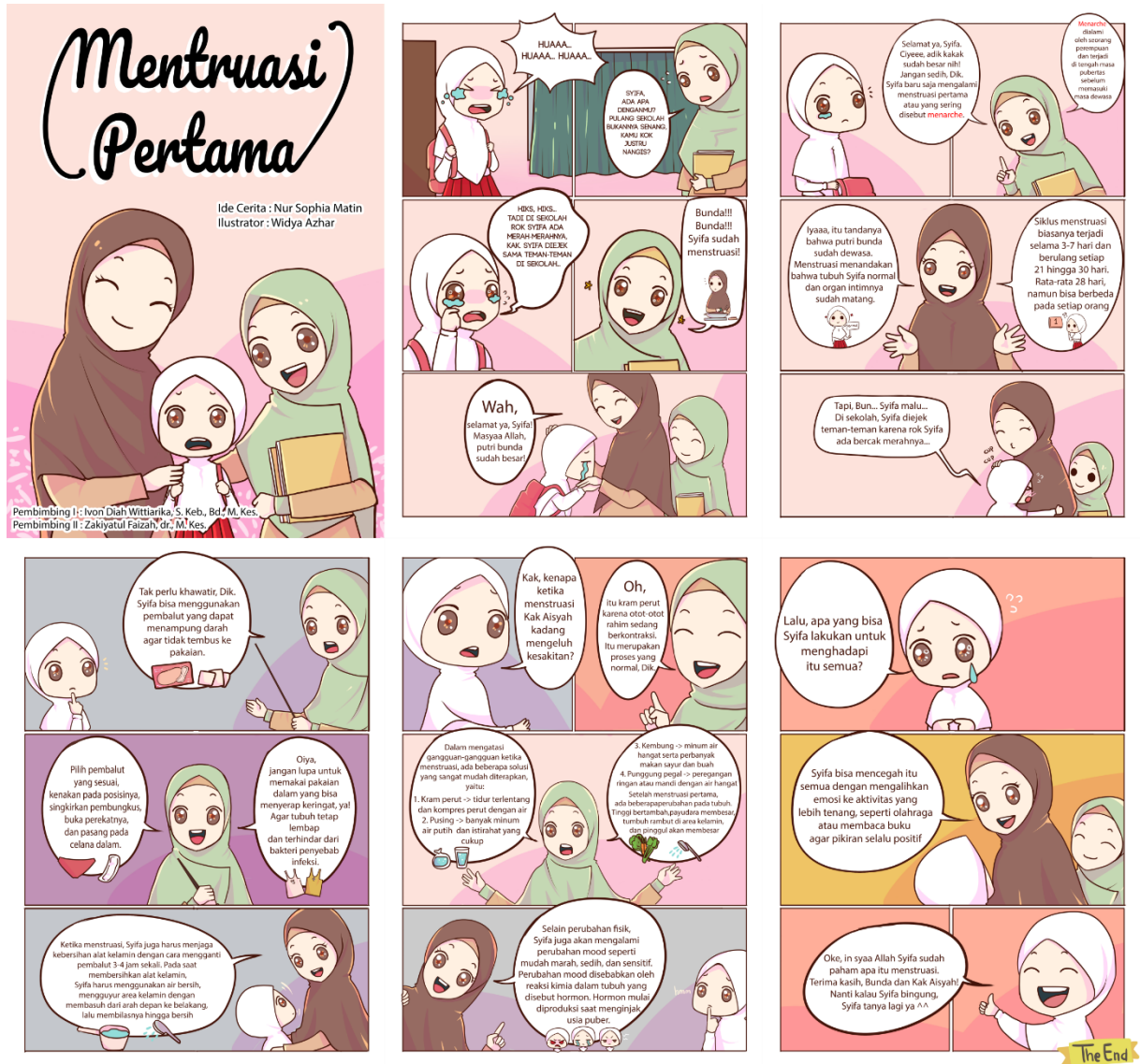


Figure 1. Menarche comic used for the study

The increase in knowledge about menarche before and after the intervention in the treatment group showed a significant increase in scores. The mean knowledge score before the intervention in the treatment group was 12.18 and increased to 17.33 after the comic media education, with a p-value of 0.000. This indicates that comic media is effective in significantly improving students' understanding of the concept of menarche.

In the control group, which received education using the lecture method, knowledge scores also increased from an average of 12.06 to 15.48, with a p-value of 0.000. However, the results of the independent t-test showed no significant difference in posttest scores between the treatment and control groups ($p=0.500$), indicating that both methods were equally effective in increasing knowledge, although the average score increase in the comic group was higher.



For the attitude variable, there was an increase in the average score in the treatment group from 55.21 to 58.03 ($p=0.132$), while the control group saw a very small increase from 54.76 to 55.03 ($p=0.830$). The results of the independent t-test on posttest attitude scores between the two groups showed a $p=0.256$, indicating no significant difference between the two groups, although descriptively, the comic group experienced a greater improvement in attitudes than the lecture group.

The following table provides a more comprehensive understanding of the data:

Table 1. Comparison of Knowledge and Attitude Scores Before and After Intervention

Variable	Group	Pretest (Mean \pm SD)	Posttest (Mean \pm SD)	p-value (Paired t-test)
Knowledge	Comic	12,18 \pm 2,31	17,33 \pm 1,52	0,000
Knowledge	Lecture	12,06 \pm 2,54	15,48 \pm 1,80	0,000
Attitude	Comic	55,21 \pm 4,13	58,03 \pm 3,90	0,132
Attitude	Lecture	54,76 \pm 4,27	55,03 \pm 4,18	0,830

Table 2. Independent t-test of Posttest Scores of Knowledge and Attitude

Variable	Group	Posttest (Mean \pm SD)	p-value (Paired t-test)
Knowledge	Comic	17,33 \pm 1,52	0,500
Knowledge	Lecture	15,48 \pm 1,80	
Attitude	Comic	58,03 \pm 3,90	0,256
Attitude	Lecture	55,03 \pm 4,18	

The statistical test comparing posttest scores between the treatment and control groups yielded a $p=0.5$, indicating a $p>0.05$, indicating no significant difference in knowledge between the treatment and control groups. For the attitude group, the statistical test comparing posttest scores between the treatment and control groups yielded a $p=0.256$, indicating a $p>0.05$, indicating no significant difference in attitudes.

Although neither variable demonstrated statistical significance, the increase in scores in the comic group demonstrates the potential of this medium to shape students' positive attitudes regarding menarche readiness.

These results suggest that comics can be an effective and enjoyable alternative educational method for elementary school girls, with the potential to improve their understanding and readiness for menarche, as well as support the implementation of more adaptive reproductive health education in elementary schools.

The results of this study indicate a significant increase in knowledge in the group of girls educated using comics, supporting the findings of Hidayah (2021) who demonstrated the effectiveness of comics in improving girls' understanding of menarche. This increase in knowledge occurs because comics present information in an engaging visual format, making it easier for children to understand the concepts presented. This aligns with visual learning theory, which explains that visualization can improve information retention.

Furthermore, comics have been shown to stimulate students' interest in reading and enthusiasm for learning reproductive health (Suarniti et al., 2024). Children tend to focus more when reading comics because the illustrations and storylines are relevant to their daily lives, enabling the health messages conveyed effectively. This finding aligns with research by Bahij & Dzul'arfah (2022), which showed that comics about puberty based on Islamic values were effective in improving reproductive health understanding in elementary school students.

Despite the increase in knowledge, this study found that the increase in attitudes in the comic group was not statistically significant, although descriptively, it showed a positive trend. This suggests that changing attitudes requires a longer time and process than increasing knowledge (Triana et al., 2023). Changes in



attitudes related to menarche readiness are influenced not only by educational media but also by personal experiences, family support, and the child's social environment.

However, the increase in attitude scores in the group exposed to comics demonstrates the positive potential of this medium in shaping children's attitudes regarding menarche readiness (Safitri, 2023). Comics can help children understand menarche as a normal physiological process, thereby helping to reduce fear and anxiety when facing their first menstruation. This aligns with research by Septialti (2022), which showed that comics can positively influence children's attitudes toward reproductive health issues.

Although this study primarily focuses on improving knowledge and attitudes toward menarche readiness, it is also important to consider the broader implications of early menarche. Early onset of menarche has been associated with several physical and psychosocial risks for adolescent girls. Studies have shown that girls who experience menarche at an earlier age are more likely to face challenges such as increased risk of depression, anxiety, low self-esteem, and even engagement in risky behaviors due to a mismatch between physical development and emotional maturity (Lusiana et al., 2023; Shrestha et al., 2025).

From a health perspective, early menarche has been linked to a higher risk of developing metabolic disorders, breast cancer, and reproductive health problems later in life (Triana et al., 2023). Furthermore, early menarche can disrupt the social adaptation of young girls in school and community settings if they are not equipped with appropriate knowledge and emotional support.

This highlights the urgency of implementing effective educational strategies at an early stage, before the onset of menarche. By equipping girls with accurate knowledge and fostering positive attitudes early on, interventions such as comic-based education can help mitigate the potential negative impacts of early menarche. Therefore, reproductive health education should not only aim to increase cognitive understanding but also be part of a preventive approach to support the mental and physical well-being of young girls facing early puberty.

Another factor that can influence improved knowledge and attitudes is the involvement of teachers and health workers in supporting the educational process

using comics in schools. Teacher support can facilitate discussions related to the material in the comics, allowing students to gain a deeper understanding and internalize the values contained within the educational material (Shrestha et al., 2025). Therefore, comics will be more effective if their use is complemented by guided discussions or Q&A sessions.

This study's limitations lie in the short intervention period, which prevented the evaluation of long-term attitude changes. Future research is recommended to employ a longitudinal design to more comprehensively evaluate attitude changes following educational interventions using comics (Suarniti et al., 2024). Furthermore, developing comic materials with local cultural adaptations and language accessible to children will enhance the effectiveness of this medium in reproductive health education.

The results of this study demonstrate that comics can be an innovative alternative for reproductive health education in elementary schools, not only increasing knowledge but also potentially fostering positive attitudes in girls regarding menarche readiness. Implementing comics in health education can support healthy school programs and provide enjoyable reproductive health education for children.

Therefore, integrating comics into the elementary school health curriculum can be an effective and adaptive educational strategy, supporting girls' understanding of reproductive health from an early age, thereby promoting their well-being.

CONCLUSION AND SUGGESTION

Comics as a means of reproductive health education have proven effective in increasing knowledge about menarche among fifth-grade elementary school students. Comics, with their engaging visuals and narratives, can help students understand the concept of menarche in a fun way, making the material easier to grasp and remember. The significant increase in knowledge in the group educated using comics suggests that this method can be an innovative alternative in reproductive health education in elementary schools, particularly in helping prepare students for menarche with a sound understanding.



Although the results of this study indicate that the improvement in attitudes in the comic group was not statistically significant, there was a positive trend towards changes in students' attitudes after receiving education through comics. This suggests that attitude formation requires time and ongoing reinforcement through active mentoring and discussion to ensure students' internalization of the material learned. Therefore, collaboration between schools and health professionals is necessary to support students through reproductive health education activities using media appropriate to their developmental age.

DECLARATION

Conflict of Interest

There is no conflict of interest in this research.

Authors' Contribution

All authors contributed to every stage of the research, from the initial conceptualization and data collection to analysis and manuscript drafting. This reflects the collaborative nature and equal involvement of all contributors throughout the study.

Ethical Approval

This study was approved by the Research Ethics Committee of the Faculty of Medicine, University of Airlangga. Informed consent was obtained from all participants prior to their inclusion in the study.

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Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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RELATIONSHIP BETWEEN THE LEVEL OF EDUCATION AND KNOWLEDGE WITH THE USE OF INTRAUTERINE DEVICE CONTRACEPTIVES

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Abstract

Background: The high birth rate is the main reason for the need for family planning services. Data at the Semen Health Center shows low interest in IUD compared to other contraceptives, this can be caused by several existing factors. This study aims to determine the relationship between the level of education and knowledge of acceptors with the use of IUD (Intrauterine Device) contraceptives at the UPTD Semen Health Center, Kediri Regency East Java Indonesia. **Method:** This study is a quantitative study with a Cross-Sectional research plan. The sampling technique used in this study was Purposive Sampling with a sample size of 100 KB acceptor respondents in Semen District, Kediri Regency. This study was conducted in April 2024. Data collection used a questionnaire instrument. Data were analyzed using the Spearman's rho test. **Result:** Secondary education level (SLTA/SMK) (51%) and basic education level (SD-SMP) (43%). High knowledge, namely 83 respondents (83%). Half of the birth control acceptors are non-IUD users (74%). The results of the analysis of the Spearman's Rho test at the education level with the use of IUD contraceptives are known that the results of sig. (2-tailed) of .140, and knowledge with the use of IUD contraceptives is known as the results of sig. (2-tailed) of .038. **Conclusion :** There was no relationship between education level and IUD contraceptive use and there was a significant relationship between knowledge and use of birth control. Acceptors need to be proactive in seeking information about the use of IUD contraceptives through various sources such as print media, electronic media, the internet, and consultation with health professionals. This can help in choosing the right method or contraceptive for them to use.

keyword : Education Level, Knowledge, Use of IUD Contraception.

INTRODUCTION

Indonesia is a country with a population that has experienced a relatively high growth rate in the fourth position in the world. The Ministry of Home Affairs through the Directorate General of Dukcapil released Population Data in 2021, recording that the population of Indonesia is 273,879,750 people. The database also recorded the reporting of births of 691,259 people (Kemendagri, 2022).

The high birth rate is also the main reason for the need for family planning services. Long-term contraceptive methods (LMPs) have proven to be the most effective in reducing pregnancy rates, but until now LMPs have not been the choice





of the majority of fertile couples in Indonesia. The number of active LMP participants according to the BKKBN in 2021 was 10,028,915 (25.29%) participants and in 2022 it was 10,028,146 (25.28%) participants. It can be said that the achievement of active LMP participants in Indonesia has decreased compared to 2020. There are several types of permanent birth control that have been scientifically proven to be the most effective methods for spacing pregnancies, such as IUDs, implants, and sterilization in the form of vasectomy and tubectomy (Dinengsih, 2023).

Based on data from the East Java Province BKKBN, the number of acceptors in the local area reached 81,637 people in the first quarter of 2023. Acceptors are KB participants and Fertile Age Couples (PUS) who use one of the contraceptive devices or drugs. The number of PUS in East Java is 5,967,082, while IUD KB users are only 5.69%. Data on Fertile Age Couples at the Semen Health Center UPTD, Kediri Regency in 2022 was 8,995 people and had 5,996 active KB acceptors, of which the number of IUD KB users was only 708 people or only 11.80% of active acceptors, where IUD KB users can still be said to be low compared to other contraceptives (Diyanah, 2023).

Low use of IUDs can lead to increased birth rates. One reason mothers are less interested in using IUDs is the frequent failure of other contraceptive methods. In fact, IUDs are effective contraceptives with a low failure rate, only 1-5 pregnancies per 100 women.

The low interest of IUD KB acceptors compared to other contraceptives in the Semen Health Center area of Kediri Regency is caused by many factors such as the level of education and lack of knowledge of participants about IUD contraception. In addition, environmental factors such as the influence of people who are considered experienced in KB and the lack of support from husbands in using IUDs also play a role. On the other hand, mothers who have a high level of education and sufficient knowledge about IUDs will be more aware and tend to use this contraceptive, so that the use of IUDs will be more in demand (Diyanah, 2023).

Activities that can support the implementation of the Family Planning Program, especially in increasing the interest of IUD KB users in Kediri Regency, include the provision of KB services and contraceptives for poor families,

Information and Education Communication (KIE) services with indicators, family planning guidance, KB Safari, procurement of Family Planning facilities and infrastructure, and Family Planning Operational Assistance (BOKB) (DP2KBP3A,2020).

The program is expected to reduce maternal and infant mortality rates caused by pregnancy at too young or too old ages. In addition, it aims to control the population and balance needs with the population in Indonesia. This study looked at the relationship between education levels and knowledge with the use of IUD contraception at the Semen Health Center UPTD, Kediri Regency.

METHOD

This study uses a quantitative analytical design with a cross-sectional approach. The population of this study was all KB acceptors in Semen District, Kediri Regency, totaling 5996 people. The sample in this study was part of KB acceptors in Semen District, Kediri Regency, totaling 100 people. The sampling technique in this study was purposive sampling. The sample criteria in this study are fertile couples who are domiciled or living in Semen District, Kediri Regency, fertile couples with active KB acceptor status and fertile couples who are willing to be respondents and become research samples by signing an informed consent. The location of this study was in the Semen Health Center UPTD area, Kediri Regency. The time of the study was conducted on April 3 - April 18, 2024. The independent variables were the level of education and knowledge while the dependent variable was the use of IUD contraceptives. Data collection used a questionnaire instrument. General respondent data were analyzed by percentage. Respondent-specific data were analyzed using the Spearman's rho test to see the relationship between education level and knowledge with the use of IUD contraceptives. It is said that there is a significant difference and there is a relationship if the level of significance (p) < 0.05 .

RESULT AND DISCUSSION

Distribution of characteristics, univariate and bivariate analysis of respondents based on the results of the questionnaire in terms of education level

and knowledge with the use of IUD contraceptives can be seen in the following table:

Respondent Characteristics

Table 1. Respondent Characteristics Data

Variable	Frequency (n)	Percentage (%)
Age		
10-19 Years	1	1%
20-44 Years	91	91%
45-59 Years	8	8%
Work		
Civil Servants	1	1%
Entrepreneur	3	3%
private sector employee	9	9%
Labor	3	3%
Housewife	84	84%
Parity		
1-3 child	94	94%
> 3 child	6	6%
Height		
<150 – 154 cm	47	47%
155 – 159 cm	41	41%
160 – 164 cm	8	8%
> 164	4	4%
Weight		
35 – 44	9	9%
45 – 54	29	29%
55 – 64	33	33%
> 64	29	29%
Complaint		
With	75	75%
Without	25	25%
Years of Education		
> 12 Years	6	6%
12 Years	49	49%
6 – 9 Years	45	45%
Graduation Year		
> 2014	28	28%
2005 - 2014	52	52%
1995 - 2004	20	20%
Duration of Use of Contraceptives		
1 – 5 years	78	78%
> 5 years	22	22%

Based on the analysis results in the table above, it can be seen that almost all respondents are aged 20-44 years with a total of 91 respondents (91%). Furthermore, respondents in this study were almost all housewives with a total of 84 respondents (84%). Respondents with a parity of 1-3 children were 94 people (94%). Almost half of the respondents in this study were respondents with a height

of <150 - 154 cm, namely 47 respondents (47%). In this study, almost half of the respondents weighed 55-64 kg, namely 33 respondents (33%). Then, half of the respondents in this study did not have complaints when using contraceptives, namely 75 respondents (75%). Almost half of the respondents with a length of education of 12 years, namely 49 respondents (49%). Half of the respondents with the last year of education in 2005-2014, namely 52 respondents (52%). And almost all of the respondents with a length of use of contraceptives for 1-5 years, namely 78 respondents (78%).

Univariate Analysis

Table 2. Frequency Distribution of Univariate Analysis Results

Variable	Frequency (n)	Percentage (%)
Education		
Senior High School	6	6%
Junior high school	51	51%
Basic secondary school	43	43%
Knowledge		
High	83	83%
Enough	16	16%
Less	1	1%
Use of Contraception		
Contraceptive users	26	26%
Not a contraceptive user	74	74%

Based on the analysis results in the table above, it can be seen that half of the respondents have a secondary education background (Senior High School/Vocational High School) which is 51 respondents (51%) and almost half of the respondents have a basic education background (Elementary School-Junior High School) as many as 43 respondents (43%). From the analysis results it is also known that almost all respondents have high knowledge, namely 83 respondents (83%). And half of the respondents are not IUD users, namely 74 respondents (74%).

The results of the study showed that half of the respondents had a secondary education background (Senior High School/Vocational High School) as many as 51 respondents (51%) and almost half of the respondents had a basic education background (Elementary-Junior High School) as many as 43 respondents (43%). Research by Nurliawati & Komariah (2020) stated that individuals with higher education have broader thinking and are more receptive to information about



contraception (Nurliawati & Komariah, 2020) . This is in line with Rizali's research (2016) which shows that the level of education of fertile couples influences a person's views, attitudes, and decision-making and actions. According to Rahman (2022), education is not only an effort to provide information and skills, but also an effort to fulfill the desires, needs, and abilities of individuals so that they can achieve a satisfying lifestyle personally and socially. Education is a learning process that helps individuals become more understanding, mature, and critical in thinking (Rahman et al, 2022).

Education is an interesting endeavor in humans, which provides programmed learning experiences in both informal, formal, and non-formal forms, both in school and outside of school, and lasts throughout life. The higher a person's level of education, the easier it is for them to receive information and have broader knowledge. Conversely, low education will hinder the development of attitudes in receiving information and knowledge (Lailaturohmah et al, 2023).

The educational background of the respondents, most of whom are middle and elementary level, can be caused by the conditions of the surrounding community, where researchers took respondents who lived in rural areas and were involved in posyandu activities. Most respondents obtained information about contraceptives through experiences and stories from neighbors or family. The level of education also affects the knowledge and attitudes of respondents in receiving information about the right contraceptives.

The results of the study of 100 respondents showed that almost all respondents had high knowledge, namely 83 respondents (83%). According to Notoatmodjo (2014), knowledge is related to a person's analytical ability, where good analytical skills affect the level of cognitive domains that are important for the formation of knowledge and behavior. Research by Cahyaningrum Frida & Sri Mularsih (2019) stated that the level of intelligence of respondents varied, and one of the factors that influenced the mother's knowledge was the information received. Good knowledge about something is not formed in a short time, but through a certain process (Cahyaningrum & Mularsih, 2019) . Sawiti (2020) explains that knowledge must go through six stages, namely knowing, understanding,

application, analysis, synthesis, and evaluation, all of which play a role in determining a person's level of knowledge (Sawiti, 2020).

Knowledge includes information received by acceptors about the IUD KB program and how to get its services. Increased knowledge does not only come from formal education but can also be obtained through various means, either through one's own initiative or encouragement from others. A high level of knowledge in a person helps overcome various problems and make the right decisions for themselves. The environment also affects the process of acquiring a person's knowledge because of the reciprocal interaction that is responded to as knowledge by each individual. Good knowledge can influence a person's views and attitudes or actions.

The results of the study showed that half of the respondents were not IUD users, namely 74 respondents (74%). According to Fiantra (2013) IUD is a very effective contraceptive with a success rate of 99.2-99.6% in the first year. Unlike hormonal contraceptive methods, IUDs immediately prevent pregnancy after being installed, and users do not need to remember to take medication every day (as with birth control pills) or visit the clinic on schedule (as with birth control injections).

According to the theory of support in using IUD contraception, it is divided into 4 supports, namely informational support, instrumental support, emotional support, and appreciation support. Factors that are considered by someone in choosing an IUD contraceptive include individual factors, education level factors, knowledge factors, health factors, contraceptive method factors such as cost, and side effects (Irasanti, 2022).

Respondents in this study were mostly aged 20-44 years. Age is related to the reproductive period or fertile period that affects sexual patterns. Younger respondents generally feel afraid to use IUDs because they tend to feel ashamed of things that are considered taboo. They are reluctant to use intrauterine contraceptives because IUD installation requires medical procedures performed in health facilities by doctors, which are often considered invasive or scary. Dependence on medical personnel for IUD installation and removal can also add to respondents' discomfort and concerns.

Bivariat Analysis

Table 3. Results of Spearman's Rho Level of Education And Knowledge With The Use Of Intrauterine Device Contraceptives.

Correlations	Use of Contraception	
Education	Sig. (2-tailed)	.140
Knowledge	Sig. (2-tailed)	.038

Based on the test results in the table above, it is known that the sig. (2-tailed) result is .140. Because the sig. (2-tailed) value is > 0.05 , it means that it can be said that there is no significant relationship between education and the use of IUD contraception.

The results of the analysis show that almost half of the respondents have a secondary education background (42%) and elementary (28%) are not IUD users. Based on the results of statistical tests using Spearman's rho analysis, it is known that the sig. (2-tailed) result is .140, because the sig. (2-tailed) value is > 0.05 . So it can be said that there is no significant relationship between education and the use of birth control. Grestasari (2014) stated that education is not the main factor in changing a person's behavior and it needs to be emphasized that individuals with low education do not always have low knowledge. Knowledge or information can be obtained not only formally but also informally (Grestasari, 2014).

The education process lasts a lifetime, where lifelong education is a system of educational concepts that explain the entirety of a person's learning and teaching activities. Before a person enters formal education at school, a person will first receive informal education in the family and if able, continue to college (Jumiati Ani et al, 2023).

The results of the study showed that the use of IUD as a contraceptive is still low, especially among respondents with secondary and primary education backgrounds. This is due to the lack of information about IUD, low awareness of

acceptors regarding their health, and lack of independence to come to health services in using effective contraceptives such as IUD.

Based on the test results in the table above, it is known that the sig. (2-tailed) result is .038. Because the sig. (2-tailed) value < 0.05 , it means that it can be said that there is a significant relationship between knowledge and the use of IUD contraception.

The results of the analysis showed that half of the responses with high knowledge (58%) were not IUD users. Based on the results of statistical tests using Spearna's rho analysis, it is known that the sig. (2-tailed) result is .038, because the sig. (2-tailed) value < 0.05 . This means that there is a significant relationship between knowledge and the use of contraception. Pratiwi (2019) stated that the factors that influence family planning acceptors in choosing contraception include age, education, knowledge, and husband's support. This study is in line with the results of Huda et al. (2016) who found a significant relationship between knowledge and use of contraception ($p = 0.000$), as well as Rusiana et al. (2017) who also found a significant relationship between knowledge of contraception ($p = 0.000$).

Knowledge about IUD contraception is obtained through information sources such as print media, electronic media, the internet, and health workers. In understanding the concept of family planning, it is important to know how to use contraception. Factors to consider when using contraception include efficiency, ease of use, safety, possibility of fertility recovery, and availability of types of contraception. It is hoped that the higher the knowledge about contraception in fertile couples, the more effective they will be in determining which contraception to use.

The reason respondents did not choose to use IUD was because of their high knowledge about birth control. Respondents realized that they were not suitable or had obstacles in using IUD, so they chose not to use it. However, based on the researcher's field study, almost all respondents who used IUD stated that they did not have any special considerations in choosing a contraceptive method. They just followed friends or relatives who used the same contraceptive method and felt interested.



CONCLUSION

Based on the results of the study of the Relationship between Education Level and Knowledge with the Use of Intrauterine Contraceptive Devices (IUD), it is known that the results of education sig. (2-tailed) are .140, and knowledge with the use of IUD is known that the results of sig. (2-tailed) are 0.038. Conclusion: There is no relationship between education level and the use of IUD and there is a significant relationship between knowledge and the use of contraceptives. Acceptors need to be proactive in seeking information about the use of IUD through various sources such as print media, electronic media, the internet, and consultation with health workers. This can help in choosing the right method or contraceptive to use.

DECLARATION

Conflict of Interest

There Is No Conflict In This Study.

Authors' Contribution

The author contributed to the preparation of the article starting from research design, data collection, data processing, and analysis.

Ethical Approval

This research has received an ethical clearance letter from the Bhakti Wiyata Kediri Health Sciences Institute, which ensures that all protocols comply with ethical guidelines (369/FIK/EP/III/2024).

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Data Availability

The data supporting the findings of this study are available upon reasonable request from the corresponding author, with restrictions due to participant confidentiality

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SEAWEEDS DODOL IS EFFECTIVE IN INCREASING HEMOGLOBIN LEVELS IN PREGNANT WOMEN WITH ANEMIA

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Abstract

Background: Anemia in pregnant women must be watched out for because it can cause pregnancy complications. The prevalence of pregnant women worldwide who experience anemia is 41.8% and in Indonesia in 2018 it reached 48.9%. The main cause of anemia is iron deficiency. Iron can be obtained from local food ingredients, one of which is seaweed. This study aims to analyze the effectiveness of seaweed dodol consumption on hemoglobin levels of pregnant women in the second trimester with anemia. **Method:** This study was a pre-experimental design with a pre-test post-test with control group design. The population was all pregnant women in the second trimester in the Bululawang Health Center work area, Malang Indonesia. The sampling technique used a purposive sampling technique. The sample size was 30 people, divided into 15 people in the control group (Fe tablets) and 15 people in the treatment group (Fe tablets and seaweed dodol). Data analysis used the Independent Sample T Test. **Result:** The results of the Independent Sample T Test in the treatment group with the control group obtained a p value = 0.040 < 0.05, meaning that there was a difference in hemoglobin levels after the intervention between the control group and the treatment group, with the average hemoglobin of the treatment group (11.36 gr / dl) greater than the average control group (11.01 gr / dl). **Conclusion:** Seaweed dodol can be used as an effective non-pharmacological therapy to accompany Fe tablets to increase hemoglobin levels in pregnant women with anemia.

keyword : Seaweed Dodol, Fe tablets, Hemoglobin, Pregnant women

INTRODUCTION

Anemia in pregnant women is one of the risks that must be watched out for because it can affect the health of the mother and fetus. Anemia in pregnant women that is not treated properly can increase the risk of dangerous complications, even increase the risk of maternal death (Dai, 2021). Anemia in pregnant women correlates with adverse perinatal outcomes, including intrauterine growth retardation, premature labor, low birth weight, or neonatal





anemia, and is responsible for maternal consequences too, including the increased risk of pre-eclampsia and postpartum depression. Taking these serious health consequences into account, the WHO has indicated that among the Global Nutrition Targets which should be achieved by 2025, is a 50% reduction in anemia frequency in women of reproductive age (Skolmowska, et al, 2022).

Anemia that occurs in pregnancy is a condition of pregnant women with hemoglobin levels of less than 11gr/dl in the first and third trimesters and less than 10.5gr/dl in the second trimester. WHO reports that the prevalence of pregnant women worldwide who experience anemia is 41.8%. In Indonesia, the rate of anemia in pregnant women is still quite high. Based on the results of the 2018 Riskesdas data, the percentage of anemia in pregnant women has increased by 11.8% over the past 5 years, from 2013 by 37.15% while in 2018 it reached 48.9% (Gusriani, 2024; Kemenkes RI, 2018).

The causes of anemia include iron deficiency caused by a lack of consumption of food sources containing iron, sufficient food but low iron bioavailability so that the amount of iron absorbed is lacking, and food eaten contains substances that inhibit iron absorption (Rahmi, 2018). Prevention or treatment of anemia in pregnant women can be done pharmacologically or non-pharmacologically, one of which is consuming foods rich in iron. Seaweed (*Eucheuma Cottonii*) is one of the foods that contains several intermediate compounds needed in hemoglobin synthesis such as iron, protein and vitamin B complex. How to get seaweed is not difficult, it is widely sold in traditional markets and modern markets and the seaweed needed by pregnant women every day is 200 grams. Seaweed is also easy to process into various foods that are more varied than other foods that contain Fe such as spinach, kale or other green vegetables. Seaweed can be processed into jelly, fresh drinks, ice cream, cakes, and meatballs (Mutiar, et al, 2021).

Seaweed contains approximately 2-10% more nutrients than vegetables, due to its phytic acid content, which can stabilize the number of red blood cells, white blood cells, and hemoglobin. Furthermore, seaweed also functions to reduce the side effect of inhibiting the production of red blood cell-producing cells (Anggeni et al, 2021). Research in the Naras Health Center work area of Pariaman City

revealed that consuming seaweed (*eucheuma spinosum*) is effective in increasing hemoglobin levels in pregnant women (Mutiara, et al, 2021). Research by Salma et al. (2021) showed that administration of two red seaweed biscuits (40 mg) and 60 mg iron tablets per day resulted in the highest increase in Hb levels compared to the control group. From the description above, researchers conducted a study to analyze the effectiveness of seaweed dodol on hemoglobin levels of pregnant women in the second trimester with anemia at the Bululawang Health Center, Malang Indonesia.

METHOD

This study is a pre-experiment with a pre-test post-test control group design. The research location was at the Bululawang Health Center in January-August 2023. The population was all pregnant women in the second trimester with anemia in the Bululawang Health Center, Malang Indonesia. The sampling technique used purposive sampling so that a sample of 30 people was obtained, divided into two groups, 15 people in the control group with the provision of Fe tablets only and 15 people in the treatment group who were given an intervention in the form of a combination of Fe tablets and seaweed dodol. The inclusion criteria for this study were pregnant women in their second trimester with anemia at the Bululawang Community Health Center who were willing to participate. The exclusion criteria were women with a history of seaweed allergy and pregnant women with complications or comorbidities such as diabetes, hypertension, and others.

The control group was given 100 mg of iron tablets per day for 14 days. The treatment group was given 100 mg of iron tablets per day and 40 mg of seaweed dodol per day for 14 days (Salma et al, 2021). Monitoring compliance with iron tablet and seaweed dodol consumption using a compliance control sheet that must be filled in every time the sample consumes iron tablets and seaweed dodol and photo/video documentation when consuming iron tablets and seaweed dodol via WhatsApp. Hemoglobin examination was carried out before and after treatment through the Bululawang Health Center laboratory. Data collection using observation sheets related to the provision of interventions and the results of Hb

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measurements/examinations before and after treatment (intervention). Data analysis using Paired sample t-test.

RESULT AND DISCUSSION

1. Respondent Characteristics Data

Respondent characteristic data are as follows:

Table 1.1 Distribution of Respondent Characteristics

DESCRIPTION	TREATMENT GROUP		CONTROL GROUP		TOTAL	
	F	%	F	%	F	%
Age						
a. <20 years	3	20,0	4	26,7	7	23,3
b. 20-35 years	11	73,3	10	66,7	21	70
c. >35 years	1	6,7	1	6,7	2	6,7
Total	15	100	15	100	30	100
Education						
a. Primary education	9	60	7	46,7	16	53,3
b. Secondary education	5	33,3	6	40	11	36,7
c. Higher education	1	6,7	2	13,3	3	10
Total	15	100	15	100	30	
Job						
a. Not working	11	73,3	11	73,3	22	73,3
b. Working	4	26,7	4	26,7	8	26,7
Total	15	100	15	100	30	100
Gravida						
a. Primigravida	7	46,7	5	33,3	12	40
b. Multigravida	8	53,3	10	66,7	18	60
Total	15	100	15	100	30	100

2. Analysis of differences in hemoglobin levels before and after intervention in the control group..

Table 1.2 Paired T Test in the Control Group

	Mean (standard deviation)	Difference (standard deviation)	IK 95%	<i>p value</i>
Pre test	10,17 (0,317)	0,84 (0,318)	1,01612 -	0,000
Post test	11,01 (0,375)		0,66388	

Table 1.2 explains the hypothesis is accepted, there is a significant difference in hemoglobin levels before and after giving Fe tablets.

3. Analysis of differences in hemoglobin levels before and after intervention in the treatment group

Table 1.3 Paired T Test on Treatment Group

	Mean (standard deviation)	Difference (standard deviation)	IK 95%	<i>p value</i>
Pre test	10,50 (0,449)	0,86 (0,372)	1,05934 - 0,6473	0,000
Post test	11,36 (0,495)			

Table 1.3 explains the hypothesis is accepted, there is a significant difference in hemoglobin levels before and after being given a combination of seaweed dodol and Fe tablets.

4. Analysis of differences in hemoglobin levels in the treatment group and the control group.

Table 1.4 Independent Sample T Test on Treatment Group with Control Group

Kadar hemoglobin	Mean (SD)	<i>p value</i>
Hemoglobin level score of treatment group (n=15)	11,36 (0,495)	0,040
Hemoglobin level score of control group (n=15)	11,01 (0,375)	

Table 1.4 explains the hypothesis is accepted, there is a significant difference in hemoglobin levels after the intervention between the treatment group and the control group, where the average Hb level in the treatment group (11.36 gr/dl) is higher than the average Hb level in the control group (11.01 gr/dl). In other words, the combination intervention of giving seaweed dodol and Fe tablets is more effective in increasing Hb levels in pregnant women compared to giving Fe tablets alone.

This study is in line with previous studies that seaweed is very effective in increasing Hb levels in pregnant women with anemia. The results showed a *p value* <0.0001 (*p* <0.05) with a mean change before the intervention of 8.94 gr/dl to 10.72 gr/dl after the intervention (Rahmi, 2018). Other studies also showed a difference in the average value of Hb levels before seaweed intervention of 9.4 gr/dl and after seaweed intervention of 11.4 gr/dl. Based on the results of the bivariate test, the *p value* was 0.001 (Carolin et al., 2023).

Pregnancy is a period that greatly determines the quality of future human resources, because the growth and development of children is largely determined by their condition during pregnancy. Pregnant women require higher nutrition compared to non-pregnant women because malnutrition during pregnancy can cause nutritional anemia, low birth weight babies and babies born with defects,



during pregnancy the body needs more iron than when not pregnant. Iron (Fe) for pregnant women is needed for the formation of red blood cells which are increasingly needed by the fetus and placenta, as the gestational age increases, the iron needed also increases (Ernawati, 2017).

In pregnant women, there is an increase in plasma volume in the blood by 30% to 40% so that blood thinning occurs (hemodilution) (Sitepu & Hutabarat, 2020). The blood volume in pregnant women increases by around 1500 ml consisting of 1000 ml of plasma and around 450 ml of Red Blood Cells (RBC). RBC production increases during pregnancy, the increase in RBC depends on the amount of iron available. Although RBC production increases, hemoglobin and hematocrit decrease, this is called physiological anemia. Pregnant women in the second trimester experience a rapid decrease in hemoglobin and hematocrit because during this period there is a rapid expansion of blood volume. The lowest decrease in Hb is at 20 weeks of pregnancy, then increases slightly until full-term pregnancy (Septiasari & Dian Mayasari, 2023). Hemoglobin is a protein in erythrocytes that functions as a carrier of oxygen from the lungs to the entire body. Hemoglobin also functions to transport carbon dioxide back to the lungs to be excreted from the body (Sitepu & Hutabarat, 2020).

Seaweed is a type of marine plant that is classified as macroalgae that lives attached to the bottom of the waters. Seaweed is rich in minerals, vitamins, proteins, carbohydrates with very little fat content. The main content of seaweed is agar-agar, alginic acid and carrageenan (Yulaikah, 2020). The iron content in dried seaweed is around 0.5-3.5 mg in 100 mg of seaweed. In addition, the bioavailability of substances contained in seaweed is around 2-10% higher compared to vegetables, because the phytic acid content in seaweed that can interfere with iron absorption is very small. Seaweed can stabilize the number of red blood cells, white blood cells, and hemoglobin. In addition, seaweed functions to reduce the side effects of inhibiting the production of blood cell-producing cells (Damayanti, et al., 2021; Anggeni, et al., 2024). The seaweed dodol used in this study is made from natural seaweed flour, is high in fiber, contains no harmful preservatives, and is low in sugar. When given in measured doses according to research (40 g/day), this seaweed dodol poses a relatively low risk to healthy

pregnant women because the sugar content is within safe limits (WHO: maximum 25 g of added sugar/day) (WHO, 2025).

The high nutritional content of seaweed makes seaweed the most important vegetable source. Leucine is an essential amino acid found in abundance in seaweed, while nonessential amino acids such as glutamic acid and iron are found in seaweed. The high nutritional content of amino acids and iron in seaweed makes seaweed have a promising therapeutic effect, besides being an ideal complementary food in overcoming iron deficiency in general (Wahyunita et al., 2023).

The iron contained in seaweed when combined with protein molecules in the body will form ferritin. After being absorbed in the small intestine, it will form transferrin which functions as a transporter that carries red blood cells and oxygen needed by pregnant women during pregnancy. This increase in hemoglobin is also supported by the consumption of daily foods that contain a lot of protein (Arianti, 2021)

In addition to being easy to obtain, seaweed is also easy to process into various foods that are more varied than other foods that contain Fe such as spinach, kale or other green vegetables. Seaweed can be processed into jelly, fresh drinks, ice cream, cakes, and meatballs (Mutiar, et al., 2021). This study used seaweed processing, dodol cake. Seaweed dodol can be used as an effective non-pharmacological therapy for pregnant women with mild anemia. In addition to being rich in iron, seaweed also contains a lot of vitamin C. Vitamin C can help increase the absorption of heme iron up to four times by converting ferric iron to ferrous. This process occurs in the small intestine to make it easier to absorb and vitamin C also forms an iron-ascorbate group that remains soluble at a higher pH in the duodenum (Krisnanda, 2020).

This was also proven in the study of Yulaikah, (2020) which used processed seaweed in the form of ice cream, the results of the study showed that there was an effect of consuming seaweed ice cream (*Eucheuma cottonii*) on hemoglobin levels in pregnant women in the second trimester who had anemia. In addition to pharmacological consumption in the form of Fe tablets, consumption of processed seaweed can be an additional nutrient to increase Hb levels in pregnant women



with anemia. Other studies have also shown that interventions of providing higher amounts of iron, providing higher amounts of multiple nutrients, or nutritional counseling, are effective in preventing or treating anemia in pregnant women (Skolmowska, et al., 2022).

CONCLUSION AND SUGGESTION

There is a difference in hemoglobin levels after giving a combination of seaweed dodol and Fe tablets with after giving Fe tablets to pregnant women in the second trimester. The average Hb level in pregnant women who were given seaweed dodol and Fe tablets (11.36 gr/dl) was higher than the average Hb level in pregnant women who were given Fe tablets alone (11.01 gr/dl). This phenomenon shows that giving seaweed dodol and Fe tablets is more effective in increasing hemoglobin levels compared to giving Fe tablets alone.

DECLARATION

Conflict of Interest

The Authors in this research have no affiliations with or involvement in any organization or entity with any financial interest or non financial interest in the subject matter or materials discussed in this manuscript.

Authors' Contribution

Author 1 is in charge of coordinating the course of research, participating in research, compiling research reports, and publishing journal articles. Authors 2, 3 and 4 participated in research, the preparation of research reports, and journal publications.

Ethical Approval

This research has received approval from the Wawa Husada Hospital Health Research Ethics Committee with the number MMR/2022/11/2568.

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Data Availability

The data supporting the findings of this study are available upon reasonable request from the corresponding author, with restrictions due to participant confidentiality.

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EFFECT OF AUTOGENIC TRAINING ON BULLYING-INDUCED ANXIETY IN CHILDREN

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Abstract

Background: Bullying remains a common issue in character education at Islamic boarding schools, often manifesting in verbal and physical forms. Such experiences can cause significant anxiety in victims. One therapeutic option to address this is autogenic training, a relaxation technique aimed at reducing anxiety levels. **Purpose:** To determine the effect of autogenic training on reducing anxiety caused by bullying among students at Al-Ukhuwah Islamic Boarding School Sukoharjo, Central Java, Indonesia. **Methods:** This study employed a pre-experimental one-group pretest-posttest design involving 109 female students in grade VII, selected through total sampling. Participants completed the Olweus Bully Victim Questionnaire (OBVQ) and the Depression Anxiety Stress Scale (DASS-42) before the intervention. The autogenic training was conducted in 15-minute sessions, three times over three weeks. After the intervention, participants retaken the DASS-42. Data were analyzed using the Wilcoxon test. **Results:** The Wilcoxon test showed a significant reduction in anxiety levels after autogenic training ($p = 0.001$). Before the intervention, most participants experienced severe to very severe anxiety; after the intervention, anxiety levels shifted to moderate and severe. **Conclusion:** Autogenic training effectively reduces anxiety among students who experience bullying. It is recommended as a supportive method to address students' mental health concerns in educational settings.

Keywords: anxiety; autogenic training; bullying.

INTRODUCTION

Bullying is a critical challenge in educational environments that affects students' psychological, emotional, and physical well-being. According to Bronfenbrenner's Ecological Systems Theory, a child's development is influenced by nested systems, especially the microsystem of schools where peer interactions occur. Disruptive experiences such as bullying within this system can lead to developmental and emotional difficulties. (Urie Bronfenbrenner, 1979)

Bullying is a persistent issue in educational settings worldwide, including in Indonesia, and has been recognized as a major threat to student well-being.

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According to the Programme for International Student Assessment (PISA) in 2018, 41% of Indonesian students reported experiencing bullying, making Indonesia the country with the 5th highest prevalence out of 78 countries surveyed.(OECD, 2019). Data from the Indonesian Child Protection Commission (KPAI) between 2011 and 2019 further revealed that 574 boys and 425 girls had been victims of bullying at school. (Kementrian Pemberdayaan Perempuan Dan Perlindungan Anak, 2022) This phenomenon is also prevalent in Islamic boarding schools (pesantren), where both verbal and physical forms of bullying—such as name-calling, cursing, hitting, and kicking—are frequently reported. (Nashiruddin et al., 2019).

Bullying is not a trivial matter. From a psychological perspective, repeated exposure to bullying can lead to chronic stress and anxiety. Bandura's Social Learning Theory suggests that aggressive behaviors can be learned and perpetuated in environments where such behaviors are normalized. Victims of bullying may experience emotional dysregulation, low self-esteem, and persistent fear, all of which contribute to heightened anxiety. (Khoirunnisa et al., 2018). Prolonged anxiety, in turn, activates the hypothalamic-pituitary-adrenal (HPA) axis, leading to physiological consequences such as increased cortisol levels and a suppressed immune response, thereby affecting overall health (Gumantan et al., 2020).

Addressing anxiety caused by bullying requires interventions that target both the psychological and physiological dimensions of distress. One such intervention is autogenic training, a relaxation technique Johannes Schultz developed based on self-regulation and autosuggestion principles. Rooted in cognitive-behavioural and psychosomatic theory, autogenic training involves repetitive verbal cues that induce a state of calmness and relaxation. This technique has been proven effective in alleviating anxiety and stress in various populations. (Agusrianto et al., 2021). Providing autogenic training is a therapy that is quite effective in reducing the level of anxiety experienced by patients in various conditions. (Prasasti et al., 2021).

Given the increasing number of bullying incidents in Islamic boarding schools and their psychological impact on students, this study aims to examine the

effectiveness of autogenic training in reducing anxiety among students who have experienced bullying at the Al-Ukhuwah Islamic Boarding School.

METHOD

This study used a pre-experimental design with a one-group pre-test and post-test method, conducted without a control or comparison group. The population included all seventh grade (Class VII) female students at Al-Ukhuwah Islamic Boarding School, Sukoharjo, Central Java, Indonesia. A total of 109 students participated, selected through total sampling.

The inclusion criteria were:

1. Students enrolled in Class VII at Al-Ukhuwah Islamic Boarding School, and
2. Students who had experienced bullying during their stay at the school.

To identify students who experienced bullying, researchers used the Olweus Bully/Victim Questionnaire (OBVQ). This tool is designed to assess both direct bullying (e.g., physical and verbal aggression) and indirect bullying (e.g., social exclusion). Students completed the OBVQ and the Depression Anxiety Stress Scale 42 (DASS-42) as pre-tests. Each questionnaire required approximately 15 to 20 minutes to complete.

Following the pre-test, participants received the autogenic training intervention. The autogenic training sessions were delivered thrice over three weeks, each lasting 15 minutes. The intervention was conducted in a calm, quiet room, guided by a trained facilitator (nurse or psychologist). Participants were instructed to sit comfortably, close their eyes, and follow a series of standardized verbal cues focusing on heaviness and warmth in different parts of the body, breathing regulation, and calm imagery. These cues were designed to induce a relaxation response and reduce physiological anxiety symptoms.

After the three-week intervention period, participants were asked to complete the DASS-42 questionnaire again as a post-test, with a similar completion time of 15 to 20 minutes. The study obtained ethical approval from the Health Research Ethics Committee of RSUD Dr. Moewardi Hospital, with the approval number No.800/V/HERC/2023. All participants and their guardians provided informed consent prior to their involvement in the study.

The OBVQ was developed by Dan Olweus to measure students' experiences with bullying, both as victims and perpetrators. This study focused on the victim section, which includes 22 items: 14 items on direct bullying and 8 on indirect bullying. According to a previous study in 2016, the validity index of OBVQ ranged from 0.340 to 0.637 at $p > 0.05$, and the reliability was acceptable with a Cronbach's alpha of 0.85. The Indonesian version used in this study had been translated and validated in previous local studies with a similar adolescent population.

The DASS-42 was developed by Lovibond and Lovibond (1995) to assess symptoms of depression, anxiety, and stress. It consists of 42 items, with 14 items for each emotional state. The instrument had been previously translated and validated in Indonesian with acceptable psychometric properties. The validity was assessed using a degree of freedom (df) of 28, and the Cronbach's alpha for the Indonesian version in prior studies exceeded 0.85, indicating high reliability.

The data were analyzed using bivariate analysis with the Wilcoxon signed-rank test, as the data distribution did not meet parametric assumptions. The test compared pre-test and post-test anxiety scores to determine the significance of change following the autogenic training intervention. A $p\text{-value} < 0.05$ was considered statistically significant. Data analysis was performed using SPSS version 25.

RESULT AND DISCUSSION

Table 1. Distribution of Anxiety Levels Among Grade 7 Female Students at Al-Ukhuwah Islamic Boarding School Before and After Autogenic Training Intervention (n = 109)

Anxiety Level	Pre-Test n (%)	Post-Test n (%)
Normal	1 (0.9%)	16 (14.7%)
Mild	12 (11.0%)	10 (9.2%)
Moderate	25 (22.9%)	26 (23.9%)
Severe	36 (33.0%)	44 (40.4%)
Very Severe	35 (32.1%)	13 (11.9%)

Before the intervention, most participants experienced severe and very severe anxiety because of bullying. Following the autogenic training intervention, anxiety levels shifted toward moderate and severe, with a notable increase in the

number of students achieving normal anxiety levels. This suggests a reduction in the severity of anxiety symptoms. Action *bullying*, which is done continuously, causes severe anxiety that can lead to suicide. This research is in line with (Mita et al., 2020) This states that bullying at school causes anxiety in children, so that children do not want to go to school and feel they are useless. This research is also in line with research by (Raharjo & Aktifah, 2021) which states that before the victim's bullying was carried out, the victim experienced severe levels of anxiety, and after providing intervention, the anxiety level decreased to moderate. This research is also in line with (Hartini et al., 2021) which shows that there is a difference in anxiety scores from high to medium levels, with the difference in scores seen in the output of pretest and posttest anxiety in students being $71.15 > 62.65$. This research is not in line with what (Kristika pupung, 2021) did, which mentioned anxiety as a result of bullying. 18 students experienced the mildest levels of anxiety, with a percentage of 72%. The difference in the results of this study was due to differences in the characteristics of the educational level of the respondents, elementary school children in grades 4 and 5.

Table 2. Comparison of Mean Anxiety Scores Before and After Autogenic Training Intervention Among Grade 7 Students (n = 109)

Measure	Mean	Min	Max	SD	p-value
Pre-Test	2.84	0	4	1.03	
Post-Test	2.26	0	4	1.23	0.001*

***P value < 0.001 = significant, processed using SPSS with the Wilcoxon test matched-signed *rank*

The research results showed that there was an influence autogenic *training* against the anxiety of teenagers who experience bullying before and after the intervention was given, this was proven by the difference in scores between the two groups obtained *n pre-test post-test* value is obtained $p 0.001 < 0.05$. This is in line with research conducted by (Rachmaningdiah & Jannah, 2016) that there was a decrease in anxiety due to autogenic *training* in badminton athletes can be seen from the average results obtained by the experimental group at that time pretest 43 to 34.67 at the time post-test, while the control group had an average score when pretest by 43 and when posttest amounting to 43.33. This is also in

line with research conducted by (Atmojo, 2023) which shows that there is a difference in reducing anxiety after doing autogenic *training* with the results of statistical tests of differences in respondents' anxiety levels (p-value 0.000). This research is not in line with research conducted by (Sari et al., 2019) which states that therapy autogenic *training* did not have a significant impact on reducing anxiety with the results of statistical tests obtained p value = (0.463). This happened because the respondents used were over 50 years old.

This study has several limitations. First, it used a pre-experimental one-group design without a control group, which limits the ability to infer causality with certainty. Second, the study focused exclusively on female students from one grade level at a single boarding school, restricting the generalizability of findings to other populations, such as males, other age groups, or different educational settings. Third, although the OBVQ and DASS-42 questionnaires were previously validated in Indonesia, the self-reported nature of these tools may introduce bias, such as underreporting due to fear or stigma. Lastly, the duration and frequency of the autogenic training (only 3 sessions in 3 weeks) may limit the long-term effectiveness of the intervention.

CONCLUSION AND SUGGESTION

This study demonstrates that autogenic training is effective in reducing anxiety levels among Grade 7 female students who experienced bullying at Al-Ukhuwah Islamic Boarding School, Sukoharjo. A significant reduction in anxiety scores was observed following a structured intervention consisting of three autogenic training sessions over three weeks. Before the intervention, most participants exhibited anxiety levels categorized as severe and very severe. Post-intervention assessments indicated a shift toward moderate and mild anxiety levels, suggesting that autogenic training may serve as a practical and non-pharmacological method to address bullying-induced anxiety among adolescents in educational settings.

Considering these findings, it is recommended that school administrators and educational stakeholders incorporate autogenic training into school-based



mental health and counseling programs, particularly in institutions where students are vulnerable to bullying. Trained school nurses, counselors, or psychologists can facilitate these sessions as part of regular psychoeducation or relaxation-based interventions.

Additionally, healthcare professionals, especially those working in adolescent and school health services, are encouraged to utilize autogenic training as a supportive intervention to promote emotional regulation and resilience in youth experiencing psychological distress. Training workshops for educators and healthcare staff can further support the effective implementation of this technique.

Future studies should consider employing randomized controlled trial (RCT) designs with larger, more diverse populations and extended intervention periods to better assess the long-term efficacy and generalizability of autogenic training. Investigations into the integration of autogenic techniques with other psychosocial interventions may also yield valuable insights into holistic adolescent mental health care.

DECLARATION

Conflict of Interest

The authors declare no potential conflict of interest to the research, authorship, and/or publication of this article.

Authors' Contributions

All authors contributed significantly to the work reported in this manuscript. SAM, NBA, and GDP conceptualized and designed the study. SAM conducted data collection. SAM, RGHN, and HN performed data analysis. SAM and GDP drafted the manuscript. All authors reviewed and approved the final version of the manuscript.

Ethical Approval

This study received ethical approval from the Health Research Ethics Committee of RSUD Dr. Moewardi, Surakarta, Central Java, Indonesia, with approval number

No. 800/V/HERC/2023. Written informed consent was obtained from all participants and their guardians before participation.

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Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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