Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

Effectiveness of the 'Regating' Application in Improving Knowledge and Attitudes Towards Stunting Prevention among Adolescents

Willa Follona[1], Shentya Fitriana[1], Deasy Irawati[2]

[1]Department of Midwifery, Health Polytechnic of Jakarta III, Indonesia
[2]Department of Midwifery, Health Polytechnic of Surabaya, Indonesia
Corresponding author: willafollona@gmail.com

ABSTRACT

Stunting is a condition of impaired growth due to chronic malnutrition during the First 1000 Days of Life (HPK), from conception to two years of age. According to WHO data from 2020, approximately 149.2 million children under five worldwide suffer from stunting, 53% of whom are in Asia. In Indonesia, the prevalence of stunting reaches 26.9% (Riskesdas, 2018), and in DKI Jakarta, it stands at 14.8% (SSGI, 2022). Stunting significantly impacts physical growth, cognitive development, and future productivity. One factor increasing the risk of stunting is adolescents' lack of knowledge regarding nutrition, reproductive health, and early marriage.

Choosing the appropriate educational media is crucial for reaching adolescents. Web-based educational applications offer several advantages, such as broad accessibility, ease of use, and the ability to deliver engaging interactive content. This media allows adolescents to access information anytime and anywhere, making the learning process more flexible and effective.

This study aims to analyze the effectiveness of stunting prevention education using the *Regating* application compared to the *Booklet* in improving adolescent knowledge and attitudes. The research design is a quasi-experiment with a control group, using pretest and posttest methods. The sample consisted of 100 female adolescents who had never received stunting education and owned a mobile phone, selected randomly.

Data analysis was performed using the *Paired Sample T-Test* for paired groups and the *Unpaired T-Test* for unpaired groups.

The results show a significant increase in students' knowledge and attitudes after the intervention. Knowledge scores increased by 6.876 points in the *Booklet* group and 9.878 points in the *Regating* group. Attitude scores increased by 5.98 points in the *Booklet* group

Corresponding email: willafollona@gmail.com
Submitted: 13 December 2024; Accepted: 11 January 2025; Published: 28 February 2025

ISSN: 2775-4448
DOI: https://doi.org/10.36749/wmm.5.1.31-44.2025

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

and 16.72 points in the *Regating* group. The *p-value* of 0.000 indicates a statistically significant difference.
The *Regating* application proved more effective than the *Booklet* in improving students' knowledge and attitudes toward stunting prevention. In conclusion, a web-based application can serve as an effective educational tool if implemented sustainably and supported by various stakeholders to break the intergenerational cycle of stunting. This includes integrating the application into school education programs, using it as an educational resource for health professionals, and promoting it for community and parental education.

Keywords: *Stunting Prevention; Adolescent; Health Education; Web-Based Application; Knowledge; Attitude*

INTRODUCTION

Stunting, or impaired growth and development, is a condition affecting children under five caused by chronic malnutrition and recurring infections, particularly during the First 1000 Days of Life (HPK). This critical period begins during pregnancy and continues until the child reaches 23 months of age. A child is classified as stunted when their height or length falls below -2 standard deviations from the average for their age group (Onah, 2021). Stunting results from a combination of long-term nutritional deficiencies, repeated infections, and inadequate psychosocial stimulation, which hinder age-appropriate growth and development (Achadi et al., 2020).
Globally, stunting is a significant public health challenge. According to WHO data from 2020, approximately 149.2 million children under five suffer from stunting, with 53% of cases occurring in Asia (World Health Organization, 2021). The global community has committed to addressing stunting under the Sustainable Development Goals (SDGs), specifically Goal 2: Zero Hunger, which targets a 40% reduction in the number of stunted children under five by 2025. In line with this, Indonesia has set a national target to reduce stunting prevalence to 14% by 2024 as part of its National Medium-Term Development Plan (RPJMN) 2020–2024. These ambitious targets underscore the urgency of implementing effective interventions at both global and national levels (National Development Planning Agency (Bappenas)., 2020).
In Indonesia, stunting prevalence remains a significant nutritional issue, surpassing other concerns such as undernutrition, wasting, and obesity. The 2018 Basic Health Research (Riskesdas) reported a stunting prevalence of 26.9%, while in DKI Jakarta, the prevalence was 14.8% in 2022, with Kepulauan Seribu Regency recording the highest figure at 20.5%. Beyond its immediate impact on physical growth, stunting affects cognitive

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

development, intelligence, productivity, and increases the risk of degenerative diseases in adulthood (Dewi et al., 2021; Mekonnen et al., 2021). The consequences extend to intergenerational cycles, where parents with stunting may pass on nutritional deficiencies to their children (KeMenkes, 2018; Ministry of Health In Indonesia, 2021).
Stunting is influenced by various factors, including inadequate maternal and child nutrition (Hakim et al., 2024). In Indonesia, the prevalence of anemia among pregnant women is alarmingly high, reaching 48.9%, with even higher rates recorded in DKI Jakarta at over 25% (Pandi et al., 2024). Untreated anemia during pregnancy significantly increases the risk of low birth weight (LBW) and preterm birth, both of which are key contributors to stunting in children (Dewi et al., 2021; Wemakor et al., 2018a). Adolescent girls suffering from anemia are particularly vulnerable, as they face a higher risk of anemia during pregnancy and protein-energy deficiencies. These conditions further elevate the likelihood of giving birth to low-birthweight babies and experiencing preterm deliveries, perpetuating the cycle of stunting (Yunita et al., 2020). Additionally, closely spaced pregnancies and pregnancies occurring under the age of 20 years further increase the risk of stunting in children (Wemakor, 2019; Wemakor et al., 2018b).

The government is accelerating efforts to reduce the prevalence of stunting to 14% by 2024 as part of the priority program under the 2020-2024 National Medium-Term Development Plan (RPJMN). To achieve this target, various policies have been implemented, including the Minister of Health Regulation No. 39 of 2016, which emphasizes the importance of interventions for pregnant and postpartum mothers, infants, school-age children, adolescents, and young adults. These interventions include specific nutrition interventions, such as promoting exclusive breastfeeding, complementary feeding education, iron and folic acid supplementation for pregnant women, and management of severe malnutrition for children under five. Additionally, sensitive interventions address underlying determinants, such as providing clean water and sanitation, increasing food security, and promoting women's empowerment and family planning services (Cunningham et al., 2020; Sethi et al., 2019; Shinde et al., 2021; Vir, 2016).
Efforts to address stunting among adolescents remain limited, focusing primarily on iron and folic acid supplementation to combat anemia (Abreha et al., 2020). However, there is an urgent need to expand adolescent-specific programs to include nutrition education, awareness of reproductive health, clean and healthy living behavior (PHBS), and advocacy for delaying marriage and pregnancy. These measures could significantly enhance adolescent health outcomes and help break the intergenerational cycle of stunting.

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

Adolescents play a pivotal role as future parents in preventing stunting. Unfortunately, many adolescents lack awareness about stunting, early marriage, and reproductive health, which increases the risk of stunting (Hakim et al., 2024). Studies highlight that a mother's nutritional status during adolescence and pre-conception stages significantly affects the risk of stunting in children (Britto et al., 2017). Interventions that actively engage adolescents and women during these critical periods, such as health, education, and empowerment programs, have proven effective in reducing stunting rates.

Stunting prevention must start early, not only during the First 1000 Days of Life (HPK) but also during adolescence. Untreated anemia, poor dietary habits, and insufficient knowledge during adolescence often mark the beginning of stunting-related issues (Achadi et al., 2020; Martorell & Zongrone, 2012). Adolescence, a critical period of growth and development, is often the starting point for stunting-related issues due to insufficient knowledge and attitudes about nutrition and reproductive health. Limited awareness among adolescents about balanced nutrition leads to poor dietary habits, inadequate nutrient intake, and delayed medical care, all of which contribute to stunting. Girls with little understanding of anemia and its prevention are at higher risk of hemoglobin deficiencies, increasing the likelihood of low birth weight in future pregnancies—a major cause of stunting (Rah et al., 2008). Additionally, negative attitudes toward dietary diversity and reproductive health exacerbate nutritional deficiencies, perpetuating the cycle of stunting when they become mothers (Eka Arum Cahyaning Putri Hakim et al., 2024). Without adequate knowledge and proper guidance on balanced nutrition and timely healthcare, adolescents are at greater risk of malnutrition, further reinforcing intergenerational stunting (Mathur et al., 2024; Pandi et al., 2024; Ulfa et al., 2024).

According to the Minister of Health Regulation No. 28 of 2017 on Licensing and Implementation of Midwifery Practice, midwives are responsible for educating the community about maternal health, school-age children, adolescents, and environmental health. Therefore, midwives play a crucial role in providing early education on stunting prevention, especially for adolescents.

The effectiveness of educational programs heavily depends on the media utilized. Various tools such as printed materials, posters, educational videos, and Android-based applications have been used for stunting prevention, but each has its limitations. Static and non-interactive printed materials and posters are less appealing to adolescents, while Android-based applications, though effective in improving knowledge and attitudes, often lack comprehensive content on marriage maturity and clean and healthy living behavior (PHBS).

Web-based applications offer significant advantages over Android-based apps. Accessible across multiple devices without requiring installation, they are practical and user-friendly. Additionally, their flexibility allows for quick and seamless content

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

updates, making them highly adaptable to current needs (Benítez-Andrades et al., 2020). For instance, Asra and Aji (2023) highlighted that web-based applications outperform Android applications in terms of accessibility, particularly for underserved or remote communities, while also facilitating seamless content updates. Their study concluded that web-based applications can significantly enhance child health monitoring efforts and stunting prevention (Belay et al., 2020).

Despite these benefits, existing web-based applications primarily target mothers with young children and have not been widely developed for adolescents. Expanding their scope to address adolescents as future parents is crucial. Comprehensive content on topics like balanced nutrition, reproductive health, marriage maturity, and PHBS can make web-based applications more effective in improving adolescents' knowledge and attitudes. By combining interactivity, accessibility, and flexibility, web-based applications hold great potential as engaging and impactful educational tools to break the intergenerational cycle of stunting.

Therefore, this research aims to develop the Regating application as an educational tool for adolescents to improve their knowledge and attitudes about balanced nutrition, family planning, and stunting prevention. The urgency of this study is to create a stunting education application specifically for adolescents and evaluate its effectiveness in enhancing their knowledge and attitudes toward stunting. The results of this research will be published as a scientific article and presented at seminars or in academic journals.

OBJECTIVE

The objective of this study is to analyze the effectiveness of health education using the Regating Application in improving adolescent knowledge and attitudes towards stunting prevention.

METHODS

This study utilized a quasi-experimental design with a control group, involving the measurement of adolescents' knowledge and attitudes regarding stunting prevention. Measurements were conducted using the pretest and posttest method to compare results before and after the intervention.

The intervention lasted for 4 weeks and involved two groups: the Experimental Group using the Regating Application as the educational medium and the control group using a booklet as the educational medium. Educational materials provided to both groups included definition of stunting and its impact on children's growth and development, balanced nutrition needs for adolescents to prevent stunting, anemia and the importance of consuming iron supplements (TTD) for adolescent girls, marriage maturity to reduce

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

the risk of early pregnancy, Clean and Healthy Living Behavior (PHBS) to prevent infections that may lead to stunting, steps for preventing stunting from adolescence as future parents.

In the experimental group, participants were instructed to access the Regating Application 3-4 times per week throughout the intervention period. Each session lasted about 20-30 minutes to read and understand the educational content. Notifications and reminders were sent through a WhatsApp group to ensure consistent participant engagement. All respondents were included in the WhatsApp group to facilitate communication, discussion, and monitoring of educational activities. In this group, researchers provided reminders, dan usage guidelines to help participants understand the research procedure.

The study was conducted in two junior high schools (SMP) in Central Jakarta from September to October 2024. The study population consisted of all junior high school (SMP) students in the area, while the sample was female adolescents selected through random sampling among first- and second-year students. Based on calculations using the hypothesis test formula for two population means, a total sample size of 100 respondents was required, divided into two groups.

Research instruments included informed consent forms for participation approval and questionnaires to measure knowledge and attitudes related to stunting before and after the intervention. The educational intervention was conducted over two weeks, with the experimental group receiving education through the Regating application, while the control group received education using a booklet containing stunting prevention materials designed by the researchers according to a structured framework.

Data analysis consisted of univariate analysis to describe the characteristics of student knowledge and attitude data. Bivariate analysis using the Paired Sample T-Test to compare pretest and posttest averages within the same group (paired) dan the unpaired T-Test to compare averages between the experimental and control groups (unpaired).

This analysis aimed to evaluate the effectiveness of the Regating Application compared to the booklet in improving adolescents' knowledge and attitudes toward stunting prevention.

RESULT

Table 1. Effect of Education on Knowledge Before and After Using Booklet Media
Knowledge Variable Score P-Value

Knowledge Variable	Score				*P-Value*
	Minimum	Maximum	**Mean**	**SD**	

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

Before Intervention	46.9	93.8	74.76	9.3883	0.000
After Intervention	50	96.9	81.636	8.5367	
Knowledge Difference			6.876		

The average knowledge score increased by 6.876 points after the intervention, indicating that Booklet media effectively improves students' understanding. The p-value of 0.000, which is smaller than the significance level of 0.05, indicates that this knowledge increase is statistically significant. In other words, there is a significant difference in students' knowledge before and after receiving education using Booklet media.

Table 2. Effect of Education on Attitudes Before and After Using Booklet Media

Attitude Variable	Score				*P-Value*
	Minimum	Maximum	Mean	SD	
Before Intervention	61	89	74.64	5.862	0.000
After Intervention	71	96	80.62	5.714	
Attitude Difference			5.98		

The average attitude score increased by 5.98 points after education, showing the positive impact of Booklet media on students' attitudes. The p-value of 0.000, which is smaller than the significance level of 0.05, indicates that this improvement is statistically significant. This means there is a meaningful difference in students' attitudes before and after education using Booklet media.

Table 3. Effect of Education on Knowledge Before and After Using the Regating Application

Knowledge Variable	Score				*P-Value*
	Minimum	Maximum	Mean	SD	
Before Intervention	65.6	96.9	79.198	7.234	0.000
After Intervention	78.1	100	89.076	6.229	
Knowledge Difference			9.878		

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

The average knowledge score increased by 9.878 points after the intervention, showing that the use of the application significantly impacts students' understanding. The p-value of 0.000, smaller than the significance level of 0.05, indicates that this increase is statistically significant. Thus, there is a clear difference in students' knowledge before and after education using the application.

Table 4. Effect of Education on Attitudes Before and After Using the Regating Application

Attitude Variable	Score				*P-Value*
	Minimum	Maximum	Mean	SD	
Before Intervention	61	84	72.04	4.463	0.000
After Intervention	80	100	88.76	5.057	
Attitude Difference			16.72		

The average attitude score increased by 16.72 points after education, showing a substantial impact of the application on students' attitudes. The p-value of 0.000, smaller than the significance level of 0.05, indicates that this improvement is statistically significant. This means there is a significant difference in students' attitudes before and after education using the application.

Table 5. Bivariate Test Results for the Effectiveness of Booklet Media and the Regating Application

	Group	N	Mean	Std. Deviation	Std. Error Mean	*P-Value*
Knowledge	Booklet	50	6.88	5.051	0.714	0.002
	Regating Application	50	9.88	4.436	0.627	
Attitude	Booklet	50	5.98	5.745	0.812	0.000
	Regating Application	50	16.72	6.456	0.913	

The average knowledge increase in the control group was 6.88 points, with a standard deviation of 5.051 and a standard error mean of 0.714. In contrast, the average knowledge increase in the group using the Regating application was 9.88 points, with a standard deviation of 4.436, indicating less variation compared to the Booklet group. The standard error mean for the Regating group was 0.627, showing a more precise average estimate compared to the Booklet group. The p-value of 0.002, smaller than the significance level of 0.05, indicates a significant difference in knowledge improvement between the two

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

groups. Therefore, the Regating application is more effective in increasing students' knowledge than the Booklet.

In the control group, the average attitude increase was 5.98 points, with a standard deviation of 5.745 and a standard error mean of 0.812. Meanwhile, the group using the Regating application showed a higher average attitude increase of 16.72 points, with a standard deviation of 6.456, indicating greater variation than the Booklet group. The standard error mean was 0.913, suggesting a good estimate of the average. The p-value of 0.000, much smaller than the significance level of 0.05, indicates a highly significant difference between the two groups. In conclusion, the Regating application is far more effective than the Booklet in improving students' attitudes.

DISCUSSION

Stunting represents a persistent cycle where stunted women are more likely to give birth to low birth weight (LBW) babies. Without timely interventions, this cycle often continues across generations. Breaking this cycle requires precise interventions at critical periods, such as adolescence, which offers a crucial window for catch-up growth in height (Eka Arum Cahyaning Putri Hakim et al., 2024; Juarez et al., 2021; Wemakor et al., 2018a).

Adolescence marks a period of rapid physical, mental, and emotional development. During this phase, nutritional improvements can have a profound impact on health outcomes. Addressing childhood nutritional deficiencies and establishing healthy habits during this stage are crucial for long-term health benefits.

This study emphasizes the importance of health education for adolescents, aligning with strategies outlined in Minister of Health Regulation No. 39 of 2016, which focuses on promoting clean and healthy living behavior (PHBS) and balanced nutrition. Education materials in this study covered stunting prevention, adolescent nutritional needs, anemia prevention, marriage maturity, and PHBS.

Health education, as described by Notoatmodjo (2018), forms the foundation for behavior change. It builds knowledge, shapes attitudes, and ultimately influences behavior (Notoatmodjo, 2012). Knowledge about stunting plays an essential role in shaping adolescent behavior for early stunting prevention. Limited adolescent understanding of early marriage and nutrition can increase the risk of stunting . Practices supported by knowledge tend to be more sutainable. Therefore, it is important for adolescents to receive information about nutrition and stunting prevention from various sources, such as schools, print media, and electronic media.

Digital tools, particularly web-based applications, provide a flexible and accessible means to enhance adolescent knowledge and attitudes. In this study, a web-based

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

application was chosen due to its accessibility, flexibility in development, and no installation requirement. The Regating application significantly improved students' knowledge and attitudes toward stunting prevention, outperforming traditional methods like booklets. The application's ability to deliver interactive and easily updated content contributed to its success.

The findings of this study align which demonstrated that nutrition education interventions delivered through Android and website media resulted in better improvements in nutrition knowledge compared to other methods. These media utilize a comprehensive edutainment approach, making them highly effective tools for nutrition education (National Population and Family Planning Board (BKKBN) et al., 2018).

Nutritional attitudes, defined as an individual's agreement or disagreement with statements about food and nutrition, are an essential component of stunting prevention education, as they foster positive behavioral changes.

The results of this study indicate that students' attitudes toward stunting prevention improved significantly after educational interventions. In the control group, education using booklets led to a notable increase in attitude scores, confirming the effectiveness of this medium. However, the intervention using the Regating application yielded even greater improvements, with statistically significant differences in pre- and post-intervention scores. A p-value of 0.000 underscores that the Regating application was more effective than the booklet in improving students' attitudes.

These findings are consistent with previous studies reported improved attitudes toward balanced nutrition after interventions using Android and website media, while highlighted that a combination of Android and website platforms resulted in the most significant gains in nutrition attitudes. The higher levels of satisfaction and engagement provided by web-based applications contribute to their effectiveness in driving meaningful behavioral changes among adolescents (Dülger & Ayaz-Alkaya, 2024).

Web-based applications also offer unique advantages beyond user engagement. Their flexibility and scalability enable integration into school health curricula and accessibility in remote or underserved areas. Features such as easily updated content ensure that information remains relevant and adaptable for long-term health education. As Sousa et al. (2022) highlighted, internet-based interventions have been effective in achieving significant health behavior changes, including increased motivation, improved physical activity, better nutritional habits, and reduced risky behaviors. These findings underline the transformative potential of web-based applications in promoting holistic adolescent health (Sousa et al., 2022).

Furthermore, research by José Alberto Benítez-Andrades et al. demonstrates the role of web-based interventions in reducing overweight and obesity among adolescents through improved physical activity and nutrition (Benítez-Andrades et al., 2020). Similarly, the "Green Hub" study by Ghammachi et al reinforces the importance of short-

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

term, engaging interventions in fostering positive attitudes and knowledge about sustainable and healthy dietary practices. These studies collectively emphasize the potential of web-based applications to address a wide range of health issues among adolescents (Ghammachi et al., 2022).

Despite its promise, the current study has limitations. It evaluates only short-term knowledge and attitude improvements without assessing long-term behavioral changes or impacts on nutritional status. Additionally, the evaluation is restricted to the educational aspects of the application, leaving other features unexplored. Future longitudinal studies are needed to confirm the sustainability of behavior changes over time.

The Regating application has significant potential to support government programs like *Program Indonesia Sehat* and school health initiatives (*Usaha Kesehatan Sekolah*). It can also serve as a valuable resource for health workers in outreach programs, helping to educate adolescents on balanced nutrition, healthy living, and marriage maturity. With consistent use, the application could foster healthy habits, break the cycle of intergenerational stunting, and contribute to better health outcomes for future generations.

To ensure the application's successful implementation and sustainability, collaboration among schools, health workers, government agencies, and communities is essential. Such collective efforts can help establish web-based applications as effective, scalable solutions for addressing critical health issues like anemia and stunting, ultimately creating a healthier and more informed adolescent population.

CONCLUSION

The results of this study show that web-based applications are effective in improving adolescents' knowledge and attitudes toward stunting prevention. The significant increase observed after using the application proves that web-based educational media can serve as an effective tool if implemented sustainably and systematically. Through this education, adolescents are expected to prevent stunting for themselves and future generations.

To ensure the sustainability and effectiveness of the stunting prevention education program, support and collaboration from various parties are essential, including schools, healthcare workers, the government, and the community. With an integrated approach, this program can significantly contribute to breaking the cycle of intergenerational stunting.

Further recommendations include conducting follow-up research to evaluate the long-term impact of using this application on changes in adolescent behavior. Such research can monitor the implementation of knowledge and attitudes related to nutrition, marriage maturity, Clean and Healthy Living Behavior (PHBS), and stunting prevention in daily

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

life. This evaluation is crucial to assess the effectiveness of the application in establishing healthy lifestyle habits and reducing stunting rates sustainably. With support from schools, healthcare workers, the government, and the community, this application has the potential to be an innovative and effective educational solution for breaking the cycle of intergenerational stunting.

REFERENCES

Abreha, S. K., Walelign, S. Z., & Zereyesus, Y. A. (2020). Associations between women's empowerment and children's health status in Ethiopia. *PLoS ONE*, *15*(7). https://doi.org/10.1371/journal.pone.0235825

Achadi, E. L., Utari, D. M., Putra, W. K. Y., & Farsia, L. (2020). Stunting. In E. L. Achadi, A. Achadi, T. Anindhita, P. Auliya, & Y. N. I. Sari (Eds.), *Pencegahan Stunting: Pentingnya Peran 1000 Hari Pertama kehidupan* (1st ed.). PT. Rajagrafindo Persada.

Belay, H., Tariku, Woreta, Demissie, & Asrade. (2020). Anemia And Associated Factors Among Pregnant Women Attending Prenatal Care In Rural Dembia District, North West Ethiopia: A Cross-Sectional Study. *Ecology Of Food And Nutrition*, *59*(2), 154–174. https://doi.org/10.1080/03670244.2019.1680551

Benítez-Andrades, J. A., Arias, N., García-Ordás, M. T., Martínez-Martínez, M., & García-Rodríguez, I. (2020). Feasibility of social-network-based ehealth intervention on the improvement of healthy habits among children. *Sensors (Switzerland)*, *20*(5). https://doi.org/10.3390/s20051404

Britto, Lye, Proulx, Yousafzai, Matthews, & Vaivada. (2017). Nurturing care: promoting early childhood development. *The Lancet*, *389*(10064), 91–102. https://doi.org/10.1016/S0140-6736(16)31390-3

Cunningham, Pries, Erichsen, Manohar, & Nielsen. (2020). Adolescent girls' nutritional status and knowledge, beliefs, practices, and access to services: An assessment to guide intervention design in nepal. *Current Developments in Nutrition*, *4*(7), 94. https://doi.org/10.1093/cdn/nzaa094

Dewi, A. K., Dary, D., & Tampubolon, R. (2021). Maternal nutritional status and eating behavior during the first trimester of pregnancy. *Jurnal Epidemiologi Kesehatan Komunitas*, *6*(1), 135–144. https://doi.org/10.14710/jekk.v6i1.10413

Dülger, H., & Ayaz-Alkaya, S. (2024). The effect of health literacy-grounded web-based education on nutrition and exercise behaviours in adolescents: A randomized controlled trial. *International Journal of Nursing Practice*, *237*(May), 316–321. https://doi.org/10.1111/ijn.13253

Eka Arum Cahyaning Putri Hakim, F. A., Purwanto, E., Izzatunnisa, N., I'tishom, R., Hasanah, U., & Rejeki, P. S. (2024). Prevention of stunting with nutrition and reproductive health education of adolescents in west Lombok, West Nusa Tenggara, Indonesia. *World Journal of Advanced Research and Reviews*, *22*(2), 994–999.

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

https://doi.org/10.30574/wjarr.2024.22.2.1429

Ghammachi, N., Mihrshahi, S., & Ronto, R. (2022). Web-Based Experiential Nutrition Education Intervention "The Green Hub" to Promote Sustainable and Healthy Diets among Young Adults in Australia. *Sustainability (Switzerland)*, *14*(22). https://doi.org/10.3390/su142215207

Hakim, E. A. C. P., Purwanto, Izzatunnisa, I'tishom, Hasanah, & Rejeki. (2024). Prevention of stunting with nutrition and reproductive health education of adolescents in west Lombok, West Nusa Tenggara, Indonesia. *World Journal of Advanced Research and Reviews*, *22*(2), 994–999. https://doi.org/10.30574/wjarr.2024.22.2.1429

Juarez, Dionicio, Sacuj, Lopez, Miller, & Rohloff. (2021). *Community-Based Interventions to Reduce Child Stunting in Rural Guatemala: A Quality Improvement Model*. https://doi.org/10.3390/ijerph

KeMenkes. (2018). *Indonesia Health Profile in 2016. Jakarta: KEMENKES RI.*

Martorell, & Zongrone. (2012). Intergenerational influences on child growth and undernutrition. *Paediatric and Perinatal Epidemiology*, *26*(1), 302–314.

Mathur, Khan, & Bashir. (2024). The Impact of Socioeconomic Factors on Turitional Knowledge and Dietary Practices Among School-Going Adolescents. *EPRA International Journal of Multidisciplinary Research (IJMR)-Peer Reviewed Journal*, *10*(8).

Mekonnen, A. G., Odo, D. B., Nigatu, D., Sav, A., & Abagero, K. K. (2021). Women's empowerment and child growth faltering in Ethiopia: evidence from the Demographic and Health Survey. *BMC Women's Health*, *21*(1), 1–9. https://doi.org/10.1186/s12905-021-01183-x

Ministry of Health In Indonesia. (2021). *Indonesian Health Profile in 2020* (B. Hardhana, F. Sibuea, & W. Widiantini (eds.)). Kemenkes RI.

National Development Planning Agency (Bappenas). (2020). *RPJMN 2020-2024. National Mid-Term Development Plan 2020-2024*.

National Population and Family Planning Board (BKKBN), Statistics Indonesia (BPS), Ministry of Health (Kemenkes), & ICF. (2018). *Indonesia District Health Survey 2017*. 588.

Notoatmodjo. (2012). *Health Promotion and Health Behavior*. PT. Rineka Cipta.

Onah, M. N. (2021). Women's empowerment and child nutrition in South-Central Asia; how important is socioeconomic status? *SSM - Population Health*, *13*, 100718. https://doi.org/10.1016/j.ssmph.2020.100718

Pandi, Sari, Prihandhani, Yogi, & Triana. (2024). Correlation Between Mother's Nutritional Expertise and Toddler's Stunting Incidence in Wainyapu Village. *Jurnal Penelitian Dan Kajian Ilmiah Kesehatan Politeknik Medica Farma Husada Mataram*, *10*(2). https://doi.org/DOI: https://doi.org/10.33651/jpkik.v10i2.627

Rah, J. H., Christian, P., Shamim, A. A., Arju, U. T., Labrique, A. B., & Rashid, M. (2008). Pregnancy and lactation hinder growth and nutritional status of adolescent girls in rural Bangladesh. *Journal of Nutrition*, *138*(8), 1505–1511. https://doi.org/10.1093/jn/138.8.1505

Sethi, Bhanot, Bhattacharjee, Gope, Sarangi, & Nath. (2019). Integrated multisectoral strategy to improve girls' and women's nutrition before conception, during pregnancy and after birth

Women, Midwives, and Midwifery
https://wmmjournal.org
Publisher: Asosiasi Pendidikan Kebidanan Indonesia (AIPKIND)
http://aipkind.org

in India (Swabhimaan): Protocol for a prospective, non-randomised controlled evaluation. *BMJ Open*, *9*(11), 1–9. https://doi.org/10.1136/bmjopen-2019-031632

Shinde, Madzorera, & Fawzi. (2021). Association of iron supplementation and dietary diversity with nutritional status and learning outcomes among adolescents: Results from a longitudinal study in Uttar Pradesh and Bihar, India. *Journal of Global Health*, *11*(1), 1–14. https://doi.org/10.7189/jogh.11.04037

Sousa, D., Fogel, Azevedo, & Padrão. (2022). The Effectiveness of Web-Based Interventions to Promote Health Behaviour Change in Adolescents: A Systematic Review. *Nutrients*, *14*(6), 1–24. https://doi.org/10.3390/nu14061258

Ulfa, L., Adawiyah, A. R., & Lestari, D. I. (2024). *Screening for Nutritional Status and Strengthening Healthy Lifestyle in Adolescents Skrining Status Gizi dan Penguatan Pola Hidup Sehat Remaja*. *8*(4), 1208–1217.

Vir, S. C. (2016). Improving women's nutrition imperative for rapid reduction of childhood stunting in South Asia: Coupling of nutrition specific interventions with nutrition sensitive measures essential. *Maternal and Child Nutrition*, *12*, 72–90. https://doi.org/10.1111/mcn.12255

Wemakor. (2019). Prevalence And Determinants Of Anaemia In Pregnant Women Receiving Antenatal Care At A Tertiary Referral Hospital In Northern Ghana. *Bmc Pregnancy And Childbirth*, *19*(1), 495. https://doi.org/10.1186/S12884-019-2644-5

Wemakor, A., Garti, H., Azongo, T., Garti, H., & Atosona, A. (2018a). Young maternal age is a risk factor for child undernutrition in Tamale Metropolis, Ghana. *BMC Research Notes*, *11*(1). https://doi.org/10.1186/s13104-018-3980-7

Wemakor, Garti, Azongo, Garti, & Atosona. (2018b). Young maternal age is a risk factor for child undernutrition in Tamale Metropolis, Ghana. *BMC Research Notes*, *11*(1). https://doi.org/10.1186/s13104-018-3980-7

World Health Organization. (2021). *Levels and trends in child malnutrition UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates Key findings of the 2021 edition.*

Yunita, Parwatiningsih, Hardiningsih, Yuneta, N., Kartikasari, & Ropitasari. (2020). The Relationship between Young Women 's Knowledge About Iron Consumption and The Incidence of Anemia in Junior High School 18 Surakarta. *PLACENTUM: Jurnal Ilmiah Kesehatan Dan Aplikasinya*, *8*(1), 36.