



**THE EFFECT OF HEALTH EDUCATION USING STUNTING SMART CARDS  
TOWARD KNOWLEDGE AND STRESS ON PREGNANT WOMEN FOR  
STUNTING PREVENTION**

**Yolanda Sukarma, Dewi Eka Putri\*, Yaslina**

Faculty of Nursing, Universitas Andalas, Limau Manis, Pauh, Padang, Sumatera Barat 25163, Indonesia

\*[dewiekaputri@nrs.unand.ac.id](mailto:dewiekaputri@nrs.unand.ac.id)

**ABSTRACT**

Pregnant women are subject to various risk factors that render them physically and psychologically vulnerable, increasing the risk of stunting in their babies. Insufficient knowledge and mental health issues during pregnancy elevate the risk of stunting by 10.2 times. These factors can lead to delayed fetal development, disrupt nutrient metabolism, and negatively affect health, ultimately contributing to stunting. One potential intervention to enhance pregnant women's knowledge and manage stress involves the use of targeted health education through Stunting Smart Cards. This study aimed to assess the effect of health education using Stunting Smart Cards on the knowledge and stress levels of pregnant women. Quantitative study, quasi-experimental pretest-posttest design with control groups. The study included 46 pregnant women selected through purposive sampling, with 23 participants in each of the intervention and control groups. The study was conducted at Seberang Padang and Ikur Koto Health Centers. Data analysis was carried out using Paired t-tests and Wilcoxon tests. The mean knowledge score in the intervention group significantly increased from 7.08 (low) to 9.82 (high) after the intervention. Concurrently, the mean stress score decreased from 107.73 (severe) to 73.86 (moderate). In contrast, the control group exhibited minimal changes, with knowledge scores increasing slightly from 6.56 to 7.39, and stress levels remaining stable at 107.00 post-intervention. This study found a significant effect of health education using Stunting Smart Cards on improving knowledge and reducing stress in pregnant women as part of stunting prevention efforts in Padang City Health Centers.

Keywords: health education; knowledge; pregnant women; stress; stunting smart card

**How to cite (in APA style)**

Sukarma, Y., Putri, D. E., & Yaslina, Y. (2024). The Effect of Health Education Using Stunting Smart Cards Toward Knowledge and Stress on Pregnant Women for Stunting Prevention. *Indonesian Journal of Global Health Research*, 6(S5), 649-660. <https://doi.org/10.37287/ijghr.v6iS5.4616>.

**INTRODUCTION**

Pregnant women are subject to several risk factors that increase their physical and psychological vulnerability, thereby raising their likelihood of giving birth to children at risk of stunting. These risk factors include maternal age, short stature, closely spaced pregnancies (less than two years apart), teenage pregnancies, and inadequate nutrition during pregnancy all of which significantly elevate the risk of stunting, by as much as 5.87 times (Nurhidayati et al., 2020; Selfianan et al., 2023; Purwanti & Setiyaningsih, 2022). Stunting is defined as a condition of impaired growth in children, typically resulting from prolonged malnutrition, and manifesting from early pregnancy through early childhood, with symptoms often becoming evident after the child reaches two years of age (Margawati et al., 2022; Meri Agritubella & Delvira, 2020). The consequences of stunting are profound, leading to delayed brain development, compromised cognitive abilities, impaired physical growth, and altered metabolism. Additionally, stunted children face an increased risk of obesity, chronic illnesses, and emotional developmental challenges (Widyaningsih et al., 2022; Margawati et al., 2022).

According to the 2018 Basic Health Research (Riskesdas), the prevalence of stunting among children under five years of age stood at 30.8%. The 2022 SSGI report indicated a reduction

in stunting prevalence from 24.4% in 2021 to 21.6% in 2022, with the Indonesian government targeting a further reduction to 14% by 2024 (Wiliyanarti et al., 2022; Badan Pusat Statistik, 2023). However, in West Sumatra, stunting prevalence increased from 23.3% in 2021 to 25.2% in 2022, with Padang City ranking 12th in the province, reporting a stunting prevalence of 19.5% (Kemenkes RI, 2022a; SSGI, 2022). Literature study highlights insufficient maternal knowledge and mental health challenges as dominant risk factors contributing to stunting. These factors elevate the likelihood of stunting by 74%, or approximately 6.96 times, and increase the risk of stunting in toddlers by 10.2 times (Ariani, 2020; Saleh et al., 2021; Abas & Gobel, 2021). Supporting this, Pratiwi & Muhlisin (2023) found that 72.4% of pregnant women possessed limited knowledge regarding stunting. Similarly, Sukmawati et al. (2021) reported that more than half of pregnant women demonstrated insufficient knowledge of stunting.

Further studies have established a strong association between maternal stress during pregnancy and adverse birth outcomes, such as low birth weight (LBW), which subsequently increases the likelihood of stunting (Babu et al., 2018; Hardiyat & Supratti, 2021). Girma et al. (2019) reported that 53.8% of pregnant women who experienced stress during pregnancy were three times more likely to give birth to stunted children. In addition, Apriliana et al. (2022) noted that stunting was 50% more prevalent among pregnant women experiencing stress compared to those who were not. The detrimental effects of insufficient maternal knowledge and elevated stress on fetal development, nutrient metabolism, and overall health significantly contribute to stunting (Susiloretni et al., 2021; Nguyen et al., 2018). Moreover, pregnant women who exhibit both low knowledge and high stress are more susceptible to intrauterine growth restriction (IUGR), low birth weight (LBW), premature birth, and infections, all of which further increase the risk of stunting in their children (Selfianan et al., 2023).

Efforts to increase pregnant women's knowledge in disease and stunting prevention require the implementation of health education. One important aspect of this education is improving knowledge about stunting and stress as part of a broader strategy to prevent stunting. Health education can begin during the first 1,000 days of life, a critical period that can enhance health outcomes and prevent disease development throughout a child's growth, starting from early pregnancy (Rahmawati et al., 2022; Fauziatin et al., 2019). Astuti et al. (2020) noted that health education media, such as illustrated cards with explanations, are more effective when provided to pregnant women. These tools are easier to understand and more engaging, facilitating the sharing of information and fostering social interactions, which help build harmonious relationships within individuals and groups. Based on the preliminary studies outlined in the background, this study assesses the effect of health education using Stunting Smart Cards on the knowledge and stress levels of pregnant women as a preventive measure against stunting at the Padang City Health Center. This study aimed to assess the effect of health education using Stunting Smart Cards on the knowledge and stress levels of pregnant women.

## **METHOD**

This study used quantitative research design with quasi-experimental pretest-posttest control groups approach. The study population consisted of pregnant women in the working areas of Seberang Padang Health Center and Ikur Koto Health Center. A total of 46 pregnant women were sampled using purposive sampling, with 23 women assigned to the intervention group and 23 to the control group. The instruments used for data collection included the Stunting Knowledge Questionnaire (Ambarwati & Aprianti, 2022) to assess knowledge validity 0,361

and reability 0,786, the Pregnancy Stress Rating Scale (PSRS) (Chen, 2015) validity 0,82 and reability alpha cronbach 0,92 to measure stress levels in pregnant women. Data analysis was conducted using the Paired t-test and Wilcoxon test.

**RESULT**

Based on Table 1, the characteristics of the pregnant women in the intervention group revealed that nearly all (87%) of the participants were not at risk in terms of age, almost half (43.5%) were in their second trimester, the majority (60.9%) were pregnant with their first child, nearly all (95.7%) were unemployed, and the vast majority (91.3%) had a higher education level and were of Minang ethnicity. In the control group, the results indicated that almost all (82.6%) participants were also not at risk regarding age, the majority (52.2%) were in their third trimester, nearly half (34.5%) were pregnant with their third child, the majority (69.7%) were employed, and all participants (100%) were of Minang ethnicity.

Table 1.

Respondent characteristics (n = 46)

No	Characteristics	Intervention Group (n = 23)		Control Group (n = 23)		Homogeneity Test (p-value)
		f	%	f	%	
1.	Maternal Age					
	a. At Risk (>35 years)	3	13	4	17,4	0,054
	b. Not at Risk (20-35 years)	20	87	19	82,6	
2.	Pregnancy Trimester					
	a. First Trimester (1-3 mnth)	4	17,4	4	17,4	0,797
	b. Second Trimester (4-6 mnth)	10	43,5	7	30,4	
	c. Third Trimester (7-9 mnth)	9	39,1	12	52,2	
3.	Number of Pregnancies					
	a. First Child	14	60,9	6	26,1	0,204
	b. Second Child	5	21,7	5	21,7	
	c. Third Child	2	8,7	8	34,8	
	d. Fourth Child	1	4,3	4	17,4	
	e. Fifth Child	1	4,3	0	0	
4.	Education					
	a. Higher Education	21	91,3	22	95,7	0,532
	b. Lower Education	2	8,7	1	4,3	
5.	Employment					
	a. Employed	1	4,3	7	69,6	0,176
	b. Unemployed	22	95,7	16	30,4	
6.	Ethnicity					
	a. Minang	21	91,3	23	100	0
	b. Batak	1	4,3	0	0	0
	c. Nias	1	4,3	0	0	0

Table 2, the mean knowledge score of pregnant women in the intervention group before receiving health education was 7.08, indicating low knowledge levels, with a minimum score of 4 and a maximum score of 10. The mean stress level among pregnant women in this group before the intervention was 107.73, reflecting severe stress, with a minimum score of 65 and a maximum score of 135. In contrast, the control group had a mean knowledge score of 6.56 before the intervention, also indicating low knowledge, with a minimum score of 1 and a maximum score of 10. The mean stress level among pregnant women in the control group before the intervention was 107.13, indicating severe stress, with a minimum score of 82 and a maximum score of 126.

Table 2  
 Mean Knowledge and Stress Scores in Pregnant Women Before Receiving Health Education Using Stunting Smart Cards in the Intervention and Control Groups (n = 46)

Variable	Intervention Group (n = 23)			Control Group (n = 23)		
	Mean	SD	Min - Max	Mean	SD	Min - Max
<b>Knowledge</b>						
Pre-test	7,08	1,59	4 - 10	6,56	2,35	1 - 10
<b>Stress</b>						
Pre - test	107,73	17,48	65 - 135	107,13	14,14	82 - 126

Table 3, the mean knowledge score of pregnant women in the intervention group after receiving health education was 9.82, indicating high knowledge (with the lowest score being 7 and the highest score being 10). The mean stress level of pregnant women in the intervention group after receiving health education was 73.86, indicating moderate stress (with the lowest score being 46 and the highest score being 98). In the control group, the mean knowledge score of pregnant women after the intervention was 7.39, indicating low knowledge (with the lowest score being 4 and the highest score being 10). The mean stress level of pregnant women in the control group after the intervention was 107.00, indicating severe stress (with the lowest score being 82 and the highest score being 126).

Tabel 3.  
 Mean Knowledge and Stress Levels Among Pregnant Women After Receiving Health Education with Stunting Smart Cards in the Intervention and Control Groups (n = 46)

Variable	Intervention Group (n = 23)			Control Group (n = 23)		
	Mean	SD	Min - Max	Mean	SD	Min - Max
<b>Knowledge</b>						
Post-test	9,82	0,38	9 - 10	7,39	1,85	4 - 10
<b>Stress</b>						
Post- test	73,86	13,96	46 - 98	107,00	14,49	82 - 126

Table 4, there was a significant difference in the mean knowledge scores before and after the intervention in the intervention group, with 22 respondents demonstrating increased knowledge, 1 respondent showing no change, and a p-value of 0.001, indicating a statistically significant improvement in knowledge following health education with the Stunting Smart Card related to stunting prevention.

Tabel 4  
 Differences in Knowledge Among Pregnant Women Before and After Receiving Health Education Using Stunting Smart Cards in the Intervention group (n=46)

Group	Knowledge	n	Mean Ranks	Sum of ranks	Z	P-Value	
Intervention	Pre-post Knowledge	Negative Ranks	0	0,00	0,00	- 4,147	0,001
		Positive Ranks	22	11,50	235,00		
		Ties	1				
		Total	23				

Table 5, in the control group, the mean knowledge score before the intervention was 6.56, and after the intervention, it increased to 7.39, with a difference of 0.87 and a p-value of 0.148, indicating no significant difference in knowledge before and after the intervention.

Table 6 shows the differences in stress levels in the intervention group before and after the intervention. In the intervention group, the mean stress level before the intervention was

107.73, and after the intervention, it decreased significantly to 73.86, with a difference of 33.87 and a p-value of 0.001, indicating a statistically significant reduction in stress levels following the health education. In the control group, the mean stress level before the intervention was 107.13, and after the intervention, it remained virtually unchanged at 107.00, with a difference of 0.13 and a p-value of 0.328, indicating no significant change in stress levels before and after the intervention.

Tabel 5  
Differences in Knowledge Among Pregnant Women Before and After Receiving Health Education Using Stunting Smart Cards in the Control Group (n=46) (n=46)

Group	Knowledge	n	Mean	SD	SE	P-Value
Control	Pre-Test	23	6,56	2,351	0,490	0,148
	Post-Test	23	7,39	1,852	0,386	
	Difference		0,87	0,499	0,104	

Tabel 6  
Differences in Stress Levels Among Pregnant Women Before and After Receiving Health Education Using Stunting Smart Cards in the Intervention and Control Groups (n = 46)

Group	Stress	n	Mean	SD	SE	P-Value
Intervention	Pre-Test	23	107.73	17,485	3,646	0,001
	Post-Test	23	73.86	13,968	2,912	
	Difference		33,87	3,517	0,743	
Control	Pre-Test	23	107,13	14,413	3,005	0,328
	Post-Test	23	107,00	14,494	3,022	
	Difference		0,13	-0,081	-0,017	

Table 7 presents the comparison of knowledge and stress levels between the intervention and control groups after receiving the health education intervention. In the intervention group, the mean knowledge score after the intervention was 9.82, indicating high knowledge, while in the control group, the mean knowledge score after the intervention was 7.39, indicating low knowledge. The test results showed a p-value of 0.001, indicating a significant difference in knowledge between the intervention and control groups after the intervention. Regarding stress levels, the mean score in the intervention group after the intervention was 73.86, indicating moderate stress, while in the control group, the mean stress score was 107.00, indicating severe stress. The p-value of 0.001 further indicates a significant difference in stress levels between the two groups post-intervention. This suggests that health education using Stunting Smart Cards had a significant effect on improving knowledge and reducing stress in preventing stunting at Padang City Health Centers.

Tabel 7  
Effect of Health Education Using Stunting Smart Cards on Knowledge and Stress Levels Among Pregnant Women in the Intervention and Control Groups (n=46)

Variable	Intervention Group	Control Group	P-Value
	Mean After	Mean After	
Knowledge	9,82	7,39	0,001
Stress	73,86	107,00	0,001

## DISCUSSION

The findings of this study indicate that the mean knowledge scores of pregnant women in both the intervention and control groups before receiving health education with Stunting

Smart Cards were 7.09 and 6.56, respectively, indicating low levels of knowledge. This is consistent with several studies that have found that the average knowledge of pregnant women regarding stunting prevention is generally low prior to receiving health education. In line with other studies, the results of the study showed that the average knowledge of pregnant women about preventing stunting was still low at 86.7 before being given health education in the intervention group (Ekayanthi et al., 2019; Anggraini et al., 2020; Sari, 2023). As one of the predisposing factors, low knowledge in pregnant women can also be influenced by information factors obtained both directly and indirectly, which can determine how a pregnant woman can behave where before adopting new behavior, there will be a process of feeling interested, starting new behavior and attitudes towards a health problem that is felt during pregnancy (Munna et al., 2020).

Low levels of knowledge among pregnant women can be attributed to several factors, such as having a first pregnancy. This study found that the majority (60%) of women were pregnant with their first child, which often results in lower knowledge due to a lack of experience and understanding of pregnancy. Pratiwi & Muhlisin (2023) highlighted that first-time mothers tend to have insufficient experience and knowledge compared to women who have had multiple pregnancies, thus leading to low knowledge and unhealthy behaviors during pregnancy. Jatmika et al. (2019) also pointed out that experience is closely related to knowledge, as it stems from events that individuals have personally encountered. Women pregnant with their fourth or fifth child generally possess more experience compared to first-time mothers.

Furthermore, nearly all participants (95.7%) were unemployed, which could have limited their exposure to health information. Consequently, lowered their knowledge levels. Other studies have similarly concluded that work experience broadens knowledge in pregnant women, as employment exposes individuals to more diverse interactions and sources of information (Ramli, 2020). Pregnant women who are employed often have better access to health information because their work environments provide opportunities for both direct and indirect experiences and knowledges, which can shape their understanding and access to information (Nurjaya & Subriah, 2019).

The study also found that stress levels among pregnant women in both the intervention and control groups before receiving health education were 107.73 and 107.13, respectively, indicating severe stress. This is corroborated by Putri (2021), who found that the mean stress level in pregnant women prior to an intervention was 49.07 (severe stress). Syahida & Mirani (2021) also reported that 33.3% of pregnant women experience severe stress. The severe stress experienced by pregnant women in this study may be related to the fact that 60.9% of the participants were first-time mothers. First pregnancies tend to have a more significant psychological impact regarded of the insufficient experience compared to those with subsequent pregnancies. First pregnancies can affect psychological aspect resulting increased stress due to insufficient experiences and knowledge about childbirth, worsen by the generated fear from hearing distressing stories of friends or family members about childbirth process (Manuaba, 2020).

Additionally, the gestational age of the pregnancy can influence stress levels. Nearly half (43.5%) of the women in the intervention group were in their second trimester. Pregnant women in their second trimester are often still adjusting to their pregnancy, and various life challenges may contribute to their stress. Ekawati et al. (2022) found that second-trimester stress can be influenced by personal, financial, and employment-related concerns, as well as

fears related to childbirth. Furthermore, insufficiency in social support and professional healthcare assistance can increase stress levels, as low levels of support are correlated with higher levels of perceived stress in pregnant women (Nuryati & Amira, 2023).

Meanwhile, in the control group, most women (52.2%) were in their third trimester, which is a period often associated with increased stress due to concerns about childbirth and the responsibilities of motherhood. This is consistent with findings by Nurhasanah et al. (2023), who reported that third-trimester pregnant women experience significant psychological stress as they worry about their own health and the health of their unborn child. Usman & Sudirman (2023) also found that third-trimester women with low tolerance for stress and labor pain tend to have lower self-efficacy compared to women who are better able to manage these stressors. Shishehgar et al. (2013) noted that indirect support can alleviate stress during pregnancy, and a lack of such support is a significant risk factor for maternal well-being, leading to adverse outcomes. Pregnancies with high levels of support are associated with significantly lower stress levels. Research also shows that insufficient support from spouses, family, and healthcare professionals can be a primary factor contributing to increased stress among pregnant women. Emotional connections help validate life experiences, offering emotional reinforcement and acting as a support system (Usman & Sudirman, 2023).

Stress among pregnant women may also be influenced by employment status. In this study, 69.7% of the participants were employed, and this contributed to higher stress levels due to the work-related responsibilities they carried during pregnancy. Nurhasanah et al. (2023) found that working pregnant women have a higher risk of stress compared to unemployed women, as they are responsible for both work and household duties, increasing the likelihood of experiencing high stress. Velga & Suryani (2022) observed that besides daily life stress, pregnant women also experience health-related stress, such as concerns about the safety of themselves and their babies, as well as fears of death during childbirth. Furthermore, 95% of healthcare professionals focus more on the physical health of pregnant women and their babies, often neglecting the mental health of the mother.

The study also found a significant improvement in knowledge among the intervention group. After receiving health education with Stunting Smart Cards, 22 pregnant women showed increased knowledge, while 1 remained unchanged, with a p-value of 0.001, indicating a significant difference in knowledge before and after the intervention. This finding aligns with Kusumawati et al. (2022), who also researched about the effect of health education using stunting prevention smart cards, reported a significant increase in knowledge after providing health education using stunting prevention cards. This result is further supported by Rahmawati et al. (2022), who found that health education interventions significantly improved knowledge among pregnant women. Increased knowledge can help reduce the effects and symptoms of stunting in children, as pregnant women become more informed and can take better care of their health, especially in preventing stunting. Lestari et al. (2024) reported that pregnant women with higher levels of knowledge are more likely to prevent stunting in their children compared to those with lower knowledge. Mothers with higher knowledge take more active roles in preventing stunting, while those with lower knowledge increase the risk of stunting by 1.6 times (Zahra et al., 2021). Research by Ramadhanty & Rokhaidah (2021) found a significant correlation between maternal knowledge and stunting risk, and incorrect knowledge about stunting can lead mothers to underestimate the seriousness of the stunting issue. Therefore, health education for pregnant women in preventing stunting is needed. Based on these findings, it can be concluded that high knowledge levels are crucial for pregnant women as a preventive measure against stunting.

Health education plays an essential role in increasing maternal knowledge, as evidenced by the significant improvements in knowledge after receiving education with Stunting Smart Cards.

In the control group, the pretest and posttest knowledge scores were 6.56 and 7.39, respectively, with a difference of 0.87 and a p-value of 0.148, indicating no significant improvement in knowledge. This is consistent with Fauziah et al. (2024), who found no significant knowledge improvement in control group participants following a leaflet intervention. Similarly, Khairunnisyah et al. (2024) reported no significant difference in knowledge among control group participants after an intervention using pocketbooks. Fauziatin et al. (2019) suggested that the absence of a significant improvement in the control group could be attributed to the fact that participants did not receive the same intervention as the experimental group, resulting in less comprehensive knowledge. Alisye et al. (2021) also noted that the provision of health education to the control group of pregnant women did not result in a significant difference in knowledge before and after the intervention period. This lack of difference was attributed to the fact that the control group did not receive any intervention, which meant that the mothers did not gain in-depth information and knowledge regarding stunting prevention measures they could implement. Based on these observations, it can be concluded that, aside from the characteristics of the respondents, the absence of significant differences in knowledge before and after the intervention in the control group was also due to the lack of any treatment provided to them, which resulted in pregnant women not acquiring comprehensive information and knowledge about stunting prevention.

Following the health education intervention using Stunting Smart Cards, the mean knowledge score in the intervention group increased significantly to 9.82 (high) with a p-value of 0.001. In contrast, the control group showed a smaller increase in knowledge to 7.39 (low), with a p-value of 0.148, indicating a non-significant improvement. Based on these findings, it can be concluded that there is a significant effect of health education using Stunting Smart Cards on the knowledge of pregnant women in stunting prevention, with a p-value of <0.005. This result is supported by Kusumawati et al. (2022), who reported that health education significantly improves the knowledge of pregnant women, particularly when delivered through engaging and effective methods like card games. Such educational games are more interactive and enjoyable compared to traditional teaching methods. Furthermore, studies on the impact of health education on the knowledge of pregnant women have demonstrated a significant influence of health education interventions on stunting prevention knowledge (Pratiwi & Muhlisin, 2023). Health education using brainstorming techniques has also been shown to significantly increase the knowledge of pregnant women in stunting prevention (Suryantar et al., 2023).

After the implementation of health education using Stunting Smart Cards in the intervention group, the mean stress level decreased to 73.86 (moderate stress) with a p-value of 0.001, indicating a significant reduction in stress among pregnant women. In contrast, the control group had an mean stress level of 107.00 (severe stress) with a p-value of 0.328, indicating a non-significant reduction in stress. This demonstrates that the provision of health education using Stunting Smart Cards had a significant effect on reducing stress in pregnant women, with a p-value of <0.005. This finding is supported by studies examining the effects of mental health training on stress during pregnancy, which also found a significant reduction in stress scores among pregnant women (Akbarian et al., 2018). Additionally, Syahida & Mirani (2021) reported that deep breathing relaxation techniques had a significant impact on reducing stress levels during pregnancy. Another study on the effectiveness of relaxation techniques

found that deep breathing exercises were more effective in reducing stress experienced by pregnant women (Putri & Margareta, 2021). Further research indicated that interventions such as deep breathing relaxation techniques and five-finger hypnosis significantly reduced stress in pregnant women and improved their mental health, thereby lowering the risk of preterm birth, which is associated with stunting in children (Abera et al., 2024). Based on these findings, it can be concluded that health education not only improves knowledge but also reduces stress among pregnant women, contributing to the prevention of stunting.

## CONCLUSION

Health education using Stunting Smart Cards significantly improves maternal knowledge about stunting and simultaneously reduces stress levels. Health education and psychosocial interventions can improve maternal well-being and contribute to stunting prevention, especially when using interactive and easily comprehensible educational media. This intervention could be widely adopted in government initiatives to reduce stunting rates in Indonesia, as stunting remains a significant public health issue.

## REFERENCES

- Abas, A. S., & Gobel, F. A. (2021). Faktor Risiko Kejadian Stunting Pada Anak Balita Di Desa Pa Lalakkang. *Journal Of Aafiyah Health Research (JAHR)*, 2(1), 1–12.
- Abera, M., Hanlon, C., Daniel, B., Tesfaye, M., Workicho, A., Girma, T., Wibaek, R., Andersen, G. S., Fewtrell, M., Filteau, S., & Wells, J. C. K. (2024). Effects of relaxation interventions during pregnancy on maternal mental health, and pregnancy and newborn outcomes: A systematic review and meta-analysis. *PLoS ONE*, 19(1 January), 1–25. <https://doi.org/10.1371/journal.pone.0278432>
- Akbarian, Z., Kohan, S., Nasiri, H., & Ehsanpour, S. (2018). The effects of mental health training program on stress, anxiety, and depression during pregnancy. *Iranian Journal of Nursing and Midwifery Research*, 23(2), 93–97. [https://doi.org/10.4103/ijnmr.IJNMR\\_207\\_16](https://doi.org/10.4103/ijnmr.IJNMR_207_16)
- Ambarwati, W., & Aprianti. (2022). Knowledge Level And Mother's Attitude Related To Stunting In Infants Aged 6-23 Months. *Amerta Nutrition*, 6(1SP), 44–50. <https://doi.org/10.20473/amnt.v6i1sp.2022.44-50>
- Anggraini, S. A., Siregar, S., & Dewi, R. (2020). Pengaruh Media Audio Visual Terhadap Tingkat Pengetahuan Dan Sikap Pada Ibu Hamil Tentang Pencegahan Stunting Di Desa Cinta Rakyat. *Jurnal Ilmiah Kebidanan Imelda*, 6(1), 26–31. <https://doi.org/10.52943/jikebi.v6i1.379>
- Apriliana, T., Keliat, B. A., Mustikasari, & Primasari, Y. (2022). A contributing factor of maternal pregnancy depression in the occurrence of stunting on toddlers. *Journal of Public Health Research*, 11(2), 78–82. <https://doi.org/10.4081/jphr.2021.2738>
- Ariani, M. (2020). Determinan Penyebab Kejadian Stunting Pada Balita: Tinjauan Literatur. *Dinamika Kesehatan: Jurnal Kebidanan Dan Keperawatan*, 11(1), 172–186. <https://doi.org/10.33859/dksm.v11i1.559>
- Astuti, S., Megawati, G., & CMS, S. (2020). Upaya Promotif untuk Meningkatkan Pengetahuan Ibu Bayi dan Balita tentang Stunting dengan Media Integrating Card. *Jurnal Pengabdian Kepada Masyarakat (Indonesian Journal of Community Engagement)*, 6(1), 51. <https://doi.org/10.22146/jpkm.42417>
- Babu, G. R., Murthy, G. V. S., Reddy, Y., Deepa, R., Yamuna, A., Prafulla, S., Rathnaiah, M., & Kinra, S. (2018). Small for gestational age babies and depressive symptoms of mothers during pregnancy: Results from a birth cohort in India. *Wellcome Open*

- Research, 3, 76. <https://doi.org/10.12688/wellcomeopenres.14618.1>
- Badan Pusat Statistik. (2023). Laporan Indeks Khusus Penanganan Stunting Kabupaten /Kota 2021 - 2022. Badan Pusat Statistik.
- Chen, C. H. (2015). Revision and validation of a scale to assess pregnancy stress. *Journal of Nursing Research*, 23(1), 25–32. <https://doi.org/10.1097/jnr.0000000000000047>
- Ekawati, H., Martini, D. E., & Rohmawati, A. R. (2022). Hubungan Stress Dengan Derajat Morning Sickness Pada Ibu Hamil Trimester 1 Dan 2 Di Desa Sukobendu Kecamatan Mantup Kabupaten Lamongan. *Surya*, 14(3), 99–107. <https://doi.org/10.38040/js.v14i3.543>
- Ekayanthi, N. W. D., & Suryani, P. (2019). Edukasi Gizi pada Ibu Hamil Mencegah Stunting pada Kelas Ibu Hamil. *Jurnal Kesehatan*, 10(3), 312. <https://doi.org/10.26630/jk.v10i3.1389>
- Fauziatin, N., Kartini, A., & Nugraheni, S. (2019). Pengaruh Pendidikan Kesehatan dengan Media Lembar Balik Tentang Pencegahan Stunting Pada ibu hamil. *VISIQUES: Jurnal Kesehatan Masyarakat*, 18(2), 224–233. <http://publikasi.dinus.ac.id/index.php/visiques>
- Girma, S., Fikadu, T., & Abdisa, E. (2019). Maternal Common Mental Disorder as Predictors of Stunting among Children Aged 6-59 Months in Western Ethiopia: A Case-Control Study. *International Journal of Pediatrics (United Kingdom)*, 2019. <https://doi.org/10.1155/2019/4716482>
- Hardiyati, S. (2021). Studi Literatur: Depresi Dan Konflik Selama Kehamilan. *Journal Kesehatan Manarang*, 7(November), 77–85.
- Herliani, S., & Yustiana, I. (2017). Hubungan Status Pekerjaan dan Pendidikan Dengan Pengetahuan Ibu Hamil Tentang Tanda Bahaya Kehamilan. *Jurnal Obstetrika Scientia*, 4(1), 418–434. <https://ejurnal.latansamashiro.ac.id/index.php/OBS/article/view/165>
- Jatmika, S. E. D., Maulana, M., Kuntoro, & Martini, S. (2019). Buku Ajar Pengembangan Media Promosi Kesehatan. In *K-Media*. [http://eprints.ukh.ac.id/id/eprint/852/1/6\\_PERENCANAAN MEDIA PROMOSI KESEHATAN 1.pdf](http://eprints.ukh.ac.id/id/eprint/852/1/6_PERENCANAAN_MEDIA_PROMOSI_KESEHATAN_1.pdf)
- Kemendes RI. (2022a). Ini Wilayah dengan Prevalensi Stunting Tertinggi di Sumatra Barat pada 2022. 2022–2023.
- Kemendes RI. (2022b). Kemendes RI no HK.01.07/MENKES/1928/2022 Tentang Pedoman Nasional Pelayanan Kedokteran Tata Laksana Stunting. 1–52.
- Kusumawati, D. D., Septiyaningsih, R., & Susilawati. (2022). Efektifitas Kartu Pintar Cegah Stunting Terhadap Peningkatan Pengetahuan Ibu Hamil Tentang Stunting. *Jika*, 7(1), 32–37.
- Manuaba, I. (2020). Ilmu Kebidanan Penyakit dan Kandungan dan Kb untuk Bidan. EGC.
- Margawati, A., Noer, R. A., Syauqy, A., Fitranti, Y. D., Purwanti, R., & Utami, A. (2022). Variasi Menu Balita Stunting. In *Fakultas Kedokteran Universitas Diponegoro (1st ed., Vol. 1, Issue August)*. Fakultas Kedokteran Universitas Diponegoro.
- Melati, I. P., & Afifah, C. A. N. (2021). Edukasi Gizi Pencegahan Stunting Berbasis Whatsapp Group Untuk Meningkatkan Pengetahuan Dan Sikap Ibu Hamil. *Jurnal Pangan Kesehatan Dan Gizi Universitas Binawan*, 1(2), 61–69. <https://doi.org/10.54771/jakagi.v1i2.153>
- Meri Agritubella, S., & Delvira, W. (2020). Efektifitas Poster Pola Diet 1000 Hari Pertama Kehidupan (HPK) terhadap Pengetahuan Ibu Hamil tentang Nutrisi dalam Pencegahan Stunting di Puskesmas Rambah Kabupaten Rokan Hulu. *Jurnal Endurance*, 5(1), 168. <https://doi.org/10.22216/jen.v5i1.5027>

- Nguyen, P. H., Friedman, J., Kak, M., Menon, P., & Alderman, H. (2018). Maternal depressive symptoms are negatively associated with child growth and development: Evidence from rural India. *Maternal and Child Nutrition*, 14(4), 1–9. <https://doi.org/10.1111/mcn.12621>
- Nurhasanah, A., Wardiyah, A., & Rilyani, R. (2023). Faktor yang Berhubungan dengan Stres pada Ibu Hamil selama Pandemi di Wilayah Kerja Puskesmas Bandar Jaya Kabupaten Lampung Tengah. *Malahayati Nursing Journal*, 5(1), 23–36. <https://doi.org/10.33024/mnj.v5i1.7636>
- Nurhidayati, Tri, R., & Heny, R. (2020). Usia Ibu Saat Hamil dan Kejadian Stunting Pada Anak Usia 1 - 3 Tahun. *Midwifery Care Journal*, 1(5), 5.
- Nurjaya, & Subriah. (2019). Hubungan antara tingkat pengetahuan ibu hamil dengan kesiapan menghadapi persalinan. *Jurnal Media Keperawatan: Politeknik Kesehatan Makassar*, 10(2), 85–91.
- Nursa'iidah, S., & Rokhaidah. (2022). Pendidikan, Pekerjaan Dan Usia Dengan Pengetahuan Ibu Balita Tentang Stunting. *Indonesian Jurnal of Health Development*, 4(1), 9–18.
- Nuryati, T., & Amira, Y. (2023). Pengaruh Dukungan Sosial dan Metode Coping terhadap tingkat stress pada ibu hamil. *Jurnal Ilmu Kesehatan Masyarakat*, 3, 432–437.
- Pratiwi, B. R., & Muhlisin, A. (2023). Pendidikan Kesehatan Terhadap Tingkat Pengetahuan Dan Sikap Ibu Hamil Tentang Upaya Pencegahan Stunting. *Keperawatan Silampari*, 6(2), 1–23.
- Purwanti, T., & Setiyaningsih, F. Y. (2022). Prenatal Massage to Reduce Psychological Stress in Teenage Mothers and Its Implications for Stunting Prevention. *Embrio: Jurnal Kebidanan*, 14, 60–68.
- Putri, E. R. T., & Margareta, S. S. (2021). Efektifitas Relaksasi Deep Breathing Dengan Teknik Self Intruccion Training (Sit) Dalam Bentuk Video Dan Audio Untuk Mengurangi Kecemasan Pada Ibu Hamil. *Jurnal Keperawatan Dan Kesehatan Masyarakat Cendekia Utama*, 10(1), 26. <https://doi.org/10.31596/jcu.v10i1.694>
- Rahmawati, S., Saraswati, D., & Lina, N. (2022). Pengaruh Pendidikan Kesehatan Dengan Media Flash Card Terhadap Pengetahuan Ibu Hamil Mengenai Pencegahan Stunting. *Jurnal Kesehatan Komunitas Indonesia*, 18(1), 395–405.
- Ramli, R. (2020). Correlation of Mothers' Knowledge and Employment Status with Exclusive Breastfeeding in Sidotopo. *Jurnal PROMKES*, 8(1), 36. <https://doi.org/10.20473/jpk.v8.i1.2020.36-46>
- Saleh, A., Syahrul, S., Hadju, V., Andriani, I., & Restika, I. (2021). Role of Maternal in Preventing Stunting: a Systematic Review. *Gaceta Sanitaria*, 35, S576–S582. <https://doi.org/10.1016/j.gaceta.2021.10.087>
- Sari, J. (2023). The Effect of Education on Prevention of Stunting on the Knowledge of Pregnant Women at the Sei Dadap Health Center, Sei Dadap District, Asahan Regency in 2022. 14(02), 836–841.
- Selfianan, V., Ulfadamayanti, N., Maani, S., Nuraini, & Fadillah, S. N. (2023). Pengaruh Stress pada Ibu Hamil. *Journal on Education*, 05(04), 11702–11706. <https://www.jonedu.org/index.php/joe/article/view/2125/1765>
- Shisheghar, S., Mahmoodi, A., Dolatian, M., Mahmoodi, Z., Bakhtiary, M., & Majd, H. A. (2013). The relationship of social support and quality of life with the level of stress in pregnant women using the PATH model. *Iranian Red Crescent Medical Journal*, 15(7), 560–565. <https://doi.org/10.5812/ircmj.12174>
- SSGI. (2022). Hasil Survei Status Gizi Indonesia (SSGI) 2022. Kemenkes, 1–150.

- Sukmawati, S., Hermayanti, Y., Nurhakim, F., DA, I. A., & Mediani, H. S. (2021). Edukasi Pada Ibu Hamil, Keluarga Dan Kader Posyandu Tentang Pencegahan Stunting. *Dharmakarya*, 10(4), 330. <https://doi.org/10.24198/dharmakarya.v10i4.33400>
- Suryantar, B., Merida, Y., & Siswantol, P. (2023). Pengaruh Pemberian Edukasi Ibu Hamil Terhadap Tingkat Pengetahuan Pencegahan Stunting. *Jurnal Kesehatan*, 12(2), 175–180. <https://doi.org/10.37048/kesehatan.v12i2.309>
- Susiloretni, K. A., Smith, E. R., Suparmi, Marsum, Agustina, R., & Shankar, A. H. (2021). The psychological distress of parents is associated with reduced linear growth of children: Evidence from a nationwide population survey. *PLOS ONE*, 16(10 October), 1–23. <https://doi.org/10.1371/journal.pone.0246725>
- Syahida, A., & Mirani, N. (2021). Analisis Relaksasi Pernafasan Terhadap Kecemasan Pada Ibu Hamil Trimester Iii. *Jurnal Kebidanan Malahayati*, 7(4), 634–641. <https://doi.org/10.33024/jkm.v7i4.5064>
- Usman, S., & Sudirman, J. (2023). Efektifitas Edukasi Maternal Mental Health terhadap Kesehatan Mental Ibu Selama Masa Kehamilan. *Jurnal Ilmu Kesehatan Indonesia*, 3(4), 317–322. <https://doi.org/10.25077/jikesi.v3i4.1041>
- Velga, Y., & Suryani, U. (2022). Faktor Yang Berhubungan dengan Tingkat Stres Pada Ibu Hamil Dalam Menghadapi Persalinan. *JKJ: Persatuan Perawat Nasional Indonesia*, 10(4), 837–856.
- Widyaningsih, V., Mulyaningsih, T., Rahmawati, F. N., & Adhitya, D. (2022). Determinants of socioeconomic and rural-urban disparities in stunting: evidence from Indonesia. *Rural and Remote Health*, 22(1), 1–9. <https://doi.org/10.22605/RRH7082>
- Wiliyanarti, P. F., Wulandari, Y., & Nasrullah, D. (2022). Behavior in fulfilling nutritional needs for Indonesian children with stunting: Related culture, family support, and mother's knowledge. *Journal of Public Health*