

Effect of Leaflet-Based Education on Pregnant Women's Knowledge About Stunting

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Abstract:

Knowledge of pregnant women is one of the internal factors that influences the increase in stunting. This is due to the lack of knowledge of pregnant women regarding the impact of stunting. the prevalence of stunting is 6.35% (9,837 stunted toddlers) out of 154,824 toddlers. In the Arjasa health center 12.26% (333 stunted toddlers) out of 2,716 toddlers, while in Arjasa Village 13.7% (97 stunted toddlers) out of 705 toddlers. Based on preliminary studies, 6 out of 10 pregnant women could not answer about stunting. Maternal knowledge is one of the elements that can influence stunting rates. The purpose is to examine the difference in stunting knowledge before and after receiving education by leaflet media. A one-group pretest-posttest design was used in this pre-experimental study. The population consisted of 67 pregnant women, with a sample of 57 pregnant women drawn using a simple random sampling. The instrument used a questionnaire, analyzed using the Spearman Test. Pregnant mothers have good knowledge of stunting before receiving an education (10.5%) and after receiving education (86%). The Spearman test resulted in a p-value of 0.000, which is less than the threshold of α (0.05). The null hypothesis was rejected, indicating a significant difference. There is a difference in pregnant women's knowledge of stunting after receiving education through leaflet media. This has resulted in increased awareness of stunting among pregnant women, and it is hoped that leaflet media will become a viable medium for giving health education to pregnant women

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INTRODUCTION

Stunting is one of the nutritional problems commonly experienced by toddlers around the world today. Stunting is a condition in which toddlers are shorter than their age peers. According to the 2023 Indonesian Nutrition Status Study, the prevalence of

stunting among toddlers in East Java is 17.9% (Pudjirahaju, 2025). Based on data from the Jember District Health Office, the prevalence of stunting cases in 2023 was 6.35%, with 9,837 toddlers experiencing stunting out of 154,824 toddlers. The Arjasa Community Health Center is one of five health centers with a relatively high prevalence rate of 12.26%, with 333 stunted toddlers out of 2,716. Specifically, Arjasa Village recorded a stunting incidence rate of approximately 13.7%, or around 97 children out of 705 toddlers. This figure is considered high, especially given the village's total population of about 10,000 people. According to the 2023 Jember District Health Profile, Arjasa Village is classified as a stunting-prone area, ranking among the highest prevalence regions alongside Jelbuk (18.46%), Sumberjambe (13.61%), Pakusari (12.63%), and Arjasa (12.26%) Community Health Centers (Muhamad, 2023) (Wahyuni & Sutarno, 2024).

Despite various government programs addressing stunting, the persistence of high rates in Arjasa Village indicates that community awareness and maternal knowledge regarding child nutrition remain limited. Previous studies have largely focused on dietary supplementation and health service interventions; however, research on educational approaches particularly the use of leaflet-based health education to improve maternal knowledge and practices related to stunting prevention remains limited in this population. Therefore, this study aims to explore the effectiveness of leaflet-based education on maternal knowledge and attitudes toward stunting prevention in Arjasa Village, Jember District (Birungi, 2023).

Previous research conducted, the analysis of counseling using leaflets on mothers' knowledge of stunting in toddlers showed a change in mothers' knowledge of stunting after counseling using leaflets. One of the risk factors for stunting is the misconception among the community that stunting is a normal occurrence. This is due to the lack of knowledge among pregnant women about stunting (Prasetyo et al., 2023). One of the factors that can influence the incidence of stunting is mothers' knowledge. Knowledge about stunting is very important for mothers because a lack of knowledge about stunting can put children at risk of stunting (Siregar, 2023).

The effects of stunting include short-term and long-term effects. Short-term effects that may occur include impaired brain development, intelligence, physical growth disorders, and metabolic disorders in the body. Meanwhile, the long-term effects of stunting include decreased cognitive abilities and learning achievements, decreased immunity, making children prone to illness and increasing the risk of diabetes, obesity, heart and blood vessel diseases, cancer, stroke, and disability in old age (Albin, 2024). Children with suboptimal intelligence due to stunting can ultimately hinder economic growth, increase poverty, and widen inequality in a country. Government efforts to combat stunting, especially among mothers, are in accordance with Minister of Health Regulation No. 39 of 2016 concerning Guidelines for Implementing the Healthy Indonesia Program with a Family Approach, which include ensuring the quality of antenatal care (ANC), implementing programs to provide food high in calories, protein, and micronutrients (tkpm), providing counseling on early breastfeeding initiation (IMD), and exclusive breastfeeding, as well as organizing family planning counseling and services (Yanti, 2024).

Improving deliveries in health facilities and intervening in the first 1,000 days of life (HPK). Initial efforts in the region to prevent stunting include providing supplementary food (PMT) for 90 days in Arjasa village, specifically for stunted toddlers and pregnant women with KEK, in the form of local PMT and manufactured PMT, namely MT biscuits. In addition to PMT in treating stunting, midwives have provided education through counseling activities at health posts or classes for pregnant women and have never used other methods (Abuay, 2024).

RESEARCH METHODS

This research design uses comparative research. This research was conducted in Arjasa Village using quantitative methods. The population consisted of all pregnant women in Arjasa Village, namely 67 pregnant women. The sample consisted of 57 pregnant women. The sampling technique used was simple random sampling. A one-group pretest-posttest design was used to measure changes in maternal knowledge before and after the leaflet intervention. Participants first completed a pretest questionnaire to assess their baseline knowledge regarding stunting prevention. Subsequently, educational leaflets on stunting prevention were distributed, followed by a posttest using the same structured questionnaire to evaluate changes in knowledge levels. The instruments used in this study were educational leaflets as the intervention medium and a structured questionnaire to measure maternal knowledge regarding stunting.

RESULTS AND DISCUSSION

Result

This section presents the results of the study, including the characteristics of respondents and their distribution based on age, education level, access to information about stunting, sources of information, and knowledge levels before and after the leaflet intervention. The findings are organized in a series of tables to provide a clear overview of both baseline conditions and post-intervention changes. In addition, the results of the statistical analysis using the Spearman test are presented to determine the difference in maternal knowledge before and after the educational intervention.

Table 1. Frequency Distribution of Respondents Based on Age Among Pregnant Women

Aged (year)	f	%
< 20	10	17.5
20-35	43	75.4
>35	4	7.0
Total	57	100

Based on table 1, Table 1 presents the age distribution of pregnant women who participated in this study. Of the 57 respondents, the majority were aged between 20 and 35 years, comprising 43 individuals (75.4%). This age group represents the largest proportion of participants and reflects the typical reproductive age range among pregnant women. Meanwhile, 10 respondents (17.5%) were younger than 20 years, indicating the presence of pregnancies occurring during adolescence. In contrast, only 4 respondents (7.0%) were older than 35 years. Although this group constituted the smallest proportion of the sample, pregnancies at this age are often considered to require closer monitoring due to increased maternal and fetal health risks. Overall, the findings demonstrate that most respondents were within the optimal reproductive age category of 20–35 years. This distribution suggests that the study sample was

predominantly composed of women in the age group generally associated with favorable pregnancy outcomes and lower obstetric complications.

Table 2. Frequency Distribution of Respondents Based on Latest Education Among Pregnant Women

Highest Level of Education	f	%
Elementary	26	45.6
Junior	15	26.3
Senior	13	22.8
University	3	5.3
Total	57	100

Based on table 2 presents the educational background of the respondents. Among the 57 pregnant women included in the study, the largest proportion had completed elementary school education, accounting for 26 respondents (45.6%). This was followed by respondents who had completed junior high school, with 15 individuals (26.3%). Meanwhile, 13 respondents (22.8%) had attained senior high school education. Only a small proportion of participants, namely 3 respondents (5.3%), had completed university-level education. These findings indicate that the majority of respondents had relatively low to moderate educational attainment, with nearly half having completed only elementary school. The limited proportion of respondents with higher education suggests that access to advanced educational opportunities may be relatively low within the study population. Educational level is an important characteristic because it may influence an individual's ability to access, understand, and apply health-related information. Therefore, the educational profile of respondents should be considered when interpreting knowledge-related outcomes in this study.

Table 3. Frequency Distribution of Respondents Based on Information About Stunting in Pregnant Women

Information About Stunting	f	%
Have ever	34	61.4
Never	23	38.6
Total	57	100

Table 3 shows the distribution of respondents based on their previous exposure to information about stunting. Of the 57 pregnant women who participated in the study, 34 respondents (61.4%) reported that they had previously received information about stunting. In contrast, 23 respondents (38.6%) stated that they had never received any information related to stunting before participating in the study. The findings indicate that a majority of respondents had already been exposed to information regarding stunting, suggesting that awareness of this public health issue has reached a considerable proportion of the study population. However, more than one-third of the respondents had never received such information, highlighting the existence of

information gaps among pregnant women. This lack of exposure may affect their understanding of stunting prevention and child health practices. Therefore, educational interventions remain important to ensure that all pregnant women have adequate access to accurate and comprehensive information about stunting and its prevention.

Table 4. Frequency Distribution of Respondents Based on Sources of Information Among Pregnant Women in Arjasa Village in 2024

Sources of Information	f	%
Healthcare personnel	21	36.8
Neighbors	6	10.5
Television	7	12.3
Not knowing	27	40.4
Total	57	100

Table 4 presents the distribution of respondents according to their sources of information about stunting. Among the 57 respondents, the largest proportion, 27 individuals (40.4%), reported that they did not know about stunting or had never received information regarding the condition. Healthcare personnel were the second most common source of information, reported by 21 respondents (36.8%). Meanwhile, 7 respondents (12.3%) obtained information from television, and 6 respondents (10.5%) cited neighbors as their primary source of information. These findings indicate that healthcare personnel play an important role in disseminating information about stunting among pregnant women. However, the high proportion of respondents who reported not knowing about stunting suggests that information dissemination remains insufficient within the study population. Mass media and community-based sources, such as neighbors, contributed to information sharing but reached relatively fewer respondents. Therefore, strengthening health education programs through healthcare providers and other communication channels may help improve awareness and understanding of stunting prevention among pregnant women.

Table 5. Pregnant Women's Knowledge About Stunting Before Being Given Education Using Leaflets

Level of Knowledge	f	%
Good	6	10.5
Fair	21	36.8
Poor	30	52.6
Total	57	100

Table 5 presents the distribution of respondents based on their level of knowledge regarding stunting. Among the 57 pregnant women included in the study, the majority demonstrated a poor level of knowledge, accounting for 30 respondents (52.6%). Meanwhile, 21 respondents (36.8%) had a fair level of

knowledge, while only 6 respondents (10.5%) were categorized as having good knowledge. The findings indicate that more than half of the respondents lacked adequate knowledge about stunting and its prevention. The relatively high proportion of respondents with poor knowledge may be associated with limited access to health information, low educational attainment, or insufficient exposure to health promotion activities. Although more than one-third of the respondents demonstrated a fair level of knowledge, the percentage of those with good knowledge remained low. This suggests that comprehensive educational interventions are still needed to improve maternal understanding of stunting. Increasing knowledge among pregnant women is important because it may influence health-related behaviors and contribute to better maternal and child health outcomes.

Table 6. Pregnant Women's Knowledge About Stunting After Receiving Education Using Leaflets

Knowledge Level	f	%
Good	49	86
Fair	5	8.7
Poor	3	5.3
Total	57	100

Table 6 presents the distribution of respondents based on their level of knowledge after the intervention. The results show a marked improvement in maternal knowledge regarding stunting. The majority of respondents, 49 individuals (86%), were categorized as having good knowledge. Meanwhile, 5 respondents (8.7%) had a fair level of knowledge, and only 3 respondents (5.3%) remained in the poor knowledge category. These findings indicate a substantial increase in the proportion of respondents with good knowledge compared to the pre-intervention condition. The decrease in the number of respondents with fair and poor knowledge suggests that the educational leaflet intervention was effective in improving maternal understanding of stunting prevention. The results highlight that providing structured health education materials can significantly enhance knowledge among pregnant women. However, a small proportion of respondents still demonstrated limited knowledge after the intervention, indicating the need for repeated education and complementary health promotion strategies to ensure more comprehensive understanding across all participants.

Table 7. A One-Group Pretest-Posttest Design was Used to Measure Knowledge Change Before and After the Leaflet Intervention for Pregnant Women

Knowledge Level	Knowledge Level				p-value Spearman
	Before		After		
	f	%	f	%	
Good	6	10.5	49	86	0,000

Fair	21	36.8	5	8.7
Poor	30	52.6	3	5.3
Total	57	100	57	100

Table 7 presents the comparison of maternal knowledge levels before and after the educational leaflet intervention. Prior to the intervention, most respondents had a poor level of knowledge (52.6%), followed by fair knowledge (36.8%), and only 10.5% demonstrated good knowledge. After the intervention, there was a substantial improvement, with the majority of respondents (86%) achieving a good level of knowledge, while only 8.7% remained in the fair category and 5.3% in the poor category. The statistical analysis using Spearman's test showed a significant difference in knowledge levels before and after the intervention, with a p-value of 0.000. This indicates that there is a statistically significant relationship between the leaflet intervention and the increase in maternal knowledge about stunting. The findings suggest that the educational leaflet was effective in improving respondents' understanding, highlighting the importance of health education media in enhancing maternal knowledge. These results support the effectiveness of simple educational interventions in public health promotion.

Discussion

Pregnant women's knowledge before receiving education about stunting using leaflets based on table 5, most pregnant women have a low level of knowledge about stunting (52.6%), almost half have sufficient knowledge (36.8%), and a small number have good knowledge (10.5%). The results of a study conducted the effect of important leaflet education media (stunting prevention) on the knowledge of pregnant women at the weekarou health center in west sumba regency obtained an average score of 59.3% before the provision of leaflet education media (Nurhidaya & Ghita, 2026). There are several factors that influence knowledge, including education, sources of information, experience, socio-cultural factors, economic factors, the environment, and age (Andayani et al., 2024). Knowledge is closely related to education, whereby it is expected that someone with a higher level of education will have broader knowledge. In addition, there are information sources that can have a short-term influence, resulting in changes or increases in knowledge (Marhaeni, 2024). Advances in technology have led to the availability of various mass media that can influence public knowledge about new innovations. As a means of communication, various forms of mass media such as television, radio, newspapers, magazines, and others have a major influence on the formation of people's opinions and beliefs (Angraini, 2023).

Based on the theory presented, the researcher assumes that before being given education about stunting using leaflets, the level of knowledge of pregnant women was in the low category, indicating that pregnant women lacked knowledge about health issues, especially stunting in toddlers (Darmawati, 2025). Of the 15 questions asked, many mothers did not know the effects of stunting and how to prevent stunting during pregnancy. Based on their highest level of education, it was found that almost half of the pregnant women who

were respondents had only a primary school education. This was one of the factors that influenced the level of knowledge of pregnant women before they were given education about stunting (Andrestian, 2023).

In addition, pregnant women also never receive specific information about stunting, including its causes, effects, characteristics, and prevention measures that can be taken during pregnancy. Almost all pregnant women are aware of stunting in terms of its definition alone (Lase, 2023). It can therefore be concluded that the lack of knowledge among pregnant women prior to receiving education is due to their level of education and their lack of knowledge about stunting (Sanas & Resky, 2025). However, nearly half of pregnant women with sufficient knowledge and a small portion of pregnant women with good knowledge may also be influenced by the educational level of the pregnant women, with a small portion having completed high school and a small portion having completed Collage. Additionally, they may have obtained information about stunting from health workers, neighbors, and television (Anggraeni, 2023).

Table 6 shows that the knowledge of pregnant women has changed, with almost all categorized as good (86%), a small portion as sufficient (8.7%), and a small portion as poor (5.3%). Knowledge can be obtained by receiving information through educational activities. Through education, the community can receive information that can increase their knowledge in that field so that they are able to do what they want without harming themselves. There are factors such as experience, socio-culture, economy, and environment that can influence a person's knowledge (Putri et al., 2024). Experience as a source of knowledge is a way to obtain true knowledge by repeating the knowledge gained in solving problems encountered. Socio-culture is the social structure and cultural patterns in a society. According to researchers, the improvement in mothers' knowledge after receiving education was influenced by the provision of information to pregnant women about the meaning of stunting (Sulisnadewi, 2026).

Table 7 shows the cross-tabulation results of this study, which found that only 6 pregnant women (10.5%) had good knowledge about stunting before receiving education using leaflets, while after education, 49 pregnant women (86%) had good knowledge. In this study, the Spearman statistical test was used, yielding a significant p-value = $0.000 < \alpha (0.05)$, indicating that there was a significant difference between the knowledge of pregnant women before and after receiving education about stunting using leaflets. Leaflets provide benefits to the community. According leaflets are a learning resource; learning objectives with the help of media will produce better learning processes and outcomes than without the help of media (Viviana & Kurniasari, 2024). Posters and leaflets make it easier to convey and receive information or educational material (Ramadhaniyati, 2026). There are advantages to leaflets according to including that the material can be designed in such a way, with various images, colors, and unique designs, can be stored for a long time, and is easy to carry (Adam et al., 2024).

The change in knowledge among pregnant women before and after education was due to the provision of health information about stunting using a perception-based approach, namely the Health Belief Model, which is a health

issue associated with perceived severity of the effects of stunting, thereby changing the behavior of mothers to prevent stunting during pregnancy (Syarif, 2025). In addition, during the study, researchers observed that changes in knowledge among pregnant women were also supported by the media used (Asdam, 2025). All pregnant women were enthusiastic about the activities because researchers had previously explained the benefits of the study before conducting it (Nurchayani, 2024). Stunting prevention efforts are essential for mothers to have children with healthy growth and development. In order to achieve sustainable changes in the knowledge of pregnant women, it is important to consider several factors that influence the level of knowledge of mothers, which must be supported comprehensively (Khairunnisyah, 2024). The active involvement of pregnant women, health workers, and families plays a key role in achieving effective stunting prevention outcomes because behavior change is not only influenced by information exposure but also by consistent support and reinforcement within the family and community environment (Erfina, 2025). The improvement in maternal knowledge observed in this study may therefore be attributed to the combined influence of educational materials and social support, which together enhance understanding and motivation to apply stunting prevention practices (Widyarni, 2026).

CONCLUSION

Based on the results of the discussion, it can be concluded from this study that there was a change in the knowledge of pregnant women before and after being given education about stunting using leaflets. Before receiving education using leaflets, the knowledge of pregnant women in Arjasa Village in 2024 was mostly in the poor category. After receiving education using leaflets, the knowledge of pregnant women in Arjasa Village in 2024 was almost entirely in the good category. There was a difference in the knowledge of pregnant women about stunting before and after receiving education using leaflets. With this research, local health workers, especially midwives, can increase their knowledge by using leaflets as a method of educating the community, as this will make it easier for the community to understand the content and education provided. This research can be used as an additional source of information by students at the Malang Ministry of Health Polytechnic when providing education about stunting using leaflets. In addition, this study contributes to the existing literature and public health practices by providing evidence that leaflet-based education can effectively enhance maternal knowledge and awareness in stunting prevention efforts. If future researchers wish to conduct similar research, they are advised to use a combination of other health education media used in this study. The results of this study can be used as preliminary research data.

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