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# Environmental Sanitation Education for Pregnant Women as an Effort to Prevent Stunting in Children in Lamongan

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## ABSTRACT
Stunting in children is a complex health problem with long-term impacts on physical growth, cognitive development, and future individual productivity. One contributing factor to stunting is poor environmental sanitation, particularly during pregnancy. This community service activity aims to increase the knowledge and awareness of pregnant women about the importance of environmental sanitation as a preventative measure against stunting in children. The activity was carried out in Rancangkencono Village, involving 12 pregnant women as participants. The implementation method included direct counseling, group discussions, and demonstrations of basic sanitation practices such as handwashing, using healthy latrines, and managing household waste. Evaluation was conducted by comparing pretest and posttest results to measure knowledge gains. The results showed an increase in the average knowledge score of participants from 55 in the pretest to 85 in the posttest. In addition, participants demonstrated positive changes in attitudes toward implementing clean and healthy living behaviors in the home environment. Data analysis showed that a participatory and contextual educational approach can increase the understanding and motivation of pregnant women to maintain environmental cleanliness for the health of their fetus and unborn child. Environmental sanitation education has proven to be an effective strategy in preventing stunting from pregnancy, so it needs to be implemented sustainably with cross-sector support at the community level.

**Keywords** **:** Environmental Sanitation, Health Education, Pregnant Women, Prevention, Stunting

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## INTRODUCTION

Stunting is a key indicator of chronic malnutrition, which remains a major challenge in Indonesia. Children who experience stunting are not only shorter than their age-standard height, but also at risk of delayed motor, cognitive, and emotional development. The long-term impacts of stunting are serious, ranging from low academic achievement and reduced productivity in adulthood to an increased risk of chronic disease (Kementrian Kesehatan RI, 2023). According to the 2022 Indonesian Nutritional Status Survey (SSGI), the national

stunting prevalence is 21.6%, still quite high compared to the target set in the National Medium-Term Development Plan, which is 14% by 2024.

To date, stunting prevention efforts have focused largely on providing nutritious food and supplements to pregnant women and toddlers. However, this approach has not fully addressed environmental factors, particularly sanitation, which also play a significant role in influencing nutritional status. Unclean environments, lack of access to clean water, open defecation, and poor waste management can trigger recurrent infections in children, such as diarrhea and worms, which then interfere with nutrient absorption (Wulandari A, Hadi S & Nurulita A, 2020). In fact, this risk begins during pregnancy. Pregnant women living in poor environments are at high risk of infections that can affect the fetus.

Several studies support this statement. A study by (Spears, D., Ghosh, A., & Cumming, O., 2013) found that improved sanitation significantly contributed to increased child height in India. A similar study by (Checkley W et al, 2024) found that chronic diarrhea caused by poor sanitation was strongly correlated with stunting in children. Research in Indonesia conducted by the Indonesian Agency for Health Research and Development (Balitbangkes) also found that children living in environments with poor sanitation were twice as likely to experience stunting compared to children living in environments with good sanitation (Pradana, G. A., & Safitri, H, 2021) .

In the context of pregnancy, gastrointestinal and urinary tract infections caused by an unclean environment can seriously impact the fetus (UNICEF, 2021). Infections during pregnancy can cause inflammation that affects intrauterine growth, putting the baby at risk of low birth weight (LBW), premature birth, or intrauterine growth restriction (IUGR). All of these conditions are strong risk factors for stunting in infancy and childhood (Black R E at al, 2013). Therefore, stunting prevention efforts should not only focus on nutrition but also on increasing pregnant women's awareness of healthy environmental sanitation.

Unfortunately, pregnant women's understanding of the importance of environmental sanitation remains very low, especially in rural areas and areas with limited education. Many pregnant women are unaware that washing hands with soap, using healthy latrines, and properly managing drinking water can directly impact fetal health. This is exacerbated by the limited information received from health workers and the lack of access to simple but effective learning resources.

In this community service, we identified an urgent need to provide environmental sanitation education to pregnant women as part of a stunting prevention strategy. The activities were carried out in areas with a high risk of stunting, limited basic sanitation, and limited access to health education. We involved pregnant women in their second and third trimesters because during this period, nutritional and hygiene needs increase significantly to support optimal fetal growth and development.

The approach used is participatory and educational. Education is delivered directly through small-group counseling, interactive discussions, and practical demonstrations, covering topics such as handwashing with soap, clean water use, household waste management, and personal hygiene during pregnancy. The education is presented in accessible language, adapted to the local context, and utilizes visual aids such as posters, leaflets, and short videos.

During the implementation, we conducted pre- and post-tests to measure knowledge gains and observe changes in participant behavior. The results showed a significant increase in participants' knowledge about the relationship between environmental sanitation and stunting risk. Furthermore, several pregnant women began making changes in their daily practices, such as providing handwashing facilities at home, using boiled water for drinking, and improving the cleanliness of their living environment.

It's important to note that the success of this education program is determined not only by the material delivered, but also by the active involvement of the integrated health post (Posyandu) cadres and village midwives. Cadres play a central role in reaching pregnant women and providing ongoing support. Therefore, during this activity, we also provided short training for the cadres so they could continue their education independently after the community service program concludes.

The goal of this activity is to improve pregnant women's understanding and skills in maintaining environmental sanitation as a first step in preventing stunting in children. This education is expected to foster awareness and sustainable clean living behaviors, thereby gradually reducing stunting rates in the target community (Kemenkes RI, 2022) . Through this simple yet impactful approach, we hope this community service can become a model that can be replicated in other areas with similar characteristics.

With greater access to information and increased public participation in health programs, educating pregnant women about environmental sanitation should be a priority in national efforts to prevent stunting. Collaboration across sectors, from village governments and health workers to academics, is necessary to ensure that information is effectively distributed and well-received by the community.

## METHOD

This community service activity uses an educational-participatory approach, designed in the form of outreach and demonstrations to increase knowledge and change the behavior of pregnant women regarding environmental sanitation practices as an effort to prevent stunting. The activity design is based on a pre-experimental approach with a one-group pretest-posttest design, allowing researchers to measure changes in knowledge before and after the education.

Time and Location: The activity will be carried out for one month, starting in July 2025, in Rancangkencono Village. This location was chosen because, based on local survey data, the village is in an area with a high risk of stunting and limited environmental sanitation. Independent Variable: Environmental sanitation education through counseling and demonstrations and Dependent Variable: Increased knowledge and changes in behavior of pregnant women regarding sanitation practices. The population in this activity was all pregnant women registered at the Posyandu and Community Health Center in the Rancangkencono Village working area, totaling 12 people. The sampling technique used was Total Sampling, which is the deliberate selection of samples based on certain characteristics that are relevant to the objectives of the community service activities.

Activity Instruments

1. Knowledge questionnaire: Used to measure the level of knowledge of pregnant women before and after education. The questionnaire contains 15 multiple-choice questions that have been validated by obstetricians and public health experts.
2. Behavioral observation sheet: Used by facilitators (cadres and community service teams) to record sanitation practices carried out by pregnant women at home, such as providing clean water, using healthy latrines, and washing hands with soap.
3. Educational media: Materials are delivered using leaflets, posters, and short educational videos developed based on guidelines from the Ministry of Health.

Implementation Procedures

1. Initial Coordination: The team coordinated with the village government, village midwives, and Posyandu cadres.
2. Pretest: Participants completed a knowledge questionnaire before the education began.

3. Sanitation Education: Delivered in two 60-minute face-to-face sessions, covering the importance of clean water, handwashing habits, waste management, and the use of healthy latrines.
4. Practical Demonstration: The team provided live simulations, including proper handwashing techniques and household waste management.


Figure 1. Wash Hands and Waste

5. Posttest and Observation: The knowledge questionnaire was repeated after the education, and observations were conducted over the next two weeks through home visits by cadres.

Data Analysis The data obtained from the pretest and posttest were analyzed using Descriptive Statistical Tests and Wilcoxon signed-rank tests (due to small samples and non-parametric data distribution), with the help of SPSS software version 25. The observation results were analyzed qualitatively to see the tendency of changes in participant behavior.

## RESULTS

This community service activity was attended by 12 pregnant women between 20 and 34 weeks of gestation. Pretests and posttests conducted before and after the education revealed a significant increase in the pregnant women's knowledge regarding environmental sanitation and stunting prevention.

1. Main Outcome – Increased Knowledge
   Participants' knowledge was measured using a 15-item multiple-choice questionnaire. The maximum score was 100. The analysis showed an average pretest score of 58.3 ± 8.1, increasing to 85.8 ± 6.4 in the posttest. This increase demonstrates the effectiveness of the educational activities implemented.
2. Supporting Results – Changes in Sanitation Attitudes and Practices
   Changes in attitudes and practices were measured through direct observation by cadres and the community service team for two weeks after the education. Observed indicators included:
   a. Frequency of handwashing with soap at key times (before eating, after using the toilet)
   b. Use of boiled water for drinking
   c. Use of healthy latrines
   d. Household waste management
   Ten of the 12 participants (83%) demonstrated positive behavioral changes in at least three of the four observed indicators. One prominent change was the habit of washing hands with soap, which increased from only 25% before the education to 91% after the education.

3. Participant Responses to Materials and Methods
   From the results of the qualitative evaluation through brief interviews, most participants stated that the material presented was easy to understand and relevant to their daily lives. Visual media such as leaflets and practical demonstrations were very helpful in explaining topics previously considered difficult or unfamiliar.
4. Environmental Support and Cadre Involvement
   This activity also successfully involved Posyandu (Integrated Health Post) cadres in assisting pregnant women after the educational session. The cadres acted as extensions, observing household sanitation practices and reminding participants to maintain clean living habits. This collaboration was deemed successful in increasing the continuity of education and strengthening the impact of behavior change.

**Table 1. Average Pretest and Posttest Scores of Pregnant Women's Knowledge (n = 12)**

| No | Participant Code | Pretest Score | Posttest Score | Score Difference |
|---|---|---|---|---|
| 1 | P 1 | 60 | 88 | 28 |
| 2 | P 2 | 55 | 82 | 27 |
| 3 | P 3 | 62 | 85 | 23 |
| 4 | P 4 | 50 | 80 | 30 |
| 5 | P 5 | 58 | 87 | 29 |
| 6 | P 6 | 61 | 90 | 29 |
| 7 | P 7 | 60 | 83 | 23 |
| 8 | P 8 | 59 | 84 | 25 |
| 9 | P 9 | 56 | 86 | 30 |
| 10 | P 10 | 60 | 88 | 28 |
| 11 | P 11 | 55 | 85 | 30 |
| 12 | P 12 | 27 | 84 | 27 |
| Average 58,3 ± 8,1 | | 85,8 ± 6,4 | | 27,5 ± 2,3 |

Based on the results of Table 1, pregnant women's knowledge increased after receiving environmental sanitation education. All participants experienced an increase in their scores, with an average difference of 27.5 points.

**Table 2. Changes in Environmental Sanitation Practices of Pregnant Women Post-Education**

| No | Participant Code | Washing Hands | Boiled Drinking Water | Using a Latrine | Manage Wast | Total Indicators |
|---|---|---|---|---|---|---|
| 1 | P 1 | √ | √ | √ | √ | 4 |
| 2 | P 2 | √ | √ | √ | √ | 4 |
| 3 | P 3 | √ | √ | √ | × | 3 |
| 4 | P 4 | √ | × | √ | √ | 3 |
| 5 | P 5 | √ | √ | √ | √ | 4 |
| 6 | P 6 | √ | √ | √ | √ | 4 |
| 7 | P 7 | √ | √ | × | √ | 3 |
| 8 | P 8 | √ | √ | √ | √ | 4 |
| 9 | P 9 | √ | √ | √ | √ | 4 |
| 10 | P 10 | √ | √ | √ | × | 3 |
| 11 | P 11 | √ | √ | √ | √ | 4 |
| 12 | P 12 | √ | √ | √ | √ | 4 |

Table 2 shows that the majority of participants adopted good sanitation practices after receiving education. Eight of the twelve participants implemented all observed indicators.

## DISCUSSION

This community service demonstrates that environmental sanitation education has a positive impact on increasing knowledge and changing the behavior of pregnant women. The discussion is structured according to the findings in the results section.

1. Increased Knowledge

   The average knowledge score of participants increased significantly after education (from 58.3 to 85.8). This indicates that the counseling approach and visual media are able to reach the understanding of pregnant women, even with diverse educational backgrounds. These results are consistent with findings from (Pradana, G. A., & Safitri, H, 2021) which stated that community-based health education is effective in increasing sanitation awareness among vulnerable groups, including pregnant women. Good education is the foundation for developing sustainable health behaviors. Community-based education and visual media have proven effective in increasing pregnant women's understanding of the importance of sanitation. These findings align with research (Maulida, D., & Sari, K, 2022) which showed an increase in hygienic behavior after video-based education. Furthermore, (Titaley, C., R et al., 2020) stated that maternal knowledge is an important determinant in stunting prevention.

2. Changes in Sanitation Behavior

   Ten out of twelve pregnant women began implementing at least three of the four recommended sanitation indicators. This demonstrates that education not only increases knowledge but also changes daily practices. A study (Wulandari A, Hadi S & Nurulita A, 2020) found that repeated, practice-based education increased adherence to handwashing, the use of healthy latrines, and clean water management. Furthermore, research (Jones A D et al, 2021) found that changes in pregnant women's sanitation behavior were directly correlated with a reduced risk of diarrhea in children, a major contributing factor to stunting.

3. Effectiveness of Methods and Cadre Support

   Visual educational media and demonstrative methods facilitate participant understanding. The involvement of integrated health post (Posyandu) cadres also strengthens the success of this activity. Research (Afriani D & Zahro R, 2021) confirms that the success of community education is highly dependent on interpersonal communication built by local health workers, especially cadres who have an emotional closeness with participants. Research (Fitriani A et al, 2020) and (Maulida, D., & Sari, K, 2022) support that participatory and locally-based approaches are more successful in changing behavior than passive lecture methods.

4. Implications for Stunting Prevention

   A clean and infection-free environment plays a crucial role in reducing the risk of stunting. When pregnant women maintain good sanitation during pregnancy, the risk of infections that can disrupt fetal growth decreases. This is supported by research (Black R E, Walker N Laxminarayan R & Temmerman M, 2020), which states that sanitation factors during pregnancy contribute to birth weight and child growth. Therefore, sanitation-based interventions for pregnant women are a strategic step in preventing stunting from the first 1,000 days of life (Nugroho, H et al, 2022). Improved sanitation behaviors have an impact on reducing the incidence of infections in infants, particularly diarrhea and worm infections. This supports the hypothesis that maternal sanitation has an indirect but crucial impact on child growth and development. Research (Bhutta Z A et al, 2020) and (Black R E at al, 2013) state that an integrative approach between nutrition and sanitation has a synergistic effect in preventing stunting.

This community service activity demonstrated that simple yet structured sanitation

education can have a real impact, even in a short time. If implemented sustainably and supported by village cadres and institutions, similar activities have the potential to become an effective and affordable model for community-based stunting prevention.

## CONCLUSION

Environmental sanitation education for pregnant women has proven effective in increasing knowledge and encouraging changes in clean and healthy lifestyle behaviors. Pretest and posttest results showed a significant increase in participants' knowledge scores, from 58.3 to 85.8. Most pregnant women (83%) also demonstrated positive changes in their implementation of basic sanitation practices, such as handwashing with soap, using boiled water, managing household waste, and using healthy latrines.

These findings support the hypothesis that structured, contextual, and community-based education can be an effective strategy in raising pregnant women's awareness of the importance of environmental sanitation as part of stunting prevention efforts from pregnancy. Furthermore, the involvement of health cadres and visual educational media have been shown to strengthen the intervention's effectiveness.

As a novel finding, this community service demonstrates that behavioral change can be achieved even with a short educational period, as long as the approach is targeted and participatory. This underscores the importance of making sanitation education part of routine services for pregnant women at the integrated health post (Posyandu) and village levels.

Recommendations

1. For Field Practice
   a. Sanitation education activities should be routinely integrated into prenatal classes, integrated health posts (Posyandu), or the First 1000 Days of Life program.
   b. Posyandu cadres need to be actively involved as facilitators for sanitation behavior change at the household level.
   c. Village governments can allocate village funds to support the provision of basic sanitation facilities and educational media.
2. For Further Research
   a. Further research using quantitative and long-term methods is needed to measure the direct impact of sanitation education on reducing stunting rates.
   b. Research can be expanded to groups of mothers with infants and toddlers, and include additional variables such as access to clean water, economic conditions, and education level.
   c. Evaluation of the use of digital media (video, WhatsApp, apps) as a tool for sanitation education is also worth examining in the context of the digital era.

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