

The Effectiveness of Nutrition Education Programs in Preventing Stunting Among Pregnant Women in Surabaya City

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ABSTRACT

Purpose: This study aimed to explore the effectiveness of nutrition education programs in preventing stunting among pregnant women in Surabaya by employing a qualitative approach.

Subjects and Methods: The study utilized interviews and focus group discussions with pregnant women who participated in structured nutrition education sessions.

Results: Findings revealed that while participants demonstrated increased knowledge about the importance of maternal nutrition, barriers such as economic constraints, lack of social support, and limited access to affordable nutritious food hindered sustained behavioral changes. Social support from family members and community health workers emerged as a critical enabler, providing motivation and practical assistance in maintaining dietary adjustments. Practical strategies like hands-on food preparation demonstrations further strengthened participants' confidence in adopting healthy behaviors.

Conclusions: This study contributes to the existing literature by providing context-specific insights into barriers and enablers of dietary change and by emphasizing the importance of multi-sectoral strategies that incorporate social support and economic access. Addressing these challenges is vital for achieving sustainable maternal and child health improvements.

INTRODUCTION

Stunting, a significant public health issue, represents chronic undernutrition during the critical periods of growth and development. Its implications include delayed physical growth, cognitive impairment, and increased susceptibility to disease, profoundly affecting individuals' quality of life and a nation's socio-economic progress. Globally, stunting is recognized as a barrier to achieving sustainable development goals, particularly in health, nutrition, and education sectors (WHO, 2023). Indonesia, despite remarkable progress, still grapples with this challenge, albeit with notable regional success stories like Surabaya City.

Surabaya, Indonesia's second-largest city, has made remarkable strides in reducing stunting. Between 2021 and 2023, the prevalence of stunting in Surabaya decreased from 28.9% to an unprecedented low of 1.6%, outperforming both national and regional targets. This success is attributed to comprehensive intervention strategies spanning education, healthcare, and

community engagement. The city's efforts exemplify the potential of localized, data-driven approaches in combating stunting (Rizkiah, 2023; Wang et al., 2024).

Pregnant women play a pivotal role in preventing stunting, given that nutritional deficiencies during pregnancy are a primary risk factor for fetal growth restrictions and subsequent stunting. Nutrition education programs targeting this demographic are critical. They aim to empower women with knowledge about balanced diets, micronutrient supplementation, and the importance of antenatal care, fostering healthier maternal and fetal outcomes. Evidence suggests that such programs can significantly reduce the prevalence of low birth weight and stunting, particularly when integrated with broader public health initiatives (UNICEF, 2023).

In Surabaya, the municipal government's proactive strategies include targeted nutrition education through community health centers (Puskesmas), school-based initiatives, and collaborations with local organizations. For example, programs like Krida Gizi and interventions focused on the "First 1,000 Days of Life" (HPK) provide critical resources and support to expectant mothers and their families. These initiatives are underpinned by rigorous health data collection and community participation, ensuring that interventions are tailored to specific needs (Haldane et al., 2019).

Surabaya's remarkable progress in reducing stunting rates underscores the importance of addressing socio-economic and cultural factors alongside technical health interventions. Despite the city's success, some challenges persist, particularly in tackling the underlying issues that contribute to malnutrition. Socio-economic constraints such as limited income, food insecurity, and inadequate access to health services can significantly hinder the sustainability of nutrition education programs. For instance, while education programs equip mothers with critical knowledge about balanced diets, their effectiveness depends on whether families can afford nutritious foods or have reliable access to healthcare facilities. This demonstrates the need for integrated policies that address these root causes alongside direct interventions (Kainz & Metz, 2019).

In response to these challenges, Surabaya has implemented innovative strategies that blend traditional and modern approaches to maternal nutrition. Programs such as "Krida Gizi" and regular counseling sessions at community health centers (Puskesmas) provide culturally relevant guidance, making nutritional information more relatable for local communities. By involving community leaders, religious groups, and family networks, these initiatives ensure that messages about maternal and child health resonate within the socio-cultural fabric of Surabaya. For example, community volunteers often incorporate traditional food practices, such as local recipes rich in essential nutrients, into educational sessions, which helps bridge the gap between theoretical knowledge and practical application (Gartaula et al., 2020).

Furthermore, Surabaya's focus on pre-pregnancy nutrition and health exemplifies the importance of early interventions. Initiatives requiring health screenings for prospective brides address risks before pregnancy, ensuring that women enter this critical phase in optimal health. These programs involve measuring upper-arm circumference and body mass index to identify potential cases of chronic energy deficiency. Once at-risk individuals are identified, they receive tailored counseling and supplemental nutrition to improve their health outcomes. This proactive strategy, combined with routine antenatal care and support during the "First 1,000 Days of Life," lays a strong foundation for preventing stunting (Clark et al., 2021).

The study's qualitative approach delves into the lived experiences of participants, shedding light on how these programs translate into real-life outcomes. For instance, some participants report adopting healthier eating habits and actively engaging with healthcare providers after attending educational sessions. However, others highlight challenges such as balancing new dietary practices with budgetary constraints or overcoming cultural taboos related to certain foods. These narratives underscore the importance of tailoring interventions to local realities, ensuring that educational programs are both accessible and actionable for all socio-economic groups (UNICEF, 2023).

Surabaya's approach also demonstrates the transformative potential of participatory strategies. By engaging community members as active partners rather than passive recipients, the city has

fostered a sense of collective ownership in tackling stunting. Programs such as the "Kampung Madani" model encourage neighborhoods to take collective responsibility for reducing malnutrition and poverty. This community-driven approach not only enhances program reach but also ensures that interventions are context-sensitive and sustainable over time (de Bruin et al., 2023; Oehring & Gunasekera, 2024).

Finally, the lessons from Surabaya serve as a blueprint for scaling similar initiatives in other urban areas. As countries strive to meet global nutrition targets, replicating Surabaya's participatory, data-driven strategies can significantly enhance outcomes. However, scalability requires continuous investment in education, robust monitoring frameworks, and a commitment to addressing socio-economic disparities.

These measures ensure that gains achieved in cities like Surabaya can be replicated across diverse regions, contributing to broader public health improvements (WHO, 2023; UNICEF, 2023). By situating this study within the dynamic socio-economic and cultural context of Surabaya, it highlights practical solutions for one of the most pressing maternal and child health challenges. Ultimately, addressing the root causes of stunting through sustained education, community engagement, and strengthened health systems will pave the way for a healthier, more equitable future.

The Problem of the Study

Stunting remains a critical public health issue in Indonesia, with its impact particularly severe among vulnerable populations, including pregnant women and children. While national initiatives aim to reduce stunting prevalence, challenges persist at the local level, especially in urban areas such as Surabaya. Despite the city's commendable progress, with stunting rates dropping to 1.6% in 2023, questions remain about the sustainability and comprehensive reach of its programs. Many pregnant women still struggle to apply nutritional knowledge due to socio-economic constraints, cultural barriers, and limited access to consistent resources. These gaps highlight the need to evaluate whether current nutrition education programs effectively empower women to make informed decisions, improve their dietary habits, and ultimately reduce stunting risks for their children. This study seeks to explore these dynamics, focusing on the practical outcomes and barriers within the context of Surabaya's successful yet evolving stunting prevention strategies.

Significance of the Study

This study contributes to the understanding of how localized nutrition education programs impact stunting prevention efforts, offering practical insights into their effectiveness and areas for improvement. For policymakers, the findings provide evidence-based recommendations to enhance program design and delivery, ensuring that interventions are inclusive and sustainable. For healthcare practitioners, the research highlights actionable strategies to bridge the gap between education and practice, particularly in addressing barriers faced by pregnant women. On a broader scale, this study adds to the global discourse on maternal and child health by showcasing Surabaya's innovative approach as a model for other urban areas. The research underscores the importance of integrating community-specific needs and socio-cultural contexts into public health interventions, contributing to the scalability of effective stunting prevention strategies across diverse regions. Ultimately, the study emphasizes the critical role of empowering pregnant women through education and support, fostering healthier generations and advancing public health outcomes.

Limitations of the Study

While this research provides valuable insights into the effectiveness of nutrition education programs in Surabaya, it is not without limitations. Firstly, the study's qualitative approach may limit generalizability, as findings are specific to the participants' lived experiences and the unique socio-cultural context of Surabaya. Secondly, the study relies on self-reported data, which can introduce bias or inaccuracies due to recall errors or social desirability effects. Additionally, the scope is limited to urban pregnant women, potentially excluding perspectives from rural or peri-urban populations, who may face different challenges. Time constraints may have restricted

follow-up with participants to evaluate long-term program impacts. Despite these limitations, the study offers a comprehensive exploration of its objectives and lays the groundwork for future research on stunting prevention in urban settings.

METHODOLOGY

The study employed a qualitative research design with phenomenology and case study methods to explore the lived experiences of pregnant women in Surabaya who participated in nutrition education programs and their perceptions of these interventions' effectiveness. Phenomenology was chosen to uncover the meaning participants assigned to their experiences and examine how their beliefs, daily practices, and cultural norms influenced their responses to stunting prevention strategies. Meanwhile, the case study approach was implemented to examine participants' behaviors and experiences within Surabaya's socio-economic and healthcare context, offering in-depth insights into shared barriers and enablers. Data were collected using a multi-method approach that combined semi-structured interviews, focus group discussions (FGDs) and document reviews to ensure depth, triangulation, and reliability. Semi-structured interviews were conducted with individual participants to explore personal experiences, attitudes, and perceived barriers related to nutrition education programs. These interviews lasted between 30 and 60 minutes and included open-ended questions to encourage reflective and detailed responses. FGDs with six to eight participants facilitated peer interactions and shared socio-cultural reflections, addressing common norms and barriers. Additionally, document reviews were carried out to analyze program reports and statistical health data, providing additional context and supporting the findings from the interviews and FGDs. Data analysis was conducted using thematic analysis, six steps: familiarization with data, generating initial codes, identifying themes, reviewing and defining themes, and synthesizing them into a comprehensive narrative. To ensure credibility and minimize bias, investigator triangulation was applied, with multiple researchers coding and analyzing the data independently and discussing their findings to reach consensus. This systematic approach provided a thorough, contextually rich, and credible understanding of the participants' experiences, motivations, and challenges related to the nutrition education programs.

RESULTS AND DISCUSSION

One of the most significant insights from the study was the gap in knowledge prior to the participants' exposure to the nutrition education programs and how these sessions improved their understanding of stunting. Participants reported that before participating in the program, they lacked awareness about the causes and preventive strategies for stunting.

One participant shared during an interview,

"Before attending the nutrition education class, I didn't know that stunting was caused by poor nutrition during pregnancy. I learned that what I eat can directly affect my baby's growth."

This response demonstrated that the program succeeded in raising foundational awareness about stunting's connection to maternal health and nutrition. Similarly, another participant highlighted a particular area of learning by stating,

"The session on iron and calcium was especially helpful. I didn't know how important these nutrients were. Now I try to eat eggs and milk every day."

These findings align with the literature, suggesting that knowledge-building through structured education programs can lead to better understanding of maternal health risks and strategies to mitigate them (Ellis et al., 2022; Teychenne et al., 2021). Thus, the nutrition education sessions proved effective in increasing knowledge among participants about stunting and its prevention strategies by highlighting nutrient-rich food sources.

Behavioral Changes After Participation in Nutrition Education Programs

Behavioral change was another major area of focus in the study. Participants reported making concrete and positive changes to their diet and daily habits after attending the nutrition education

sessions. These changes included incorporating more vegetables, consuming more iron-rich foods, and adhering to regular eating schedules.

One interview participant stated,

"Since attending the program, I've started to include more vegetables in my diet. I understand that they provide essential vitamins."

Another participant shared during a group discussion,

"Our community health workers taught us about food timing and daily meal planning. I make sure I eat three times a day, with healthy, balanced meals. This program has shown me how important consistency is."

These responses suggest that the education program not only provided information but also encouraged participants to make actionable changes in their dietary routines. This finding supports the idea that providing contextually relevant and practical health advice can translate into real-life changes, as supported by prior studies (Brooks et al., 2022; Archibald et al., 2023).

Barriers to Adopting Nutrition Advice

Although participants reported positive changes and behavioral adjustments, they also identified barriers that limited their ability to consistently apply the advice given during the programs. Economic constraints were frequently mentioned as a challenge. One participant explained,

"Sometimes, the food is expensive. For example, I want to eat healthy fish, but I can't afford it every week."

Economic difficulties underscore the limitations faced by low-income families in accessing healthy food options, a barrier that has been well-documented in other studies (Garrity et al., 2024; Odoms-Young et al., 2023). In addition to financial barriers, participants reported socio-cultural challenges, including the lack of spousal support. One participant in the focus group explained,

"Our husbands or other family members are not always supportive. I try to eat better, but when my husband brings unhealthy snacks home, it's difficult to resist."

These barriers suggest that while education can increase awareness, external factors such as financial constraints and familial dynamics play a significant role in limiting participants' ability to implement advice fully. These findings highlight the importance of addressing structural and cultural barriers alongside nutrition education.

Social Support and its Role in Program Effectiveness

Participants emphasized that social support was a key factor influencing their ability to engage with the advice offered by the nutrition education program. Support from partners, family members, and community health workers appeared to strengthen motivation and adherence to healthier dietary practices.

One participant reflected on this by stating,

"My sister came with me to the session. She is always supporting me, and now she reminds me to eat healthy and take my vitamins."

This demonstrates that having supportive family members can create a more encouraging environment for behavior change. Furthermore, another participant in a focus group mentioned the role of community health workers, stating,

"When the community health workers visit our neighborhood, they involve our husbands too. That makes it easier because they understand the importance of what we're doing."

The findings suggest that including family members in educational sessions and health promotion efforts can lead to better outcomes. Social support and engagement from a participant's close social network were critical motivators that improved adherence to nutrition interventions.

Suggestions for Program Improvement

Participants offered valuable feedback regarding how Surabaya's nutrition education programs could be improved to increase their effectiveness and long-term adherence. One recurring suggestion involved the inclusion of affordable and practical food strategies, particularly for low-income families. One participant said,

"I think it would help if they could show us more affordable food options or have cooking demonstrations to show how we can make healthy meals with local ingredients."

Additionally, participants expressed a desire for sustained support rather than one-time education sessions. A common sentiment was shared in a focus group discussion, where a participant said,

"Sometimes we need more regular sessions and follow-ups. Once the program ends, some of us fall back into old habits."

This feedback aligns with evidence suggesting that long-term and consistent community-based health promotion efforts improve adherence and behavior change (Pardoel et al., 2021; Torres-Vitolas et al., 2023). These insights demonstrate the need to incorporate hands-on workshops, ongoing support, and sustained engagement into future iterations of the program.

Document Review Insights

The document review of health department reports and data provided a macro-level perspective on program trends and outcomes. Analysis of these reports indicated that participation in Surabaya's nutrition education programs increased by 20% over the past year, suggesting growing community engagement and awareness. Moreover, program monitoring data highlighted an improvement in dietary diversity among program participants, especially an increase in the consumption of iron-rich foods like leafy greens, eggs, and fortified foods. These findings correspond with participants' qualitative reports of changes in diet patterns. Additionally, insights from health officials noted that interactive sessions, particularly those including cooking demonstrations and culturally appropriate strategies, were successful in engaging participants and improving adherence to nutrition advice.

DISCUSSION

Improved Knowledge and Understanding of Stunting Prevention

One of the primary findings of this study was that participants reported a significant increase in their understanding of stunting prevention through their participation in the nutrition education program. The participants' narratives indicated a clear awareness of the link between maternal diet and stunting, particularly the role of key nutrients like iron and calcium. This aligns with previous studies showing that knowledge is a critical first step toward behavior change (Aryeetey et al., 2022; Jaisamrarn et al., 2023; Nurhaeni et al., 2024).

This study contrasts with previous research that has shown inconsistent results regarding the level of knowledge among pregnant women in urban areas (Ding et al., 2021; Wulandari & Laksono, 2020). While some studies suggest that awareness campaigns have a limited effect unless paired with structural support, this study reveals that even short-term programs can lead to substantial shifts in knowledge when they are contextually tailored and practical. The use of culturally relevant strategies, such as incorporating local food examples and daily dietary tips, appears to enhance understanding and engagement among participants.

For instance, participants shared insights like, "Before attending the nutrition education class, I didn't know that stunting was caused by poor nutrition during pregnancy," and "The session on iron and calcium was especially helpful." These responses indicate that contextual education successfully filled knowledge gaps and empowered participants to make informed choices about their health. Thus, this study contributes to filling the literature gap by demonstrating how localized, practical approaches to nutrition education can effectively improve maternal health knowledge.

Behavioral Changes and Dietary Adaptations

Another significant outcome of the study was the reported behavioral changes related to diet among the participants. Behavioral shifts, such as increased vegetable consumption and incorporating iron-rich foods into daily routines, point toward the success of the education program in translating knowledge into action. This finding supports the notion that health education can result in positive dietary practices when it addresses key practical aspects of food choices (Monterrosa et al., 2020; Ensaff, 2021).

Similar findings have been reported by other researchers. For example, Beulen et al. (2020) emphasize that interventions focusing on daily nutrient consumption lead to measurable improvements in pregnant women's health behaviors. However, a key distinction in this study is the acknowledgment of socio-economic barriers that affect the sustained application of these changes. Participants indicated challenges such as affordability and family attitudes toward diet as impediments. This suggests that knowledge alone is insufficient unless it is supported by systemic changes that address economic and social factors.

Participants' responses like *"Sometimes, the food is expensive"* and *"Our husbands or other family members are not always supportive"* highlight these challenges. This finding expands the literature by emphasizing that program outcomes depend not just on knowledge dissemination but on the ability to address contextual barriers. These insights contribute to a broader understanding of how programs can move beyond education to include structural and social interventions.

Barriers to Full Implementation of Nutrition Advice

A key barrier identified in this study was economic hardship, as well as the lack of social support. Economic constraints, such as the affordability of iron-rich foods like fish and dairy, restricted participants from consistently implementing advice. This aligns with previous research by Vilar-Compte et al. (2021), who suggest that poverty significantly impacts dietary diversity and access to nutrition. Additionally, participants identified the lack of spousal or family support as a major barrier, with some noting the difficulty of resisting unhealthy food options introduced by family members.

These findings underscore the need for multi-sectoral strategies in addition to education. Although education programs can raise awareness and teach strategies, they must be paired with community-based support systems and policies addressing food affordability. This study contributes by emphasizing the interaction of economic hardship, socio-cultural norms, and knowledge in shaping the implementation of dietary advice, offering a nuanced understanding of the barriers pregnant women face in Surabaya.

Social Support as a Catalyst for Change

The findings highlighted that social support significantly impacted participants' ability to adopt healthier behaviors. Participants reported that family members and community health workers facilitated positive change by reinforcing the advice given in the nutrition education sessions. This finding aligns with the Social Cognitive Theory, which posits that individuals' health behaviors are influenced by their social environment (Schunk & DiBenedetto, 2020). This study further adds evidence to the literature by showing that both family involvement and community health initiatives strengthen motivation and adherence.

For instance, participants shared that having family members attend the sessions with them and having health workers directly engage with their spouses had a positive impact. One participant stated,

"My sister came with me to the session. She is always supporting me, and now she reminds me to eat healthy."

These findings suggest that integrating family members and community networks into program designs can enhance their long-term success.

Addressing Gaps in the Existing Literature

This study has made notable contributions to addressing gaps in the existing body of research. Prior studies on maternal nutrition have focused on quantitative measures of behavioral change

(Strasser et al., 2021; Wu et al., 2020), often neglecting the qualitative insights that capture personal experiences, perceptions, and barriers. This study adopted a qualitative approach that provided a deeper understanding of the participants' lived experiences and allowed for a richer analysis of contextual factors influencing behavior change.

For example, while previous studies have documented changes in dietary intake through intervention programs, they often do not explore how socio-economic barriers like affordability and lack of familial support mediate these changes. This study directly addresses this gap by identifying these barriers and linking them to participants' experiences. Furthermore, the findings suggest that interventions that incorporate local food demonstrations and practical strategies tailored to the local context can have a profound effect on knowledge and behavior.

Moreover, this study expands the literature by highlighting the role of sustained social support and engagement from family members and community health workers in maintaining positive health behaviors over time. While previous studies have focused primarily on the educational component of interventions, this study illustrates the importance of long-term follow-ups, family inclusion, and affordable solutions for sustained behavior change.

CONCLUSION

This study has provided important insights into the effectiveness of nutrition education programs in preventing stunting among pregnant women in Surabaya by employing a qualitative approach that captured participants' lived experiences. The research highlighted that while knowledge about maternal nutrition significantly improved among participants, persistent barriers such as economic hardship and limited social support impeded full adherence to dietary changes. Economic challenges, particularly the high cost of nutritious food, and the lack of familial involvement were identified as major obstacles restricting the ability of pregnant women to translate knowledge into consistent behavior change. Additionally, the study emphasized the role of social support networks, including family members and community health workers, in motivating and reinforcing positive health behaviors. Moreover, findings revealed that practical, hands-on strategies, such as family involvement and tailored learning methods, significantly enhanced motivation and facilitated behavior change. By addressing socio-economic and cultural barriers, this research fills existing gaps in the literature by contextualizing the factors affecting maternal dietary behaviors in Surabaya. It advocates for multi-sectoral strategies that incorporate education, economic assistance, and social support interventions to remove barriers and ensure sustainable health improvements. The findings call on policymakers and health practitioners to design comprehensive, context-specific programs that extend beyond merely disseminating knowledge to include practical solutions and community engagement to improve maternal and child health outcomes.

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