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Community Perspectives on the Contributions of Village Officials, Health Cadres, and Mothers in Stunting Prevention: A Qualitative Study in Ngijo Village, Indonesia

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ABSTRACT

Introduction: Stunting among children under five years old remains a critical public health issue in Indonesia, with long-term consequences for cognitive development, physical growth, and future productivity. Addressing this challenge requires strong community engagement, particularly in rural areas with limited access to health services. This study employed a qualitative design, using semi-structured interviews with village officials, nutrition officers, posyandu cadres, and mothers of children under five in Ngijo Village, Indonesia. Data were analyzed using thematic analysis following Braun and Clarke's framework to explore stakeholder roles, implementation challenges, and expectations regarding stunting prevention and potential digital nutrition tools in Ngijo Village.

Methods: A qualitative design was employed through semi-structured interviews with village officials, nutrition officers, *posyandu* cadres, and mothers of children under the age of five.

Results: Thematic analysis was conducted to identify strategies, challenges, and expectations for digital nutrition applications. Findings revealed that prevention efforts included nutrition education, routine anthropometric monitoring, and supplementary feeding using local resources. Challenges involved limited digital literacy, resistance to counseling, and irregular *posyandu* cadre.

Conclusion: Mothers often accessed nutrition information via YouTube and TikTok, highlighting opportunities for user-friendly digital tools. Strengthening cadre training and integrating digital applications may enhance the sustainability and replication of stunting prevention in rural contexts.

INTRODUCTION

Stunting is a form of chronic malnutrition that affects children's physical growth and cognitive development, especially during the first 1,000 days of life. WHO noted that stunting impacted not only height but also learning capacity and future economic productivity. In Indonesia, although the prevalence of stunting had decreased year by year, challenges in implementing interventions at the community level remained high. Indonesia has set a national target to reduce stunting prevalence to 14% by 2024; however, the rate remains relatively high (1). A multisectoral

approach that engages families, communities, and local governments is essential for sustainable stunting prevention (2).

Preventive efforts require cross-sectoral interventions, ranging from village-level policies, primary health care services, and support from posyandu cadres, to the active involvement of mothers of under-five children in feeding practices. Community-based approaches had proven effective in improving children's nutritional status. Community-based nutrition education and rehabilitation have been shown to empower families and contribute to significant reductions in stunting rates (3,4). In addition, training health cadres and utilizing digital technologies such as nutrition monitoring applications have been reported to support monitoring processes and information access in various community health settings (5,6). Active community involvement in child nutrition programs has been shown to improve intervention effectiveness and strengthen program sustainability (7,8).

Previous studies have emphasized the importance of a life-course nutrition approach (9) as well as community-based interventions supported by digital technology (10).However, implementation at the village level continues to face challenges. Therefore, this study aims to explore stunting prevention practices in Ngijo Village, with a particular focus on the roles of multiple stakeholders and the potential integration of digital nutrition applications.

Needs assessment is carried out as an initial step to despite extensive evidence on community-based stunting prevention and the growing interest in digital health solutions, limited research has explored how stunting prevention practices are perceived and implemented at the village level from the perspectives of multiple community stakeholders. In particular, the roles, interactions, and challenges faced by village officials, health cadres, and mothers in routine nutrition monitoring and intervention remain insufficiently documented in qualitative studies. Furthermore, while digital nutrition applications are increasingly promoted, there is a lack of evidence regarding community readiness, acceptability, and contextual needs before their development or implementation. This study addresses these gaps by conducting a qualitative thematic analysis to examine community-based stunting prevention practices in Ngijo Village, Indonesia, and to identify stakeholder expectations and contextual considerations that may inform future program and digital tool development.

Social and environmental factors such as access to clean water, sanitation, and family economy also influenced the success of interventions. Monitoring nutritional status and feeding practices is recommended as key indicators for evaluating stunting programs (11). Exclusive breastfeeding and appropriate complementary feeding are emphasized as primary strategies for reducing stunting (12). Nutritional interventions are considered more effective when accompanied by a health rights approach and child protection measures (12,13). Therefore, this study aimed to explore the community's perspective in Ngijo Village as part of a locally grounded and sustainable effort to prevent stunting.

METHOD
This study employs a clear and systematic approach to ensure the reliability and validity of the findings. Below are the components of the methodology:

Research Type
This study examined the roles of village officials, health cadres, and mothers in preventing stunting in Ngijo Village. A qualitative design was employed through semi-structured interviews with village officials, nutrition officers, *posyandu* cadres, and mothers of children under five years of age.

Population and Sample/Informants
A purposive sampling approach was adopted and this study involved four groups of informants representing key stakeholders in stunting prevention at the village level. One village official, serving as a local policymaker, was interviewed to explore policies, budget allocation, digital program support, and strategies for institutional sustainability, while a nutrition officer from the community health center (*Puskesmas*) provided professional insights into monitoring, intervention practices, technology use, and the application of nutritional standards. Five *posyandu* cadres were included to represent frontline community health workers responsible for routine growth monitoring, nutrition counseling, and direct interaction with families, and seven mothers of children under five years of age were engaged to capture household-level practices, perceptions, feeding challenges, and readiness to use digital technology.

Research Location

The study is conducted in Ngijo Village, Malang City, East Java, Indonesia. This village represents a community with an active posyandu system and ongoing stunting prevention programs involving village officials, health cadres, and mothers. Ngijo Village is considered relevant for this study because it reflects a semi-urban community where routine nutrition monitoring is implemented, yet challenges related to participation, resource availability, and access to health information remain, making it an appropriate setting to explore community-based stunting prevention practices.

Instrumentation or Tools

Semi-structured interview guides were developed based on a review of relevant literature on community-based stunting prevention and national nutrition program guidelines. The guides were tailored to each participant group (village officials, nutrition officers, posyandu cadres, and mothers) while maintaining a consistent structure to enable cross-case comparison. Key domains included: (1) roles and responsibilities in stunting prevention; (2) routine nutrition monitoring and intervention practices; (3) coordination and support among stakeholders; (4) perceived challenges and enabling factors in program implementation; and (5) expectations and perceived needs related to potential digital nutrition tools. Open-ended questions and probing prompts were used to encourage in-depth responses and clarification.

Framework CFIR

This study uses the Consolidated Framework for Implementation Research (CFIR) framework to interpret contextual factors influencing stunting prevention in Ngijo Village, including intervention characteristics, community needs, organizational capacity, individual perceptions, and implementation processes. Mapping qualitative findings to CFIR domains provides insights into implementation challenges and perceived opportunities for future program and digital tool development.

Data Collection Procedures

Interview recordings were transcribed verbatim in Bahasa Indonesia and subsequently coded using a thematic analysis approach. Thematic analysis was conducted using **Braun and Clarke's six-phase framework**, which is grounded in a **constructivist–interpretivist paradigm** and widely employed in qualitative health research to systematically identify, analyze, and report patterns within textual data. This approach allows both flexibility and methodological rigor in exploring shared meanings across multiple stakeholder perspectives in community-based health settings. The analysis involved data familiarization, initial code generation, theme development, theme refinement, and final theme definition to ensure analytic transparency and credibility. The analysis followed three stages: open coding to identify initial concepts, axial coding to categorize related codes, and selective coding to refine overarching themes. NVivo 12 software was used to facilitate data organization and analysis.

Table 1 Coding Process in Thematic Analysis

Verbatim excerpt	Initial Code	Category	Theme
"We measure children's weight and height every month, and visit homes if they do not come."	Routine anthropometric monitoring	Nutrition monitoring	Nutrition monitoring and intervention systems
"Some cadres are still not confident using mobile applications."	Digital literacy barriers	Implementation constraints	Program implementation challenges
"Some mothers do not believe their child is stunted."	Maternal resistance to diagnosis	Counseling barriers	Program implementation challenges
"I usually look for food ideas on YouTube or TikTok."	Social media use for nutrition information	Digital information sources	Mothers' perspectives on feeding practices and technology

Data Analysis

To ensure trustworthiness, triangulation was applied across different informant groups, and peer debriefing was conducted among the research team during the coding process. Credibility was enhanced by member checking, whereby selected participants reviewed key findings to confirm accuracy. Dependability and confirmability were supported by maintaining a detailed audit trail of coding decisions and analytic memos.

Ethical Approval

This study was approved by ITEKES Bali (Approval Number: 04.167/KEPITEKES-BALI/VI/2025). All participants provided written informed consent before participation after receiving a clear explanation of the study objectives, procedures, potential risks and benefits, and confidentiality measures. Participation was voluntary, and participants were informed of their right to withdraw from the study at any time without consequences.

RESULTS
This study revealed that stunting prevention efforts in Ngijo Village were carried out through the synergy of various stakeholders, each playing complementary roles. The village government contributed through policy and financial support, particularly by allocating village funds for *posyandu* activities and supplementary feeding programs.

Theme 1: Village Strategies and Support in Stunting Prevention
Most village officials stated that the main strategy involved routine education for pregnant women and *posyandu* cadres regarding maternal health and child nutrition. Village funds were specifically allocated to support nutrition programs, including the distribution of supplementary food for pregnant women and children at risk of stunting. The village also expressed a strong commitment to integrating digital technology into program implementation, with plans to provide training for cadres to operate applications. This support is expected to facilitate the integration of digital applications into annual work programs, as perceived by stakeholders, to support program continuity.
"We already have a special budget and continue distributing weekly assistance, especially for pregnant women and children identified as stunted." (Village Official)

Theme 2: Nutrition Monitoring and Intervention Systems
Nutrition monitoring of children in Ngijo Village was conducted regularly, mainly through monthly weight and height measurements, with special focus during February and August when coverage was targeted to reach nearly 100%. Home visits were arranged for children who did not attend *posyandu*, involving local leaders such as the village head to ensure complete coverage. Interventions also included the provision of locally based supplementary feeding (*PMT*) tailored to children with undernutrition or stunting. This monitoring system relied on close collaboration among the *puskesmas*, cadres, and the village government.
"Every month we strive to measure children's weight and height. If someone doesn't attend, we conduct home visits together with village officials." (Nutritionist)

Theme 3: Roles of Nutrition Officers and *Posyandu* Cadres
Nutrition officers played a strategic role in assisting cadres by providing training on anthropometric measurement and offering direct support at *posyandu* sites. They also conducted monitoring and evaluation of nutrition programs. Cadres, as the frontline actors, carried out weighing, provided dietary counseling, and distributed *PMT*. Practical guidance on preparing supplementary food was also provided to enhance mothers' skills at the household level.
"We also accompany cadres with refresher training on measurement, while visiting posyandu and delivering health education to the community." (Nutritionist).

Theme 4: Challenges in Program Implementation
Several key obstacles were identified. First, limited digital literacy among cadres and some mothers hindered the optimal use of technological applications. Second, there was resistance from some mothers in accepting stunting diagnoses for their children, which complicated education and follow-up. Irregular attendance of children at posyandu was **frequently reported** by informants and was perceived to disrupt data completeness and the efficiency of routine nutrition monitoring. In addition, cadres faced difficulties in reaching busy mothers or those who relied heavily on caregivers, which reduced attention to children's dietary practices.
"Sometimes mothers are reluctant to accept when their child is considered stunted, especially those with higher education levels this becomes a challenge for us." (Health Cadre)

Theme 5: Mothers' Perspectives on Feeding Practices and Technology
Mothers of under-five children often turned to digital platforms such as YouTube and TikTok to seek recipes and nutrition information. They managed household budgets carefully but continued striving to meet children's nutritional needs with affordable, child-preferred ingredients. However, feeding difficulties, such as picky eating or refusal to

eat (*gerakan tutup mulut* / GTM), were commonly reported. Mothers expressed the need for practical and simple guidance through applications to help address these challenges and maintain motivation in providing nutritious meals. *"Sometimes I look for recipes on YouTube or TikTok so my child won't get bored and keeps eating."* (Mother of under-five child)

Theme 6: Expectations and Needs for Digital Nutrition Application Features
Informants including health workers, cadres, and mothers, expressed the need for an application capable of providing quick and easy nutrition assessments based on children's weight, height, and age. They expected the app to offer practical local recipes tailored to different age groups, preventing feeding monotony while supporting mothers in planning nutritious meals at affordable costs. Features for monitoring growth progress and reporting data to official health systems were also considered essential for transparency and effectiveness. Ease of use, simple design, and interactive educational content were highlighted as priorities.
"Mothers want an application that is easy to use, can track nutritional status, and provide menu ideas based on locally available ingredients." (Mother of an under-five child).
Ngijo Village implemented stunting prevention strategies through routine education for pregnant women and *posyandu* cadres regarding maternal health and child nutrition. Village funds were allocated to support these programs, including the distribution of supplementary food for pregnant women and children at risk of stunting. The village also encouraged the use of digital technology by providing application training for cadres, thereby strengthening program effectiveness through improved digital literacy.

DISCUSSION

The findings indicate that stunting prevention in Ngijo Village is supported by a community-based monitoring system involving routine anthropometric measurements, home visits, and locally sourced supplementary feeding. These activities are sustained through collaboration between village authorities, community health centres, and posyandu cadres, enabling early detection and follow-up of children at risk of stunting.

Interpretation of Key Findings
The monitoring of child nutritional status in Ngijo Village demonstrated a structured and inclusive approach through monthly weighing and height measurement activities, with special emphasis placed on February and August to achieve nearly 100% coverage. These efforts were reinforced by home visits conducted by posyandu cadres alongside village officials, including the village head, to reach children who did not attend posyandu sessions. Nutritional interventions were complemented by the provision of supplementary food (PMT) sourced from local ingredients, tailored to the needs of children experiencing undernutrition or at risk of stunting. The system operated through close collaboration between the community health centre (puskesmas), posyandu cadres, and village authorities, reflecting a comprehensive multisectoral approach.

Monitoring activities through anthropometric measurements and home visits in Ngijo Village aligned with best practices recommended in recent literature. Early stunting detection at posyandu is facilitated through the five-table system, consisting of registration, weighing, recording, counselling, and supplementary feeding. Home visits are emphasised as a strategy to reach children who are absent, ensuring continuity of monitoring and nutritional interventions. The provision of locally sourced supplementary feeding, supported by training in menu preparation using nutritious local ingredients, aligns with national guidelines that promote local food availability to improve dietary diversity and consumption among vulnerable groups (14). PMT menu training in Ngijo Village, which focused on processing local vegetables and fruits, enhanced cadre capacity and empowered posyandu to deliver contextual and sustainable nutritional interventions (15). From a cross-sectoral collaboration perspective, research indicated that active involvement of village government, health workers, and the community was key to the success of stunting prevention programs, particularly through synergy in data management and field services. This monitoring system was perceived by stakeholders as facilitating early identification and follow-up of children at risk of stunting. while strengthening the role of cadres and health facilities at the village level (16).

Despite the implementation of a robust monitoring system, several challenges were identified, including limited posyandu infrastructure, such as weighing equipment and venue availability, which could affect the quality of monitoring (17). Furthermore, not all cadres had received adequate intensive training, resulting in varied competencies in measurement and record-keeping. Another issue was that some mothers had not optimally utilised

the Child Growth Monitoring Card (KMS) as a tool for tracking child development, indicating a need to raise awareness about the importance of accurate nutritional data. Home visit monitoring required human resources and time, which were sometimes limited. Nevertheless, this practice proved highly effective in reaching children who were at risk of being missed in official records. These activities reflected the sustainability of a proactive, community-based nutritional intervention approach.

Comparison with Previous Studies

Evidence consistently supports the effectiveness of community-based approaches in stunting prevention. Nutrition education and routine growth monitoring have been shown to reduce stunting prevalence in rural areas (18) .Interventions during the first 1,000 days of life are considered critical (19), while community-based early childhood development centres have demonstrated improvements in dietary diversity and reductions in stunting rates (20). Family and community-based strategies also strengthen local health systems (21), early childhood nutrition enhancement is closely linked to human resource development, poverty reduction, and malnutrition prevention (22). Direct nutrition education by health cadres is essential to address inadequate dietary behaviours, particularly in the new normal era, highlighting the importance of community empowerment (23). Training health cadres further improves data accuracy and enhances the effectiveness of nutritional interventions (24). Collectively, these findings confirm that the approach implemented in Ngijo Village aligns with global best practices in community-based stunting prevention.

Previous research reinforces that community-based monitoring of child nutritional status and stunting prevention, as practised in Ngijo Village, is an effective strategy consistent with international standards. Health education and nutritional rehabilitation have been shown to empower families and improve child growth when parents are directly involved (4). Community interventions, improved access to health services, and integrated nutrition education significantly contribute to reductions in stunting rates (3). Access to clean water and adequate sanitation also plays a substantial role in child growth and cognitive development, underscoring the need to integrate nutrition programs with environmental health initiatives (24). Integrated nutrition interventions combining education, growth monitoring, and community-based food supplementation have further demonstrated significant reductions in stunting prevalence (25).

These four studies affirmed that the success of stunting prevention programs depended not only on routine monitoring but also on cross-sectoral synergy, family empowerment, and improved access to essential services that supported child development. The approach adopted in Ngijo Village reflected these principles, making it a model of contextual, inclusive, and sustainable community-based nutrition intervention.

Limitations and Cautions

This study had several strengths. First, it provided a comprehensive overview of community-based stunting prevention by involving multiple stakeholders (village government, health workers, posyandu cadres, and mothers of young children), resulting in diverse perspectives. Second, the qualitative approach enabled an in-depth exploration of participants' experiences, perceptions, and expectations regarding nutritional interventions, including the potential integration of digital applications. Third, the contextual findings from Ngijo Village offered practical insights relevant for developing community-based programs in other rural areas of Indonesia. Fourth, the use of a theoretical framework (acceptability/CFIR) strengthened the validity of data interpretation and facilitated the mapping of findings for program implementation.

However, the study also had limitations. It was conducted in only one village (Ngijo), making the findings not yet generalizable to the broader rural context in Indonesia. The relatively small number of participants did not fully represent the variation in experiences among mothers and cadres in other villages. Additionally, the data were obtained through interviews, which might have been influenced by social desirability bias or participants' tendency to provide normative responses aligned with researchers' expectations. This study provides qualitative insights into community-based stunting prevention practices in Ngijo Village and highlights the roles of multiple stakeholders in nutrition monitoring and intervention efforts. The findings identify key challenges related to cadre capacity, caregiver participation, and digital literacy, while also revealing stakeholder expectations regarding potential digital nutrition applications. Rather than demonstrating the effectiveness of a digital intervention, this study underscores the **perceived needs and contextual considerations** that should guide the design and future evaluation of user-friendly, locally relevant digital nutrition tools to support existing stunting prevention programs.

Recommendations for Future Research

Future studies should focus on addressing the identified limitations. The subsequent research recommendations included a quantitative evaluation of the effectiveness of the digital nutrition application on child nutritional status, the development and pilot testing of a locally tailored application prototype, and a comparative study across villages with differing characteristics to understand contextual factors influencing intervention success. In addition, longitudinal research on behavioural changes among mothers following interventions, participatory action studies to strengthen the capacity of posyandu cadres, and economic analyses of village-based stunting prevention programs were considered essential to reinforce scientific evidence and support data-driven community-level policy development.

CONCLUSION

Stunting prevention in Ngijo Village is carried out through multiparty collaboration involving village officials, health workers, *posyandu* cadres, and mothers of under-five children. The main strategies include the allocation of village funds, routine monitoring of nutritional status, and the distribution of locally sourced supplementary food. However, challenges remain, such as limited digital literacy, reluctance among some mothers to accept their children's nutritional status, and uneven participation in programs.

Therefore, it is recommended that capacity building for cadres through continuous training, improvement of *posyandu* facilities, and the development of simple, interactive, and context-specific nutrition applications be prioritised to ensure program sustainability. Such measures highlight the perceived potential to support inclusivity and community engagement within village-level stunting prevention programs.

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Data curation: An Nisa Fithri, Arti Wardani
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Methodology: Eka Yuni Indah Nurmala
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CONFLICTS OF INTEREST

The authors declare no competing interests.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS:

The authors use the assistance of artificial intelligence (AI) tools, specifically Microsoft Copilot, in supporting the preparation of this manuscript. The AI contributed to language refinement, structuring of academic content, and synthesis of relevant literature, which facilitated clarity and accessibility for an international readership. All interpretations, conclusions, and responsibilities for the content remain solely with the authors.

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