



Capacity Building of *Posyandu* Cadres through Training on an Early Stunting Detection Application in Lombok

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Abstract

Stunting remains a significant public health problem in Lombok, particularly in areas with limited access to formal healthcare services. *Posyandu*, as a community-based health service, plays a strategic role in stunting prevention; however, cadres' capacity for early detection is often limited, especially in utilizing digital technology. This community service program aimed to strengthen the capacity of *posyandu* cadres through training on an early stunting detection application. The program employed face-to-face training sessions, hands-on application practice, and continuous mentoring during routine *posyandu* activities. The results indicated improved knowledge and skills among cadres in digitally interpreting child growth data, as well as behavioral changes toward data-driven recording and decision-making. The use of the application also enhanced communication between cadres and parents regarding nutritional status and stunting risk. Additionally, the program encouraged the emergence of local cadre leaders who actively promoted technology use within *posyandu*. In conclusion, training on an early stunting detection application is an effective approach to strengthening the role of *posyandu* cadres in Lombok. It is recommended that similar programs be scaled up to other areas and supported by the development of user-friendly and offline-capable applications to ensure sustainability.

Keywords

stunting, *posyandu*, health cadres, digital application, Lombok

INTRODUCTION

Stunting remains one of the most persistent public health challenges in Indonesia, particularly in regions with strong rural and semi-rural characteristics such as Lombok (Dinas Kesehatan Provinsi NTB, 2023). Stunting is associated with chronic malnutrition during early childhood and has long-term impacts on physical growth (Bhutta et al., 2020), cognitive development, and future human capital. Although national and regional governments have implemented various stunting prevention programs, early detection at the community level remains suboptimal. In Lombok, *posyandu* serves as the primary platform for monitoring the growth and development of infants and toddlers (Andriani et al., 2022), placing *posyandu* cadres at the forefront of early stunting prevention efforts (Abdulrahman et al., 2021).

Despite their strategic role, *posyandu* cadres in Lombok face several challenges in conducting effective early stunting detection. Based on field observations and partner discussions, growth monitoring activities are still largely dependent on manual recording systems and visual interpretation of growth charts. While anthropometric measurements such as height and weight are routinely collected, cadres often experience difficulties in accurately interpreting nutritional status and identifying early signs of growth faltering. Limited access to decision-support tools and varying levels of digital literacy further hinder the ability of cadres to perform early detection consistently and accurately. These conditions increase the risk of delayed identification of stunting cases, reducing opportunities for timely intervention (Suryani et al., 2022).



Previous community service programs related to stunting prevention have predominantly focused on nutrition education, maternal counseling, and conventional training on anthropometric measurement techniques. Such programs have demonstrated positive outcomes in improving knowledge and awareness among community members and health cadres. However, most of these initiatives emphasize theoretical understanding rather than providing practical, technology-based tools that support daily growth monitoring activities. Several community-based interventions have introduced digital health concepts, yet their implementation is often limited to health facilities or pilot projects without structured capacity-building for *posyandu* cadres (Yuliani et al., 2024). This indicates a gap between existing community service approaches and the need for integrated digital solutions that are directly applicable at the grassroots level.

Recent advances in digital health and mobile health applications have shown significant potential in strengthening maternal and child health services (Davis et al., 2023). Studies report that mobile applications equipped with automated anthropometric calculations and standardized growth indicators can improve accuracy, efficiency, and data management in child growth monitoring (Feroz et al., 2021). However, the effectiveness of such technologies depends heavily on users' capacity and confidence in operating digital tools (Hapsari et al., 2020). In the context of community-based health services, particularly in Lombok, structured training and mentoring for *posyandu* cadres in utilizing early stunting detection applications remain limited. This gap highlights the urgency of implementing a capacity-building program that integrates digital technology with hands-on training tailored to the needs of community health workers (Kurniawan et al., 2023).

In response to these challenges, this community service program focuses on capacity building of *posyandu* cadres through training on an early stunting detection application. The program is designed to enhance cadres' digital literacy, improve their skills in recording and analyzing anthropometric data, and support accurate early identification of stunting risks. By combining training, practical application, and mentoring, this initiative offers a novel approach that bridges the gap between digital health innovation and community-level implementation. It is expected that strengthening cadres' capacity through technology-based training will contribute to more effective early stunting detection and support ongoing stunting prevention efforts in Lombok.

METHOD

Program Design

This community service program was designed using a participatory capacity-building approach, emphasizing active involvement of *posyandu* cadres as key partners. The program focused on strengthening cadres' competencies in early stunting detection through the utilization of a digital application. The design integrated training, practice, and mentoring stages to ensure not only knowledge transfer but also sustainable skill development. The implementation was tailored to the socio-cultural and geographical context of Lombok, where community-based health services play a central role in maternal and child health.

Location and Participants

The program was conducted in selected *posyandu* located in Lombok, Nusa Tenggara Barat, Indonesia. The selection of locations was based on the prevalence of stunting, accessibility of *posyandu* services, and the willingness of cadres to participate. Participants consisted of active *posyandu* cadres who routinely provide growth monitoring services for infants and toddlers. Most participants were women



with varying levels of education and digital literacy, reflecting the typical profile of *posyandu* cadres in Lombok.

Needs Assessment

Prior to program implementation, a needs assessment was conducted through informal interviews and direct observation during *posyandu* activities. This assessment identified several key issues, including limited understanding of stunting indicators, reliance on manual growth charts, difficulties in interpreting anthropometric data, and low confidence in using digital tools. The findings from this stage informed the development of training materials and the selection of appropriate instructional strategies.

Training Materials and Application Description

The training materials covered three main components: basic concepts of stunting, principles of early detection using anthropometric indicators, and practical guidance on using the early stunting detection application. The application was designed to allow cadres to input children's age, height, and weight, and automatically generate nutritional status classifications based on standardized growth references. The interface was simplified to accommodate users with limited digital experience, which is particularly important in the Lombok context.

Implementation Stages

The program implementation consisted of four main stages: preparation, training, mentoring, and evaluation.

1. **Preparation Stage**

This stage involved coordination with local health authorities and *posyandu* coordinators, preparation of training modules, and technical setup of the application on cadres' smartphones. Administrative permissions and schedules were arranged to ensure alignment with routine *posyandu* activities.

2. **Training Stage**

The training was conducted through face-to-face sessions using interactive learning methods. Lectures were used to introduce stunting concepts and the importance of early detection, followed by demonstrations of application use. Participants were encouraged to ask questions and share their experiences related to growth monitoring in Lombok communities.

3. **Hands-on Practice Stage**

Cadres practiced using the application by inputting sample and real growth data under direct supervision. This stage emphasized learning by doing, allowing participants to familiarize themselves with application features, correct data entry procedures, and interpretation of results.

4. **Mentoring Stage**

Continuous mentoring was provided during routine *posyandu* sessions. Facilitators observed cadres' application use in real service settings and provided immediate feedback. Peer learning



was encouraged, allowing more digitally skilled cadres to support others. This approach aligned with Lombok's communal culture and enhanced collective learning.

Data Collection

Data collection focused on documenting program implementation and outcomes. Data sources included participant attendance records, observations of training and *posyandu* sessions, cadres' performance in using the application, and informal feedback from cadres and parents. Changes in cadres' knowledge, skills, and behavior were assessed qualitatively through observation and discussion rather than experimental measurement, in line with the nature of community service activities.

Evaluation of Program Achievement

Program achievement was evaluated based on several indicators: improvement in cadres' ability to use the application independently, accuracy in interpreting growth data, integration of the application into routine *posyandu* activities, and changes in communication practices with parents. The evaluation emphasized practical outcomes and behavioral changes rather than statistical testing, which is appropriate for community-based capacity-building programs.

Ethical Considerations

Ethical considerations were addressed by ensuring voluntary participation of all cadres and obtaining verbal consent prior to data collection. Personal data of children and families were handled confidentially and used solely for educational and service improvement purposes. The program was implemented in collaboration with local *posyandu* authorities to ensure alignment with existing health service guidelines.

Data Analysis

The collected data were analyzed descriptively to capture patterns of change in cadres' knowledge, skills, and practices. Observational notes and feedback were organized thematically to identify key outcomes, challenges, and contextual factors influencing program implementation in Lombok. The analysis focused on understanding the dynamics of capacity building and digital application adoption within community-based health services.

Sustainability Strategy

To support sustainability, cadres were encouraged to continue using the application beyond the program period. Local cadre leaders identified during mentoring were empowered to act as resource persons for their peers. Coordination with local health offices was initiated to explore the integration of digital growth monitoring into routine reporting systems, ensuring long-term benefits for stunting prevention efforts in Lombok.

RESULTS

The community service program was implemented in Lombok, a region characterized by a strong reliance on community-based health services, particularly *posyandu*, as the primary platform for maternal and child health monitoring. Lombok consists of many rural and semi-rural areas where access to formal healthcare facilities may be limited by geographical distance and transportation constraints. In this



context, *posyandu* cadres play a strategic role as the first line of stunting prevention through routine growth monitoring activities.



Picture 1. Intoduction to Posyandu cadres

Participants in this program consisted of *posyandu* cadres from several villages in Lombok. The majority of cadres were women who had been actively involved in *posyandu* activities for several years. Their experience in organizing monthly *posyandu* sessions and interacting with mothers and children positioned them as trusted figures within their communities. However, despite their extensive experience, most cadres had never received formal training related to digital health tools or early stunting detection applications.

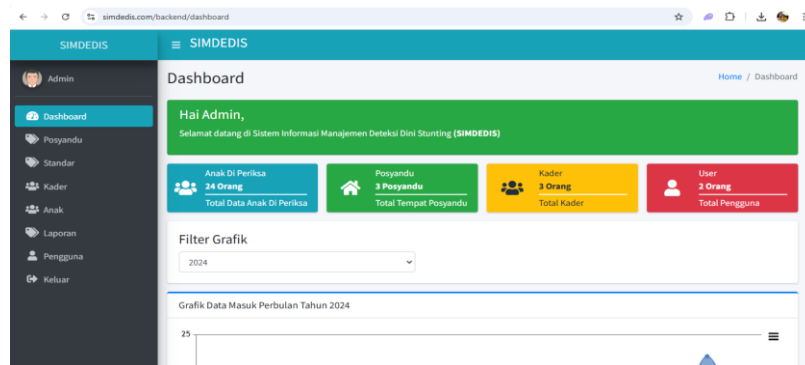


Picture 2. Application usage

Prior to the implementation of the program, growth monitoring activities in Lombok *posyandu* largely relied on manual recording using growth charts and handwritten registers. Cadres measured children's height and weight but often faced difficulties in interpreting the results, especially in borderline cases. This condition led to uncertainty in determining whether a child was at risk of stunting, which potentially delayed early intervention. Such challenges are common in community-based health services in island regions like Lombok, where standardized decision-support tools are rarely available at the grassroots level. The results of the training showed a clear improvement in cadres' understanding of stunting concepts and early detection indicators. Pre-training assessments indicated that cadres generally associated stunting only with visible short stature, without fully understanding the importance of age-specific growth standards. After the training, cadres demonstrated a more comprehensive understanding of stunting as a chronic condition that can be detected early through systematic anthropometric analysis.



The introduction of the early stunting detection application significantly enhanced cadres' ability to interpret growth data. By entering anthropometric measurements into the application, cadres were able to obtain immediate nutritional status classifications based on standardized growth indicators. This

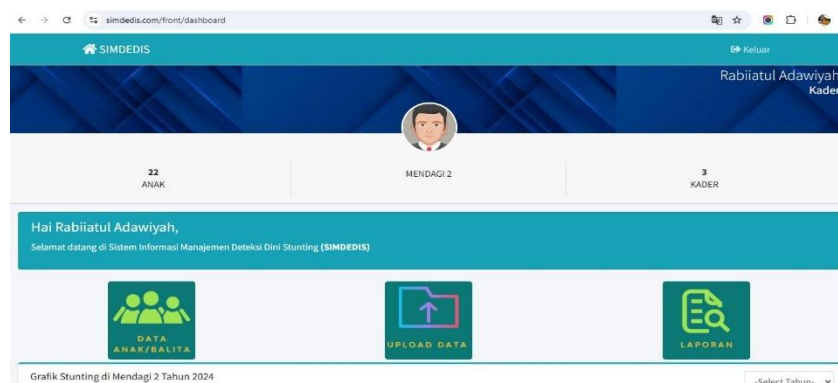


feature was particularly valuable in Lombok *posyandu* settings, where cadres often manage a large number of children within limited time during monthly sessions. Automated analysis reduced calculation errors and increased efficiency in service delivery.

Picture 3. Dashboard application

During the initial phase of application use, several cadres experienced difficulties related to digital literacy, such as navigating menus and inputting data correctly. These challenges reflected the broader digital divide that still exists in certain areas of Lombok. However, the hands-on training approach and continuous assistance provided during the program helped cadres gradually overcome these barriers. Repeated practice and direct guidance proved effective in building confidence and competence. The mentoring process revealed important social dynamics unique to Lombok communities. Cadres tended to learn more effectively through peer interaction rather than individual instruction. More digitally confident cadres naturally assumed supportive roles, assisting their peers during application use. This peer-assisted learning approach aligns with Lombok's strong communal culture, where collective problem-solving and mutual support (*gotong royong*) are deeply embedded social values.

As the program progressed, cadres began to integrate the application into routine *posyandu* activities. Digital data recording gradually replaced manual documentation, resulting in more organized and easily retrievable growth records. This transition marked a significant behavioral change, as cadres shifted from experience-based judgment toward data-driven decision-making. Such a shift is essential for improving the accuracy and consistency of early stunting detection in Lombok.





Picture 4. Posyandu cadres dashboard

The application also influenced communication patterns between cadres and parents. Visual outputs generated by the application allowed cadres to explain children's growth status more clearly to parents. In Lombok communities, where health literacy levels vary, visual and simple explanations are particularly effective in increasing parental understanding and engagement. Parents became more aware of the importance of regular growth monitoring and early intervention when risks were identified. From a program achievement perspective, the training successfully increased cadres' capacity to use digital tools independently. By the end of the mentoring phase, most cadres were able to operate the application without assistance, input data accurately, and interpret results correctly. This outcome demonstrates that with appropriate training and support, digital health applications can be effectively adopted even in community settings with initially low digital literacy.

Beyond individual capacity improvement, the program contributed to broader social changes within *posyandu* groups in Lombok. The use of digital tools encouraged more structured discussions among cadres regarding child growth data and follow-up actions. Decision-making processes became more collaborative and evidence-based, reflecting a positive transformation in organizational behavior at the community health service level. The emergence of informal local leaders was another notable outcome of the program. Some cadres who quickly mastered the application began to take initiative in guiding others and promoting digital practices during *posyandu* sessions. In the Lombok context, where social influence and local leadership are highly valued, the presence of such champions is critical for sustaining program impact beyond the formal intervention period.

The findings of this program are consistent with previous studies indicating that capacity building combined with digital tools can significantly enhance the performance of community health workers. However, this program differs from earlier initiatives in Lombok that primarily focused on nutrition education and awareness campaigns without integrating practical technological solutions. The novelty of this program lies in its emphasis on hands-on application use supported by structured training and mentoring. The state of the art literature on digital health highlights that technology adoption alone is insufficient without user empowerment. This program supports that perspective by demonstrating that the success of early stunting detection applications depends heavily on cadres' skills, confidence, and contextual understanding. In Lombok, where community health services operate within strong social networks, participatory capacity-building approaches are particularly effective.

Another important aspect of the program is its relevance to island and rural contexts. Lombok's geographical characteristics pose challenges for centralized health services, making community-based early detection systems essential. By strengthening *posyandu* cadres' capacity, this program contributes to decentralizing stunting prevention efforts and enhancing local resilience in child health monitoring. The integration of digital technology into *posyandu* activities also represents an initial step toward broader digital transformation in community health services in Lombok. While the program focused specifically on stunting detection, the skills and experiences gained by cadres may facilitate future adoption of other digital health applications. This potential multiplier effect further strengthens the significance of the program. Despite its positive outcomes, the program also revealed areas for improvement. Some cadres expressed concerns regarding internet connectivity and device availability during *posyandu* sessions. These challenges highlight the need for offline-capable applications and continued technical support to ensure sustainability, particularly in more remote areas of Lombok.

Overall, the results demonstrate that capacity building through training on an early stunting detection application is a feasible and effective strategy for strengthening *posyandu* cadres' roles in Lombok. The combination of training, mentoring, and real-world application use addresses both technical and social dimensions of digital health adoption.



In conclusion, this program contributes not only to improving early stunting detection but also to fostering behavioral change, local leadership, and digital awareness among *posyandu* cadres in Lombok. By aligning technological innovation with local community practices and values, the program offers a contextualized and sustainable approach to supporting stunting prevention efforts in island regions.

CONCLUSIONS

This community service program successfully achieved its main objective of strengthening the capacity of *posyandu* cadres in Lombok through training on the use of an early stunting detection application. The results demonstrate that structured training combined with hands-on mentoring significantly improved cadres' knowledge, skills, and confidence in identifying early signs of stunting using digital tools.

The implementation of the application enhanced the accuracy and efficiency of growth monitoring activities at the *posyandu* level. Cadres were able to interpret anthropometric data more systematically and communicate children's nutritional status more clearly to parents. This improvement supports earlier identification of stunting risks and promotes timely preventive actions within the community.

Furthermore, the program contributed to positive behavioral and organizational changes among *posyandu* cadres in Lombok. The adoption of digital-based data recording fostered a shift toward evidence-based decision-making, strengthened peer collaboration, and encouraged the emergence of local cadre leaders who actively supported technology use in routine health services.

Overall, the findings confirm that capacity building through digital health training is a feasible and contextually appropriate approach for strengthening community-based stunting prevention efforts in Lombok, particularly in areas with limited access to formal health facilities.



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