

# Effectiveness of Communication-Based Stunting Interventions in Depok City: A Comparative Study of Psychosocial and Environmental Factors and the Role of Community Health Volunteers

Siti Nur Fauziah<sup>1</sup>, Renny Septiani Mokodongan<sup>2</sup>, Ina Ristian<sup>3</sup>

<sup>1</sup>Department of Medical Laboratory Technology, Genesis Medicare Health Polytechnic, Depok, Indonesia

<sup>2</sup>Department of Pharmacy, Genesis Medicare Health Polytechnic, Depok, Indonesia

<sup>3</sup>Department of Occupational Safety and Health, Genesis Medicare Health Polytechnic, Depok, Indonesia

Email: [sitifauziah.genesis@gmail.com](mailto:sitifauziah.genesis@gmail.com)

---

**Abstract.** *Stunting is a public health problem requiring comprehensive interventions involving families, community health volunteers, and health-care facilities. This study aimed to analyze the effectiveness of community-based stunting interventions and identify supporting and hindering factors in Depok City. A mixed-methods approach was conducted in the service areas of Cisalak Pasar and Mampang Primary Health Centers. Quantitative data were collected through questionnaires from 18 community health volunteers and 11 mothers of children under five, while qualitative data were obtained through in-depth interviews. Quantitative data were analyzed using frequency distributions and percentages, while qualitative data were analyzed thematically. The findings showed that 100% of volunteers had received stunting-related training, understood challenges faced by mothers, and coordinated with Primary Health Centers. Routine child development monitoring was reported by 88.9% of volunteers, while 94.4% considered video-based media and two-way communication effective. Among mothers, 90.9% reported that informational media were easy to understand and improved their knowledge. All respondents reported understandable health education, confidence in practicing healthy behaviors, and access to clean water, sanitation, food, and health-care facilities. However, barriers included suboptimal caregiving practices, resistance to nutritional assessment results, household smoking, and inadequate sanitation. Community-based interventions demonstrated good implementation, supported by volunteer capacity, communication, coordination, and family support.*

**Keywords:** *Community; Community Health Volunteers; Health Communication; Stunting*

Received: July 23, 2026

Received in Revised: August 19,  
2026

Accepted: September 17, 2026

## INTRODUCTION

Stunting is one of the major forms of chronic malnutrition, reflecting growth failure resulting from prolonged exposure to inadequate nutrition, recurrent infections, and various long-term social and environmental conditions (Verma & Prasad, 2021; Laksono et al., 2022; Siregar et al., 2024). Its consequences extend beyond impaired physical growth and are also associated with cognitive development, learning capacity, long-term health, productivity, and the quality of human resources in adulthood. The World Health Organization recognizes stunting as a major barrier to human development because its consequences may persist across the life course (Gansaonré et al., 2022; Amriviana et al., 2023).

Globally, stunting remains a public health challenge that requires strengthened interventions extending to the family and community levels. In this context, stunting prevention cannot be understood merely as the provision of nutritional interventions but rather as a multidimensional process influenced by family behaviors, caregiving practices, social conditions, sanitation and environmental factors, access to health services, and the quality of program implementation at the local level (Saleh et al., 2021; Patlán-Hernández et al., 2022; Satriani et al., 2022). Therefore, successful stunting reduction requires comprehensive, sustainable interventions capable of reaching target populations through effectively functioning community systems (Ghodsi et al., 2021; Fristiwi et al., 2023; Puspitasari et al., 2025).

Community-based approaches have become increasingly important because families and communities represent the immediate environments that shape children's daily health and nutrition practices. Stunting interventions integrated with primary healthcare services have the potential to reach vulnerable populations more effectively than sector-specific approaches alone. This approach positions families as the primary agents of behavioral change, while community health volunteers, Family Assistance Teams (*Tim Pendamping Keluarga* [TPK]), integrated health service posts (*Posyandu*), community health centers (*Puskesmas*), and local stakeholders play complementary roles in establishing sustainable support (Miranda et al., 2023; Rekawati et al., 2024; Sentika et al., 2024).

Evidence presented in the research proposal indicates that growth monitoring, family assistance, and home-based interventions may produce better outcomes when supported by family trust and the active involvement of community health volunteers (Siswati et al., 2022; Sutinbuk et al., 2024). The performance of these volunteers is influenced by various factors, including workload, training quality, supervision, motivation, skills, and the availability of support systems. Accordingly, the effectiveness of community-based interventions should be assessed not only through changes in nutritional status indicators but also through family behaviors, psychosocial factors, environmental conditions, and the implementation mechanisms through which these changes occur (Mediani et al., 2022; Beatty et al., 2024; Has et al., 2024).

The stunting situation in Indonesia indicates that the problem has not yet been fully resolved. According to data from Statistics Indonesia through the Indonesian Nutritional Status Survey, the national stunting prevalence remains at 21.5%, despite a declining trend. This situation underscores the need to accelerate stunting reduction through a combination of specific and sensitive nutrition interventions implemented across sectors. At the study site, Depok City, West Java Province, has reportedly achieved a relatively favorable reduction in stunting prevalence, with rates below the averages for West Java Province and Indonesia (Siramaneerat et al., 2024).

However, nutrition monitoring data from the electronic Community-Based Nutrition Recording and Reporting System (*e-PPGBM*) still indicate that the number of stunted children in Depok City amounts to several thousand, with variations in achievements across subdistricts. This finding is important because city-level aggregate figures may reflect overall progress while potentially masking differences in local conditions and program implementation effectiveness at smaller administrative levels. Therefore, variations among subdistricts with low, moderate, and fluctuating achievements need to be examined more closely (Daniel et al., 2023; Anastasia et al., 2023).

Variations in achievements across subdistricts suggest a gap between the existence of a program and its effectiveness within different implementation contexts. Previous studies on the implementation of policies to accelerate stunting reduction in Depok City demonstrated effectiveness in terms of productivity, linearity, and efficiency, with determinants including resource availability, implementers' behavior, target group participation, interactions within work networks, and cross-sectoral collaboration. However, these achievements primarily describe conditions at an aggregate level (Sentika et al., 2024; Mardani et al., 2024).

At the family level, initial resistance to the label “stunting” may still occur because of stigma and social perceptions. Persuasive and non-judgmental communication by community health volunteers and Family Assistance Teams has been reported to improve family acceptance and participation. In addition, caregiving practices, nutritional knowledge and literacy, maternal mental health or psychosocial conditions, social support, and hygiene and sanitation practices may influence the success of stunting prevention. These conditions indicate that the same intervention may not produce similar outcomes in every subdistrict because the social and environmental contexts in which interventions are implemented differ (Laksono et al., 2022; Nadhiroh et al., 2023; Has et al., 2024).

Several limitations in previous research can be identified systematically (Thurstans et al., 2022; Oktarina et al., 2024). First, some studies have focused primarily on program achievements or aggregate stunting prevalence and have therefore not adequately explained variations in effectiveness across geographical areas. Second, studies on stunting risk factors often examine family, psychosocial, environmental, or community health volunteer-related factors separately, although these factors interact with one another in actual implementation.

Third, research on the role of community health volunteers generally emphasizes capacity strengthening through training and mentoring but does not always simultaneously link volunteer performance with environmental contexts and family acceptance of the program. Fourth, quantitative evidence may demonstrate differences in outcomes but is often insufficient to explain how and why an intervention is more effective in one subdistrict than in another. Conversely, qualitative research can describe experiences and implementation mechanisms but often lacks systematic comparisons of effectiveness indicators. These limitations highlight the need for a mixed-methods approach that integrates descriptive and comparative analyses with contextual exploration using the context-mechanism-outcome (CMO) framework (Daniel et al., 2023; Putra et al., 2024).

This study is important because Depok City requires more specific evidence to guide improvements in interventions based on the characteristics of individual subdistricts rather than relying solely on average city-level achievements. The study will compare subdistricts with low, moderate, and fluctuating stunting outcomes to identify patterns of success, barriers, and mechanisms influencing program implementation. The assessment of effectiveness will include child-related outcomes, such as stunting prevalence and mean height-for-age Z-scores (HAZ); family behaviors, including feeding practices, exclusive breastfeeding, meal frequency, and hygiene; psychosocial factors, including knowledge, attitudes, beliefs, caregiving practices, and family communication; local environmental conditions; and the knowledge, motivation, anthropometric skills, health education, and monitoring activities of community health volunteers (Dewi et al., 2024; Mardani et al., 2024; Larson et al., 2024).

Integrating these components within a single evaluation framework is expected to provide a more comprehensive understanding of the relationships among local context, implementation mechanisms, and program outcomes. The findings are expected to contribute to the development of a more contextual, adaptive, applicable, and potentially replicable conceptual model of community-based stunting interventions. Based on the above considerations, this study aims to analyze the effectiveness of community-based stunting interventions in Depok City through a comparative study across subdistricts and to examine the roles of family psychosocial factors, local environmental conditions, and community health volunteer performance in influencing program implementation and stunting reduction outcomes. Academically, this study is expected to enrich the empirical evidence regarding the mechanisms underlying successful community-based stunting interventions (Cameron et al., 2021; Elisaria et al., 2021; Suranny & Maharani, 2021).

Practically, the findings may serve as a basis for developing policy briefs, improving program strategies, and strengthening the capacity of local stakeholders. This study is also expected to support the development of community-based promotive and preventive services

and contribute to development agendas related to the Sustainable Development Goals (SDGs) and Asta Cita. The study hypothesis is that the effectiveness of community-based stunting interventions differs across subdistricts in Depok City and that greater effectiveness is associated with more supportive family psychosocial conditions, more conducive local environments, and more optimal community health volunteer performance.

## **METHODS**

### **Study Design**

This study employed a mixed-methods approach using a convergent parallel design, in which quantitative and qualitative data were collected and analyzed during the same study period and subsequently integrated to provide a more comprehensive understanding of the implementation of community-based stunting interventions. The quantitative component used a descriptive cross-sectional design to describe the responses of community health volunteers and mothers of children under five regarding health communication, volunteer roles, social support, environmental conditions, and the implementation of stunting prevention programs. The qualitative component involved in-depth interviews to explore experiences, barriers, and facilitating factors related to intervention implementation at the community level. In this study, effectiveness was defined as the effectiveness of program implementation and acceptance, rather than as causal evidence of a reduction in stunting prevalence.

### **Study Setting and Period**

The study was conducted in the service areas of Cisalak Pasar Community Health Center and Mampang Community Health Center in Depok City, Indonesia. These sites were selected based on the active involvement of primary healthcare facilities and communities in implementing community-based stunting prevention programs. The study was conducted in 2026 and included coordination with relevant stakeholders, instrument preparation, quantitative and qualitative data collection, data processing, analysis, and integration of findings.

### **Population and Sample**

The study population comprised community health volunteers and mothers of children under five years of age in the study areas. The quantitative component included 18 community health volunteers and 11 mothers of children under five, resulting in a total of 29 respondents. Community health volunteers were included because of their direct roles in health education, growth monitoring, communication, and family support. Mothers of children under five were included as the primary recipients of community-level interventions and health education. For the qualitative component, informants were selected from among community health volunteers and mothers of children under five who had relevant experiences and knowledge regarding the implementation of community-based stunting prevention programs. The number of qualitative informants was determined based on the adequacy of information obtained during data collection. Eligibility criteria included willingness to participate as a respondent or informant, residence in the study area, and the ability to provide relevant information regarding the implementation of community-based stunting interventions.

### **Sampling and Informant Selection**

Quantitative participants were selected using purposive sampling, based on their involvement in and relevance to the implementation of community-based stunting prevention programs. A total of 18 community health volunteers and 11 mothers of children under five who met the study criteria were included. Informants for in-depth interviews were also selected purposively, considering their direct experiences with Posyandu activities, stunting education, child growth monitoring, and family support.

### **Program Focus and Intervention Components**

The study evaluated the implementation of existing community-based stunting interventions, including health education, training and capacity strengthening for community

health volunteers, communication on stunting prevention, child growth monitoring, coordination between community health volunteers and community health centers, and family support. Program implementation also involved the use of integrated health service posts (*Posyandu*) as platforms for health information delivery and child health monitoring, as well as face-to-face communication and visual media for educational activities. No new experimental intervention was introduced, and participants were not assigned to intervention or control groups. Therefore, the study focused on evaluating respondents' perceptions and experiences regarding the implementation of ongoing community-based programs.

### **Study Variables and Areas of Inquiry**

The quantitative component assessed health communication, coordination with community health centers, the roles and capacities of community health volunteers, acceptance of health education messages, perceived changes in understanding following education, self-efficacy in adopting health-related behaviors, social support, social norms, environmental conditions, and the role of community health volunteers in family support. These domains were measured based on responses to the indicators included in the questionnaires. The qualitative component focused on community health volunteers' understanding of stunting and the first 1,000 days of life, the effectiveness of communication provided by community health centers, support from neighborhood and community leaders, family caregiving practices, sanitation conditions, barriers to program implementation, volunteer capacity, and family acceptance of child nutritional status monitoring results.

### **Research Instruments**

Quantitative data were collected using structured questionnaires with four response categories: strongly agree, agree, neutral, and disagree. The questionnaire for community health volunteers consisted of 13 indicators covering stunting-related training, access to information, communication with mothers of children under five, coordination with community health centers, child growth monitoring, and the use of educational media. The questionnaire for mothers of children under five consisted of 16 indicators covering the acceptance of health education messages, changes in knowledge and attitudes, self-efficacy, social support, social norms, environmental conditions, and the role of community health volunteers. Qualitative data were collected using semi-structured interview guides. The interviews explored the experiences of community health volunteers and mothers of children under five regarding program implementation, facilitating factors, communication barriers, caregiving practices, environmental conditions, coordination, and family acceptance of health information and child growth monitoring results.

### **Data Collection Procedures**

Data collection began with coordination with the Depok City Health Office and the relevant community health centers. Following authorization and approval for study implementation, eligible respondents and informants were identified according to the study criteria. Quantitative data were collected through questionnaire administration to 18 community health volunteers and 11 mothers of children under five. Subsequently, in-depth interviews were conducted with selected informants to obtain a deeper understanding and contextual explanation of the survey findings. After data collection, questionnaire completeness was checked, and responses were categorized according to the study indicators. Interview data were documented and organized for thematic analysis. Quantitative and qualitative findings were then compared and integrated to identify convergent findings as well as discrepancies between respondents' perceptions and conditions identified through the interviews.

### **Ethical Considerations**

The study was conducted in accordance with the principles of respect for participants, confidentiality, and voluntary participation. Before data collection, respondents and informants received information regarding the study objectives, data collection procedures, potential

benefits, and their right to refuse or withdraw from participation at any time. Informed consent was obtained before participation. Participant identities were kept confidential, and the findings were presented in aggregated form to prevent individual identification.

## Data Analysis

Quantitative data were analyzed descriptively using frequency distributions and percentages. The findings were presented in tables to describe the responses of community health volunteers and mothers of children under five for each study indicator. To facilitate interpretation, the strongly agree and agree responses were combined as positive responses for selected indicators, as presented in the results tables. Qualitative data were analyzed using thematic analysis through data organization, identification of meaningful information, coding, category development, and the identification of major themes. The resulting themes included psychosocial factors, environmental factors, the roles and capacities of community health volunteers, health communication, and barriers to program implementation.

In the final stage, quantitative and qualitative findings were integrated using the convergent parallel approach. Integration was conducted by comparing findings from both data sources to obtain a more comprehensive understanding of the effectiveness of community-based stunting intervention implementation. Consistent findings were used to strengthen interpretation, whereas differences between survey and interview findings were examined in relation to the field context. The study findings were ultimately interpreted as evidence of the effectiveness of program implementation and acceptance, rather than as a causal assessment of reductions in stunting prevalence

## RESULT AND DISCUSSION

Table 1. Distribution of Respondents According to Their Roles in the Implementation and Acceptance of Community-Based Stunting Interventions

| Respondent group                     | n  | %     |
|--------------------------------------|----|-------|
| Posyandu community health volunteers | 18 | 62.1  |
| Mothers of children under five       | 11 | 37.9  |
| Total                                | 29 | 100.0 |

Most respondents were *Posyandu* community health volunteers, accounting for 18 participants (62.1%), while 11 participants (37.9%) were mothers of children under five years of age. The inclusion of these two groups enabled the study to obtain information from two key perspectives: that of intervention implementers at the community level and that of recipients of health education and family support. However, demographic characteristics such as age, educational level, length of service as a community health volunteer, and family socioeconomic characteristics were not available in the data provided and were therefore not presented in the results to avoid introducing information not supported by the study data.

All 29 participants participated in qualitative interviews, comprising 18 *Posyandu* community health volunteers (62.1%) and 11 mothers of children under five years of age (37.9%) from the service areas of Cisalak Pasar and Mampang Primary Health Centers. Community health volunteers represented the perspectives of community-level intervention implementers, whereas mothers provided insights into program acceptance and household experiences. To maintain confidentiality, community health volunteers were assigned identifiers CHV-01 to CHV-18, and mothers were assigned identifiers M-01 to M-11.

Table 2. Summary of Qualitative Findings on Psychosocial Factors and Communication

| Indicator                                          | Main finding |
|----------------------------------------------------|--------------|
| Community health volunteers' knowledge of stunting | Good         |
| Understanding of the first 1,000 days of life      | Good         |

|                                                        |                                                                                               |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Communication and guidance from Primary Health Centers | Good and provided through health education, training, and mentoring                           |
| Mothers' acceptance of health education                | Generally good, although some volunteers perceived that enthusiasm was not evenly distributed |
| Educational media considered effective                 | Posyandu, face-to-face health education, two-way communication, and video-based media         |
| Psychosocial barriers                                  | Some families were still reluctant to accept measurement results or a stunting label          |

All 29 participants were interviewed, comprising 18 *Posyandu* community health volunteers and 11 mothers of children under five years of age from the service areas of Cislak Pasar and Mampang Primary Health Centers. Community health volunteers provided perspectives on health education, coordination with health professionals, and challenges encountered during program implementation. Mothers provided perspectives on the acceptance of educational messages, household support, and their experiences with community-based services. For anonymized reporting, community health volunteers are designated CHV-01 to CHV-18, and mothers are designated M-01 to M-11. These identifiers should be matched consistently to the corresponding interview records.

The qualitative findings summarized in Table 2 were organized into five descriptive themes: perceived understanding of stunting and the first 1,000 days of life; technical support from Primary Health Centers; variation in maternal engagement; perceived usefulness of interactive communication; and reluctance to accept child growth assessment results or stunting-related labels. The interview summaries described guidance delivered through health education, training, and mentoring. Face-to-face education, two-way communication, and video-based media were identified as useful channels for conveying information. Nevertheless, maternal engagement was not uniform, and some families were reportedly reluctant to accept their children's nutritional status assessment results. These accounts suggest that the availability of information and institutional support did not necessarily ensure acceptance of health messages or assessment findings. The themes describe participants' perceptions and do not establish objectively measured knowledge gains or behavioral changes.

Table 3. Distribution of Community Health Volunteers' Responses Regarding Communication, Coordination, and Their Roles in Stunting Prevention

| No | Indicator                                                                  | SA<br>n (%) | A<br>n (%) | N<br>n (%) | DA<br>n (%) | A+SA<br>n (%) |
|----|----------------------------------------------------------------------------|-------------|------------|------------|-------------|---------------|
| 1  | Availability of training on stunting                                       | 12 (66.7)   | 6 (33.3)   | 0          | 0           | 18 (100.0)    |
| 2  | Receiving information about stunting                                       | 16 (88.9)   | 2 (11.1)   | 0          | 0           | 18 (100.0)    |
| 3  | Mothers' enthusiasm in receiving information                               | 10 (55.6)   | 5 (27.8)   | 3 (16.7)   | 0           | 15 (83.3)     |
| 4  | Video-based information on stunting is more effective                      | 5 (27.8)    | 12 (66.7)  | 0          | 1 (5.5)     | 17 (94.4)     |
| 5  | Ensuring that mothers understand information through two-way communication | 4 (22.2)    | 13 (72.2)  | 0          | 1 (5.6)     | 17 (94.4)     |
| 6  | Monitoring child development at every Posyandu session                     | 7 (38.9)    | 9 (50.0)   | 0          | 2 (11.1)    | 16 (88.9)     |
| 7  | Understanding mothers' barriers to preventing stunting                     | 8 (44.4)    | 10 (55.6)  | 0          | 0           | 18 (100.0)    |
| 8  | Coordination with the Primary Health Center regarding stunting information | 4 (22.2)    | 14 (77.8)  | 0          | 0           | 18 (100.0)    |

|    |                                                                                                           |          |           |          |          |            |
|----|-----------------------------------------------------------------------------------------------------------|----------|-----------|----------|----------|------------|
| 9  | Community health volunteers and health professionals discuss solutions to stunting-related problems       | 8 (44.4) | 10 (55.6) | 0        | 0        | 18 (100.0) |
| 10 | Community health volunteers actively communicate with mothers                                             | 9 (50.0) | 9 (50.0)  | 0        | 0        | 18 (100.0) |
| 11 | Community health volunteers monitor the progress of activities conducted by the Primary Health Center     | 7 (38.9) | 11 (61.1) | 0        | 0        | 18 (100.0) |
| 12 | The Primary Health Center provides access to stunting-related information for community health volunteers | 5 (27.8) | 11 (61.1) | 2 (11.1) | 0        | 16 (88.9)  |
| 13 | Face-to-face information delivery is easier than delivery through social media                            | 6 (33.3) | 9 (50.0)  | 0        | 3 (16.7) | 15 (83.3)  |

Note: SA = strongly agree; A = agree; N = neutral; DA = disagree.

all community health volunteers (18/18; 100.0%) reported having received training and information about stunting. This indicates consistently reported exposure to guidance among participating volunteers but does not independently establish gains in knowledge or competence. Fifteen of 18 volunteers (83.3%) perceived mothers as enthusiastic about receiving information, while 17 of 18 (94.4%) perceived video-based media and two-way communication as useful for message delivery.

Regarding coordination, all community health volunteers (18/18; 100.0%) reported coordination with the Primary Health Centers and discussions with health professionals to address stunting-related problems. All volunteers (18/18; 100.0%) also reported actively communicating with mothers and monitoring the progress of activities conducted by the Primary Health Centers. Sixteen of 18 volunteers (88.9%) reported monitoring child development at every *Posyandu* session and having access to information from the Primary Health Centers. Nevertheless, a small proportion of volunteers provided neutral or disagreeing responses to several indicators. These findings suggest that communication and monitoring were favorably perceived, although not all components of implementation were perceived uniformly by all community health volunteers.

Table 4. Summary of Qualitative Findings on Environmental Factors

| Factor                                                              | Finding                        |
|---------------------------------------------------------------------|--------------------------------|
| Support from RT/RW                                                  | Good                           |
| Community support                                                   | Good                           |
| Support from Primary Health Centers and community health volunteers | Ongoing                        |
| Parenting-related barriers                                          | Still present                  |
| Childcare by family members other than parents                      | Still found in some families   |
| Exposure to cigarette smoke inside the home                         | Reported as an ongoing barrier |
| Sanitation-related barriers                                         | Still found in some families   |

The qualitative findings summarized in Table 4 highlighted the coexistence of community-level support and household-level barriers. Interview summaries described support from neighborhood leaders (RT/RW), community members, Primary Health Centers, and community health volunteers. However, reported barriers included caregiving-related difficulties, childcare provided by relatives other than parents, exposure to cigarette smoke inside the home, and sanitation-related concerns in some families. Childcare by other family members should not itself be interpreted as inadequate; its implications depend on the caregiving practices and support

provided. These findings suggest that favorable perceptions of institutional and community support can coexist with challenges in implementing recommended practices at home.

The sanitation-related accounts also require cautious interpretation alongside the survey findings. All 11 mothers (100.0%) reported access to clean water and a clean latrine or toilet, while the qualitative summaries identified sanitation barriers in some households. These findings may reflect differences between perceived access to facilities and their condition, maintenance, or consistent use. However, the available summaries do not establish which of these explanations applies. Because all survey participants were also interviewed, the discrepancy should not be attributed to separate participant samples. Instead, it highlights the need to distinguish the availability of sanitation facilities from the specific household conditions or practices described during interviews.

Table 5. Distribution of Mothers' Responses Regarding Message Acceptance, Psychosocial Factors, Environmental Factors, and the Role of Community Health Volunteers

| Variable/Indicator                                      | SA n (%) | A n (%)   | N n (%)  | DA n (%) | A+SA n (%) |
|---------------------------------------------------------|----------|-----------|----------|----------|------------|
| <b>A. Acceptance of Health Education Messages</b>       |          |           |          |          |            |
| Educational media are easy to understand                | 0 (0)    | 10 (90.9) | 1 (9.1)  | 0        | 10 (90.9)  |
| The language used is easy to understand                 | 4 (36.4) | 7 (63.6)  | 0        | 0        | 11 (100.0) |
| <b>B. Changes in Knowledge and Attitudes</b>            |          |           |          |          |            |
| Understanding improved after health education           | 3 (27.3) | 7 (63.6)  | 1 (9.1)  | 0        | 10 (90.9)  |
| Stunting-related messages are considered important      | 2 (18.2) | 9 (81.8)  | 0        | 0        | 11 (100.0) |
| <b>C. Self-Efficacy</b>                                 |          |           |          |          |            |
| Confident in preparing nutritious meals                 | 5 (45.5) | 6 (54.5)  | 0        | 0        | 11 (100.0) |
| Able to practice handwashing with soap                  | 6 (54.5) | 5 (45.5)  | 0        | 0        | 11 (100.0) |
| <b>D. Social Support</b>                                |          |           |          |          |            |
| Support from husband and family                         | 6 (54.5) | 4 (36.4)  | 1 (9.1)  | 0        | 10 (90.9)  |
| Support from neighbors                                  | 4 (36.4) | 7 (63.6)  | 0        | 0        | 11 (100.0) |
| <b>E. Social Norms</b>                                  |          |           |          |          |            |
| Feeling ashamed if one's child is stunted               | 0 (0)    | 2 (18.2)  | 4 (36.4) | 5 (45.5) | 2 (18.2)   |
| <b>F. Environment</b>                                   |          |           |          |          |            |
| Access to clean water                                   | 8 (72.7) | 3 (27.3)  | 0        | 0        | 11 (100.0) |
| Access to a clean latrine/toilet                        | 8 (72.7) | 3 (27.3)  | 0        | 0        | 11 (100.0) |
| Eggs and fish are easily available                      | 8 (72.7) | 3 (27.3)  | 0        | 0        | 11 (100.0) |
| Home is close to a health facility                      | 7 (63.6) | 4 (36.4)  | 0        | 0        | 11 (100.0) |
| <b>G. Role of Community Health Volunteers</b>           |          |           |          |          |            |
| Community health volunteers listen to mothers' concerns | 4 (36.4) | 7 (63.6)  | 0        | 0        | 11 (100.0) |
| Community health volunteers conduct home visits         | 7 (63.6) | 2 (18.2)  | 2 (18.2) | 0        | 9 (81.8)   |

|                                                                              |          |          |          |   |          |
|------------------------------------------------------------------------------|----------|----------|----------|---|----------|
| Community health volunteers teach mothers how to prepare complementary foods | 7 (63.6) | 2 (18.2) | 2 (18.2) | 0 | 9 (81.8) |
|------------------------------------------------------------------------------|----------|----------|----------|---|----------|

Note: SA = strongly agree; A = agree; N = neutral; DA = disagree; CTPS = handwashing with soap; MPASI = complementary foods.

mothers' acceptance of health education messages was generally favorable. Ten of 11 mothers (90.9%) stated that the educational media were easy to understand, while 11/11 (100.0%) stated that the language used during health education was easy to understand. Furthermore, 10/11 (90.9%) perceived that their understanding was better after health education, and 11/11 (100.0%) considered stunting-related messages to be important. Because knowledge was not assessed using an objective pre-post measure, this response represents perceived understanding rather than demonstrated knowledge improvement.

Regarding self-efficacy, 11/11 mothers (100.0%) reported confidence in preparing nutritious meals and practicing handwashing with soap. Social support was also high, with 10/11 (90.9%) reporting support from their husbands and families, while 11/11 (100.0%) reported support from their neighbors. For the social norms indicator, only 2/11 (18.2%) agreed or strongly agreed that they would feel ashamed if their child were stunted, whereas 5/11 (45.5%) disagreed. This pattern suggests that perceptions related to stunting-associated stigma were not uniform and require further understanding through qualitative data.

Table 6. Summary of Findings on the Role and Capacity of Community Health Volunteers

| Indicator                                                                     | Main finding                                                                           |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Training on stunting                                                          | Received by all community health volunteer respondents                                 |
| Information about stunting                                                    | Received by all community health volunteer respondents                                 |
| Coordination with the Primary Health Center                                   | Good                                                                                   |
| Discussions with health professionals                                         | Conducted by all community health volunteer respondents                                |
| Communication with mothers                                                    | Conducted by all community health volunteer respondents                                |
| Monitoring of child development                                               | Reported by 16/18 (88.9%) community health volunteers                                  |
| Understanding of mothers' barriers                                            | Reported by all community health volunteer respondents                                 |
| Home visits according to mothers' perceptions                                 | Positively reported by 9/11 (81.8%) mothers                                            |
| Education on complementary food preparation according to mothers' perceptions | Positively reported by 9/11 (81.8%) mothers                                            |
| Main barriers                                                                 | Acceptance of measurement results by some families and variations in family engagement |

Overall capacity of community health volunteers was conducive to intervention implementation. Nevertheless, the findings do not indicate that the entire implementation process was free from barriers. A total of 11.1% of community health volunteers reported not monitoring child development at every *Posyandu* session, while 11.1% gave neutral responses regarding the adequacy of access to information from the Primary Health Centers. In addition, based on the interviews, some families were still reluctant to accept the results of their children's nutritional status assessments. These findings indicate that efforts to strengthen community health volunteer capacity should focus not only on knowledge and technical skills but also on persuasive communication skills and family support.

Table 7. Proposed Interpretation of Findings Based on the Context–Mechanism–Outcome Framework

| <b>Context</b>                                                                              | <b>Proposed mechanism</b>                                                       | <b>Observed outcome/finding</b>                                                                                                                                                      |
|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Community health volunteers receive training and information from the Primary Health Center | Improved knowledge and communication capacity among community health volunteers | All community health volunteers reported receiving training and information about stunting                                                                                           |
| Active coordination between community health volunteers and health professionals            | Professional support and collaborative problem-solving                          | All community health volunteers reported coordination and discussions with health professionals                                                                                      |
| Educational language is easy to understand                                                  | Improved acceptance and understanding of information                            | 11/11 (100.0%) mothers reported that the language used during health education was easy to understand                                                                                |
| Two-way communication and video-based media                                                 | Facilitation of understanding of health messages                                | 17/18 (94.4%) community health volunteers gave positive responses                                                                                                                    |
| Family and community support                                                                | Strengthened acceptance and adoption of health-related behaviors                | 10/11 (90.9%) mothers reported support from husbands and families; 11/11 (100.0%) reported support from neighbors                                                                    |
| Supportive environmental access                                                             | Facilitated adoption of health-related behaviors                                | All 11 mothers (100.0%) reported access to clean water, sanitation facilities, food, and health services; this reflects reported availability rather than adequacy or consistent use |
| Resistance to measurement results or a stunting label                                       | Hindered problem recognition and follow-up                                      | Still identified among some families based on interview findings                                                                                                                     |
| Home visits and complementary food education were not perceived as equally available        | Household-level support was not implemented with uniform intensity              | 9/11 mothers (81.8%) gave positive responses to both indicators                                                                                                                      |

The Context–Mechanism–Outcome interpretation presented in Table 7 represents an analytical proposition rather than a tested causal model. The study assessed participants' reports of implementation conditions and perceived outcomes but did not directly measure the proposed mechanisms. Training and coordination may support community health volunteer capacity, understandable and interactive communication may facilitate message acceptance, and family and environmental support may enable engagement. These proposed relationships should therefore be considered hypotheses requiring further investigation through longitudinal or theory-driven evaluation.

The pooled findings from the Cisalak Pasar and Mampang Primary Health Center service areas indicate favorable perceived implementation and acceptability, particularly regarding volunteer preparation, communication, coordination, and social support. The present dataset was not disaggregated by health-center area; consequently, no valid between-site comparison can be made. The study should therefore be described as a cross-sectional assessment conducted in two service areas, not as evidence that one site performed better than the other. If site-specific counts are available, they should be added before comparative language is restored (Fatimah, 2025; Gaio et al., 2025).

The reported role of community health volunteers is consistent with previous studies describing volunteers as links between health services and families, as well as providers of education, growth monitoring, and household support (Aprillia et al., 2023; Putri et al., 2024). In the present study, however, exposure to training was self-reported and knowledge was not objectively tested. The findings therefore support the reach of capacity-building activities, but not a causal claim that training improved knowledge. The remaining resistance to anthropometric results also qualifies the broadly favorable responses: technical information may be insufficient when measurement results are perceived as stigmatizing or inconsistent with caregivers' views of a healthy child. This may explain why information was widely available while acceptance was not uniform (Kusuma et al., 2025).

The preference for two-way, video-based, and face-to-face communication broadly agrees with studies showing that clear and engaging delivery can facilitate comprehension (Fatimah, 2025; Gaio et al., 2025). A possible explanation is that interactive delivery allows families to clarify unfamiliar nutrition and growth concepts, whereas direct contact enables volunteers to adapt messages to household circumstances. Nevertheless, these studies used different populations, intervention intensities, and outcome measures. Moreover, the present study assessed perceived usefulness rather than observed comprehension or behavioral change; it therefore cannot establish that one communication medium was more effective than another (Gaio et al., 2025).

The favorable reports of confidence and social support align with literature emphasizing that maternal practices are embedded in household and community relationships (Asekun-Olarinmoye Esther et al., 2014; Kajjura et al., 2019). Yet reported confidence should not be equated with actual feeding or hygiene behavior. Decisions concerning food, childcare, and use of services often involve husbands or other relatives, which may help explain why some recommended practices remained inconsistent despite positive maternal responses. Programs may therefore benefit from involving household decision-makers rather than directing education only to mothers (Nizame et al., 2013).

The survey-interview discrepancy concerning sanitation is not necessarily contradictory. All 11 mothers (100.0%) reported access to clean water and a clean latrine or toilet, whereas interview accounts identified sanitation-related barriers in some households. The closed-ended survey items measured perceived availability of facilities, while the interviews could capture different dimensions, including facility condition, maintenance, safe disposal, handwashing resources, or consistent use. In addition, the two data sources may not have involved exactly the same participants or may have elicited socially desirable survey responses. Accordingly, access should not be interpreted as evidence of adequate sanitation practice. This distinction is consistent with previous work showing that infrastructure and daily household practices can influence child-health risks through different pathways (Aprillia et al., 2023; Nassar & Al-Haddad, 2024; Putri et al., 2024).

Home visits and complementary-feeding education were positively reported by 9/11 mothers (81.8%), leaving 2/11 (18.2%) neutral for each item. This variation suggests that household-level assistance may not have been experienced uniformly. Previous studies have emphasized home-based contact as an opportunity to identify caregiving barriers that may remain hidden during facility or *Posyandu* encounters (Prabasari et al., 2021). Differences may reflect variation in visit frequency, volunteer workload, household availability, or local implementation; these explanations were not measured and should be examined in future studies.

Taken together, the findings describe perceived implementation and acceptability rather than intervention effectiveness. The cross-sectional, self-reported data do not demonstrate improved knowledge, sustained behavioral change, changes in height-for-age, or reductions in stunting prevalence. The small sample 18 community health volunteers and 11 mothers also makes each response influential; frequencies are therefore presented alongside percentages, and

the results should not be generalized beyond the participating respondents. Other limitations include possible social desirability bias, the absence of site-specific analysis, and the inferred rather than directly measured CMO mechanisms.

Community-based stunting activities in the two Depok City service areas were generally perceived favorably, while resistance to measurement results, household practice barriers, and uneven experiences of home-based support remained. Program strengthening should prioritize non-stigmatizing communication, household engagement, complementary-feeding support, and assessment of sanitation practices in addition to facility access. Future studies should use larger site-stratified samples, objective pre-post measures of knowledge and behavior, and longitudinal anthropometric outcomes to evaluate implementation differences and intervention effectiveness more robustly.

## CONCLUSION

Based on the study findings, community-based stunting interventions in the service areas of Cisalak Pasar Primary Health Center and Mampang Primary Health Center, Depok City, were generally implemented well and were supported by cadre capacity, health communication, family psychosocial support, environmental conditions, and coordination with the Primary Health Centers. All cadres had received training and information on stunting and demonstrated active involvement in education, communication, coordination, and the monitoring of child development. From the family perspective, most mothers of children under five responded positively to health education, improved understanding, family support, access to basic resources, and the role of cadres. However, the study also identified several barriers, including suboptimal caregiving practices among some families, resistance to the results of children's nutritional status measurements, variations in sanitation conditions, and the unequal implementation of home visits and complementary feeding education.

## SUGGESTION

Strengthening community-based stunting interventions should focus on improving the quality and sustainability of program implementation. Primary Health Centers and relevant stakeholders should continue to enhance cadre capacity through regular training that focuses not only on stunting knowledge and anthropometric skills but also on persuasive communication, family counseling, and non-stigmatizing approaches. Educational strategies should combine face-to-face communication, two-way communication, visual media, and digital media according to community characteristics. Future studies are recommended to use larger sample sizes, longitudinal evaluation designs, and more objective outcome measurements, including changes in growth indicators and stunting status, so that the effectiveness of interventions can be assessed more robustly.

## ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to the Depok City Health Office, Cisalak Pasar Primary Health Center, and Mampang Primary Health Center for their support and facilitation throughout the study. The authors also thank all Posyandu cadres and mothers of children under five who participated as respondents and provided valuable information for this study. Appreciation is also extended to all individuals and parties who contributed to the coordination process, data collection, implementation of study activities, and completion of this research. The contributions and support of all parties were essential to the completion of this study on the effectiveness of community-based stunting interventions in Depok City

## REFERENCES

- Amriviana, M. P., Khairunnisa, C., & Sasongko, T. H. (2023). Parental stature as a risk factor for stunting in Indonesia: A systematic review and meta-analysis. *Narra X*, 3(2), e144. <https://doi.org/10.52225/narra.v3i2.144>
- Anastasia, H., Hadju, V., Hartono, R., Samarang, Manjilala, Sirajuddin, Salam, A., & Atmarita.

- (2023). Determinants of stunting in children under five years old in South Sulawesi and West Sulawesi Province: 2013 and 2018 Indonesian Basic Health Survey. *PLoS ONE*, 18(5), e0281962. <https://doi.org/10.1371/journal.pone.0281962>
- Aprillia, R., Astuti, A. W., Fatimah, S., Annisa, L., Pondawati, L. W. O., Zahra, T., ... & Arofah, T. H. (2023). Community Empowerment with Stunting Risk Factors Based on Home visit Approach: Scoping Review. *Women, Midwives and Midwifery*, 3(1), 61-76. <https://doi.org/10.36749/wmm.3.1.61-76.2023>
- Asekun-Olarinmoye, E. O., Olubukola, O., Adebimpe, W. O., & Asekun-Olarinmoye, I. O. (2014). Hand washing: Knowledge, attitude and practice amongst mothers of under-five children in Osogbo, Osun State, Nigeria. *Journal of Preventive Medicine and Hygiene*, 4(16), 40-49.
- Beatty, A., Borkum, E., Leith, W., Null, C., & Suriastini, W. (2024). A cluster randomized controlled trial of a community-based initiative to reduce stunting in rural Indonesia. *Maternal & Child Nutrition*, 20(1), e13593. <https://doi.org/10.1111/mcn.13593>
- Cameron, L., Chase, C., Haque, S., Joseph, G., Pinto, R., & Wang, Q. (2021). Childhood stunting and cognitive effects of water and sanitation in Indonesia. *Economics and Human Biology*, 40, 100944. <https://doi.org/10.1016/j.ehb.2020.100944>
- Daniel, D., et al. (2023). Interactions of factors related to the stunting reduction program in Indonesia: A case study in Ende District. *International Journal of Social Determinants of Health and Health Services*, 53(3), 354-362. <https://doi.org/10.1177/27551938231156024>
- Dewi, P., Khomsan, A., & Dwiriani, C. M. (2024). The household food security and stunting of under-five children in Indonesia: A systematic review. *Media Gizi Indonesia*, 19(1), 17-27. <https://doi.org/10.20473/mgi.v19i1.17-27>
- Eidelman, A. I. (2023). Breastfeeding, complementary food, and the risk of stunting. *Breastfeeding Medicine*, 18(5), 337. <https://doi.org/10.1089/bfm.2023.29244.editorial>
- Elisaria, E., Mrema, J., Bogale, T., Segafredo, G., & Festo, C. (2021). Effectiveness of integrated nutrition interventions on childhood stunting: A quasi-experimental evaluation design. *BMC Nutrition*, 7, 1-8. <https://doi.org/10.1186/s40795-021-00421-7>
- Fatimah, S. N. (2025). Empowering community health volunteers: Enhancing early stunting detection through knowledge and skill development in Indonesia's 3T regions. *Jurnal Riset Kualitatif dan Promosi Kesehatan*, 4(2), 114-128. <https://doi.org/10.61194/jrkpk.v4i2.894>
- Fristiwi, P., Nugraheni, S. A., & Kartini, A. (2023). The effectiveness of stunting prevention programs in Indonesia: A systematic review. *Jurnal Penelitian Pendidikan IPA*, 9(12), 1262-1273. <https://doi.org/10.29303/jppipa.v9i12.5850>
- Gaio, E. C., Pinto, J., Tilman, C. B., Soares, V., da Costa Monteiro, E., & Ximenes, A. (2025). The Role of Family and Community in Preventing Stunting in Toddlers. *West Science Interdisciplinary Studies*, 3(12), 2402-2410.
- Gansaonré, R. J., Moore, L., Bleau, L.-P., Kobiané, J.-F., & Haddad, S. (2022). Stunting, age at school entry and academic performance in developing countries: A systematic review and meta-analysis. *Acta Paediatrica*, 111(10), 1853-1861. <https://doi.org/10.1111/apa.16449>
- Ghodsi, D., Omidvar, N., Nikooyeh, B., Roustaei, R., Shakibazadeh, E., & Al-Jawaldeh, A. (2021). Effectiveness of community nutrition-specific interventions on improving malnutrition of children under 5 years of age in the Eastern Mediterranean Region: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, 18(15), 7844. <https://doi.org/10.3390/ijerph18157844>

- Has, E. M. M., Krisnana, I., & Efendi, F. (2024). Enhancing maternal caregiving capabilities model to prevent childhood stunting: A UNICEF-inspired model. *Journal of Transcultural Nursing*, 10, 23779608231226061. <https://doi.org/10.1177/23779608231226061>
- Kajjura, R. B., Veldman, F. J., & Kassier, S. M. (2019). Effect of nutrition education on knowledge, complementary feeding, and hygiene practices of mothers with moderate acutely malnourished children in Uganda. *Food and Nutrition Bulletin*, 40(2), 221–230. <https://doi.org/10.1177/0379572119840214>
- Kusuma, E., Nastiti, A. D., Handayani, D., Puspitasari, R. H., & Rahmawati, I. (2025). Community-led health education and social mobilization for improving stunting prevention behavior. *Jurnal Promosi Kesehatan Indonesia*, 20(4), 323–332. <https://doi.org/10.14710/jpki.20.4.323-332>
- Laksono, A. D., Wulandari, R. D., Amaliah, N., & Wisnuwardani, R. W. (2022). Stunting among children under two years in Indonesia: Does maternal education matter? *PLoS ONE*, 17(7), e0271509. <https://doi.org/10.1371/journal.pone.0271509>
- Larson, E. A., Zhao, Z., Bader-Larsen, K. S., & Magkos, F. (2024). Egg consumption and growth in children: A meta-analysis of interventional trials. *Frontiers in Nutrition*, 10, 1278753. <https://doi.org/10.3389/fnut.2023.1278753>
- Mamun, A. A., Mahmudiono, T., Yudhastuti, R., Triatmaja, N. T., & Chen, H.-L. (2023). Effectiveness of food-based intervention to improve the linear growth of children under five: A systematic review and meta-analysis. *Nutrients*, 15(11), 2430. <https://doi.org/10.3390/nu15112430>
- Mardani, R. A. D., Wu, W.-R., Hajri, Z., Thoyibah, Z., Yolanda, H., & Huang, H.-C. (2024). Effect of a nutritional education program on children's undernutrition in Indonesia: A randomized controlled trial. *Journal of Pediatric Health Care*, 38(4), 552–563. <https://doi.org/10.1016/j.pedhc.2024.02.006>
- Mediani, H. S., Hendrawati, S., Pahria, T., Mediawati, A. S., & Suryani, M. (2022). Factors affecting the knowledge and motivation of health cadres in stunting prevention among children in Indonesia. *Journal of Multidisciplinary Healthcare*, 15, 1069–1082. <https://doi.org/10.2147/JMDH.S356736>
- Miranda, A. V., Sirmareza, T., Nugraha, R. R., Rastuti, M., Syahidi, H., Asmara, R., & Petersen, Z. (2023). Towards stunting eradication in Indonesia: Time to invest in community health workers. *Public Health Challenges*, 2(3), e108. <https://doi.org/10.1002/puh2.108>
- Nadhiroh, S. R., Micheala, F., Tung, S. E. H., & Kustiawan, T. C. (2023). Association between maternal anemia and stunting in infants and children aged 0–60 months: A systematic literature review. *Nutrition*, 115, 112094. <https://doi.org/10.1016/j.nut.2023.112094>
- Nassar, A. A. H., & Al-Haddad, A. (2024). The role of community health and nutrition volunteers in improving the health and nutrition status of infant and young children in remote areas, Hajjah, Yemen. *BMC Pediatrics*, 24, 481. <https://doi.org/10.1186/s12887-024-04958-x>
- Nizame, F. A., Unicomb, L., Sanghvi, T., Roy, S., Nuruzzaman, M., Ghosh, P. K., Winch, P. J., & Luby, S. P. (2013). Handwashing before food preparation and child feeding: A missed opportunity for hygiene promotion. *The American Journal of Tropical Medicine and Hygiene*, 89(6), 1179–1185. <https://doi.org/10.4269/ajtmh.13-0434>
- Oktarina, C., Dilantika, C., Sitorus, N. L., & Basrowi, R. W. (2024). Relationship between iron deficiency anemia and stunting in pediatric populations in developing countries: A systematic review and meta-analysis. *Children*, 11(10), 1268. <https://doi.org/10.3390/children11101268>
- Patlán-Hernández, A. R., Stobaugh, H. C., Cumming, O., Angioletti, A., Pantchova, D., Lapègue, J.,

- Stern, S., & N'Diaye, D. S. (2022). Water, sanitation and hygiene interventions and the prevention and treatment of childhood acute malnutrition: A systematic review. *Maternal & Child Nutrition*, 18(1), e13257. <https://doi.org/10.1111/mcn.13257>
- Prabasari, M. A. D., Lubis, D. S., & Sutiari, N. K. (2021). Community participation in the utilization of village fund for stunting prevention: Case study in two villages in Gianyar District. *Public Health and Preventive Medicine Archive*, 9(2), 100–107. <https://doi.org/10.15562/phpma.v9i2.293>
- Puspitasari, Y. D., Indarwati, R., Wahyuni, S. D., & Suraya, A. S. (2025). Community and family-based intervention strategies to prevent stunting: A systematic review. *Care: Jurnal Ilmiah Ilmu Kesehatan*, 13(2). <https://doi.org/10.33366/jc.v13i2.6613>
- Putri, L. T. D., Kartasurya, M. I., & Musthofa, S. B. (2024). Self-Stigma, Experiences and Psychological Conditions of Mothers Having Children with Malnutrition-Stunting: Literature Review. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, 7(7), 1764–1771. <https://doi.org/10.56338/mppki.v7i7.5407>
- Rekawati, E., Sari, I. P., & Permatasari, H. (2024). Empowering community health worker to reduce stunting among toddlers: Systematic review. *Jurnal Ilmu dan Teknologi Kesehatan*, 11(2). <https://doi.org/10.32668/jitek.v11i2.1462>
- Saleh, A., Syahrul, S., Hadju, V., Andriani, I., & Restika, I. (2021). Role of maternal in preventing stunting: A systematic review. *Gaceta Sanitaria*, 35(Suppl. 2), S576–S582. <https://doi.org/10.1016/j.gaceta.2021.10.087>
- Satriani, S., Ilma, I. S., & Daniel, D. (2022). Trends of water, sanitation, and hygiene (WASH) research in Indonesia: A systematic review. *International Journal of Environmental Research and Public Health*, 19(3), 1617. <https://doi.org/10.3390/ijerph19031617>
- Sentika, R., Setiawan, T., Kusnadi, Rattu, D. J., Yunita, I., Masita, B. M., & Basrowi, R. W. (2024). The importance of interprofessional collaboration (IPC) guidelines in stunting management in Indonesia: A systematic review. *Healthcare*, 12(22), 2226. <https://doi.org/10.3390/healthcare12222226>
- Siramaneerat, I., Astutik, E., Agushybana, F., Bhumkittipich, P., & Lamprom, W. (2024). Examining determinants of stunting in urban and rural Indonesian: A multilevel analysis using the population-based Indonesian Family Life Survey (IFLS). *BMC Public Health*, 24, 1371. <https://doi.org/10.1186/s12889-024-18824-z>
- Siregar, R. J., Harahap, M. L., & Suryani, E. (2024). Determinants of stunting among children under five years in Indonesia: Evidence from the 2021–2022 Demographic and Health Survey. *International Journal of Public Health Excellence*, 3(2), 666–676. <https://doi.org/10.55299/ijphe.v3i2.794>
- Siswati, T., Iskandar, S., Pramestuti, N., Raharjo, J., Rubaya, A. K., & Wiratama, B. S. (2022). Impact of an integrative nutrition package through home visit on maternal and children outcome: Finding from locus stunting in Yogyakarta, Indonesia. *Nutrients*, 14(16), 3448. <https://doi.org/10.3390/nu14163448>
- Suranny, L. E., & Maharani, F. C. (2021). Mapping of community empowerment in prevention stunting in Kabupaten Wonogiri through “Sego Sak Ceting”. *IOP Conference Series: Earth and Environmental Science*, 887(1), 012035. <https://doi.org/10.1088/1755-1315/887/1/012035>
- Sutinbuk, D., Nugraheni, S. A., Rahfiludin, M. Z., & Setyaningsih, Y. (2024). Effectiveness of ERKADUTA model to increase stunting prevention behaviors among mothers with toddlers in Indonesia: A quasi-experiment. *Narra Journal*, 4(1), e688. <https://doi.org/10.52225/narra.v4i1.688>
- Thurstans, S., Sessions, N., Dolan, C., Sadler, K., Cichon, B., Isanaka, S., Roberfroid, D., Stobaugh, H.,

- Webb, P., & Khara, T. (2022). The relationship between wasting and stunting in young children: A systematic review. *Maternal & Child Nutrition*, 18(1), e13246. <https://doi.org/10.1111/mcn.13246>
- Triatmaja, N. T., Mahmudiono, T., Al Mamun, A., & Abdullah, N. A. (2023). Effectiveness of positive deviance approach to reduce malnutrition among under five children: A systematic review and meta-analysis of interventional studies. *Nutrients*, 15(8), 1961. <https://doi.org/10.3390/nu15081961>
- Verma, P., & Prasad, J. B. (2021). Stunting, wasting and underweight as indicators of under-nutrition in under five children from developing countries: A systematic review. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 15(5), 102243. <https://doi.org/10.1016/j.dsx.2021.102243>