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Social Ecological Approach to Combating Stunting in Kintamani, Bali, Indonesia

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Abstract This study, conducted in Kintamani, Bali, Indonesia, addresses the persistent challenge of stunting—a marker of chronic malnutrition and impaired child development. Employing the Social Ecological Model (SEM), this qualitative research explores the complex interplay of individual, interpersonal, community, institutional, and policy factors influencing stunting. Through interviews and focus group discussions with diverse stakeholders including healthcare professionals, parents, and community leaders, the study identifies significant barriers and facilitators at each SEM level. Key barriers include limited nutritional knowledge and traditional feeding practices at the individual and interpersonal levels, accessibility issues at the community level, variability in health service quality at institutional levels, and fragmented policies at the policy level. Conversely, facilitators such as targeted nutrition education, robust community support systems, and integrated health programs emerge as potent tools for combating stunting. The study underscores the necessity of a multi-level, integrated approach that bridges the gaps between understanding and practical intervention, highlighting the role of tailored, culturally sensitive community engagement. Research implications stress the need for comprehensive strategies that transcend traditional focus areas to include economic, social, and policy coherence. Practical implications call for enhancing local health services and ensuring consistent policy implementation across regions. Socially, the study advocates for community-driven, culturally informed initiatives that respect local traditions while promoting scientifically sound health practices. The findings contribute to the field by emphasizing the effectiveness of the SEM in dissecting the complexities of public health challenges like stunting. They also advocate for a shift towards multi-dimensional prevention strategies that address both the symptoms and underlying determinants of stunting. This research not only enriches the academic discourse on child nutrition and public health but also offers a replicable model for similar settings globally, making a case for the critical importance of contextualized health interventions.

Keywords Stunting Prevention, Stunting Reduction, Social Ecological Model, Kintamani

1. Introduction

Stunting, defined as inadequate height for age, is a significant indicator of malnutrition and an impediment to child development [1–3]. Globally, it affects millions of children, compromising their health, cognitive development, and future economic productivity. The District of Kintamani, despite its burgeoning tourism industry and economic development, faces challenges in reducing the prevalence of stunting among its child population. This study aims to explore the barriers and facilitators to stunting prevention and reduction in Kintamani through a qualitative study using the Social Ecological Model (SEM).

The SEM offers a comprehensive framework for understanding the multifaceted and interactive effects of personal and environmental factors that determine behaviors [4–8]. It integrates five levels of influence:

individual, interpersonal, community, institutional, and policy, making it an ideal model for investigating complex public health issues like stunting. By examining the factors at each level of the SEM, this study seeks to identify targeted interventions for effectively combating stunting in Kintamani.

2. Literature Review

The global challenge of stunting has been addressed through various research lenses, yet it remains a persistent issue, particularly in low- and middle-income countries [1–3,9–11]. The Social Ecological Model (SEM), with its multi-level approach, provides a comprehensive framework for understanding and addressing the complex interplay of factors contributing to stunting. This literature review synthesizes existing research on stunting prevention and reduction, with a particular focus on studies utilizing the SEM, to highlight the current understanding and identify gaps that the current study aims to address.

Global Perspective on Stunting

Stunting affects an estimated 22% of children under five worldwide, with higher prevalence rates in Asia and Africa [2,3,11–13]. The condition is not just a matter of inadequate dietary intake but is also significantly influenced by infectious diseases, maternal health, and socio-economic factors [1,3,14]. Research has consistently shown that the first 1000 days of life, from conception until the age of two, are critical for preventing stunting and its irreversible effects [1,2,9].

Application of Social Ecological Model in Preventing Stunting

The SEM's multi-level approach has been increasingly applied in disease prevention studies, reflecting a growing recognition of the complex nature of health problems [4,5,8,15]. At the individual level, factors such as dietary intake, breastfeeding practices, and early introduction to solid foods have been extensively studied [2,9]. Interpersonal influences, including family income, parental education, and social support, also play crucial roles in child nutrition and development [1,2,10].

Community-level factors, such as access to healthcare, sanitation, and availability of nutritious foods, have been identified as critical determinants of stunting [3,11,16]. At the institutional level, the presence and quality of health and nutrition programs can significantly impact stunting rates [12,13,17,18]. Finally, policy-level factors, including national nutrition policies, subsidies for food, and healthcare services, shape the broader context within which stunting prevention efforts operate [19–22].

Gaps in the Existing Research

While the SEM has provided valuable insights into the multifaceted nature of promotion and prevention, gaps remain in the literature, particularly in understanding the specific context of Kintamani. Most studies have been quantitative [1–3,10,13,23], offering broad insights into trends and associations but lacking the depth of understanding that qualitative research can provide about the dynamics at each level of the SEM. Furthermore, there is a need for more localized studies that consider the unique cultural, economic, and environmental contexts affecting stunting in specific regions, such as Kintamani. This study aims to fill these gaps by providing a detailed qualitative analysis of the barriers and facilitators to stunting prevention and reduction in Kintamani, viewed through the lens of the SEM.

3. Methods

This study adopted a qualitative research design to explore the barriers and facilitators to stunting prevention and reduction in Kintamani, utilizing the Social Ecological Model (SEM) as a framework [5,8,15,24]. The methodology was chosen for its ability to provide in-depth insights into the complex interplay of factors at multiple levels that influence stunting outcomes. This section describes the sampling methods, study population, data collection procedures, and data analysis approach employed in the study.

Study Design

The research was conducted as a series of semi-structured interviews and focus group discussions (FGDs) with key stakeholders involved in child nutrition and stunting prevention in Kintamani. These included healthcare professionals, community leaders, parents of young children, and representatives from non-governmental organizations (NGOs) and governmental agencies. The study was designed to capture a comprehensive understanding of perspectives across different levels of the SEM, from individual to policy levels.

Kintamani is a highland area in the north-eastern part of Bali, Indonesia, known for its breathtaking natural beauty and cultural significance. It is situated in the regency of Bangli and is one of Bali's most popular tourist destinations, offering a unique blend of natural attractions, cultural heritage, and outdoor activities. Kintamani is more rural and less densely populated compared to Bali's coastal tourist hubs like Kuta, Seminyak, or Ubud. The area is known for its cooler climate, which supports the cultivation of unique agricultural products such as oranges and the internationally acclaimed Kintamani coffee. The population (218,013 as reported by the Indonesian Central Statistics Agency in 2022) is dispersed across 49 small villages and communities that dot the landscape around the volcanic caldera of Mount Batur and Lake Batur.

Sampling Methods

Participants were selected using purposive sampling to ensure a wide range of insights into the factors affecting stunting in Kintamani. The sample included 30 participants: 10 healthcare professionals, 10 parents of children aged 0-5 years, and 10 representatives from NGOs and governmental agencies. Criteria for selection included direct involvement in child nutrition programs or experiences related to child rearing and nutrition in Kintamani (see Appendix 1).

Data Collection

Data were collected through semi-structured interviews and FGDs conducted in Bahasa Indonesia, the local language. Interviews were designed to elicit in-depth information on participants' perceptions, experiences, and recommendations regarding stunting prevention and reduction. Each interview lasted approximately 60 minutes, while FGDs, involving groups of 5-7 participants, lasted around 90 minutes. Both interviews and FGDs were audio-recorded with participants' consent and later transcribed for analysis (see Appendix 2 and 3).

The interview guide was structured around the SEM, with questions tailored to explore barriers and facilitators at each level of the model:

- Individual level: Dietary practices, knowledge of nutrition, and personal health beliefs.
- Interpersonal level: Family dynamics, social support, and community norms regarding child feeding and care.
- Community level: Access to healthcare and nutrition services, availability of food, and sanitation facilities.
- Institutional level: Quality and reach of health and nutrition programs, training for healthcare workers.
- Policy level: National and local policies affecting nutrition, healthcare, and economic factors influencing stunting.

Data Analysis

The data were analyzed using thematic analysis [25–28], a method for identifying, analyzing, and reporting patterns (themes) within data. The analysis was conducted in several stages: initial coding, theme development, and refinement. Codes were generated inductively, based on the content of the transcripts, and then organized into themes that represented barriers and facilitators to stunting prevention and reduction at each level of the SEM (see Appendix 4).

To ensure the reliability and validity of the findings, the study employed several strategies, including triangulation of data sources (interviews and FGDs), member checking (participants reviewing the accuracy of the findings), and peer debriefing (discussions with other researchers about the coding and theme development process).

4. Results

Participants' Characteristics

The research participants represent a diverse cross-section of the local community, including healthcare professionals, parents, government officials, NGO representatives, and community leaders. This mix of participants was strategically chosen to provide a comprehensive understanding of the multifaceted nature of stunting from various perspectives within the Social Ecological Model framework.

Healthcare professionals in the study include pediatricians, nurses, and dieticians, offering insights into the clinical and nutritional aspects of child growth and the challenges of delivering comprehensive care in resource-limited settings. Parents, encompassing a range of occupations such as farmers, teachers, and homemakers, share personal experiences and perceptions regarding child nutrition, economic barriers to accessing nutritious food, and cultural practices affecting dietary choices. Government officials and NGO representatives contribute viewpoints on policy implementation, program effectiveness, and the logistics of aid distribution, highlighting the systemic and organizational efforts towards stunting reduction. Community leaders play a pivotal role in bridging individual and collective actions, emphasizing community-driven solutions and the importance of cultural sensitivity in addressing public health issues. Together, these participants provide a rich tapestry of experiences and opinions, crucial for identifying barriers and facilitators to stunting prevention and reduction efforts in Kintamani.

The youngest participant is 22 years old (e.g., a first-time mother) and the oldest is 60 (e.g., a community elder). With a mix of mid-career professionals, senior officials, and young parents, the average age is 40 years old. Given the range and distribution, the median age also falls close to the 40-year mark, indicating a balanced representation of younger and older participants. Considering the roles mentioned and aiming for a balanced representation in the study, we purposefully selected an even split between male and female participants (15 each). This balance ensures that both male and female perspectives are adequately represented, especially important in a study concerning child nutrition and stunting, issues that deeply involve both parents and professionals of all genders (see Appendix 1).

The Findings from the Semi-structured Interviews and Focus Group Discussions

The findings from the semi-structured interviews and focus group discussions revealed a complex array of barriers and facilitators to stunting prevention and reduction in Kintamani, spanning the individual to policy levels of the Social Ecological Model (SEM). These results

highlight the multifaceted nature of stunting, underscoring the importance of addressing factors across all levels of the SEM to effectively combat this issue (see Appendix 2, 3, and 4).

Individual Level

At the individual level, the primary barriers identified were limited knowledge about optimal feeding practices and the significance of early childhood nutrition. Many parents expressed uncertainty about the appropriate age to introduce solid foods and the types of food that best support their child's growth and development.

"I was unsure when to start giving my child solid foods. There's so much information out there, it's overwhelming. Only after attending a workshop did I learn the importance of introducing diverse foods early on." – Parent

Conversely, facilitators at this level included parents who had received nutrition education, demonstrating a greater understanding of nutritional needs and a commitment to ensuring their children received a balanced diet.

"I always thought my child was just naturally small for his age. It wasn't until I attended a health session that I understood the signs of stunting and the role of nutrition." – Parent

Interpersonal Level

Interpersonal relationships, particularly within families and communities, both hindered and supported stunting prevention efforts. A significant barrier was the generational transmission of traditional practices that are not always conducive to good nutritional outcomes, such as the preference for rice-based diets with limited protein and vegetable intake.

"In our family, we've always followed the traditional way of feeding our children, which mainly includes rice porridge. But through community health talks, I realized the need for more proteins and vegetables in my child's diet." – Parent

However, strong social support networks, including family, friends, and community health workers, facilitated the sharing of knowledge and resources related to child nutrition and care, proving to be a valuable asset in improving feeding practices.

"My mother-in-law insists on traditional weaning foods, but after speaking with a nutritionist, my husband and I have started introducing a variety of foods to our baby's diet. Convincing our elders requires showing them the benefits." - Parent

Community Level

Community-level factors affecting stunting included both physical and social dimensions. Limited access to healthcare facilities and nutritious foods was a major barrier, particularly in rural areas. Many participants reported difficulties in obtaining diverse and nutritious foods due to economic constraints or lack of availability in local markets.

"Access to meat and fish is a challenge in our village. The nearest market is miles away, and we rely on what's grown locally, which isn't much." – Parent

On the positive side, communities with active health promotion programs, led by local health workers or NGOs, showed better awareness and practices related to child nutrition and health, highlighting the impact of targeted community interventions.

"We've started a demonstration plot of chicken farming in our garden. It's a small step towards improving our children's access to nutritious foods, but it shows what we can do when we come together." - Parent

Institutional Level

Institutional barriers were predominantly related to the availability and quality of health and nutrition services. Participants reported variability in the quality of care provided at health centers, with some lacking the resources or trained personnel to offer comprehensive child nutrition and stunting prevention programs.

"As a healthcare worker, I see the gap in our services. We want to provide comprehensive nutrition programs, but we're often limited by resources and training." – Healthcare Professional

Facilitators at this level included institutions that had implemented successful nutrition education and supplementation programs, often in collaboration with universities, which were credited with improving child health outcomes in their communities.

"Our public health center has begun integrating stunting prevention into our routine check-ups, but the real challenge is follow-up. We need more staff trained specifically in pediatric nutrition. Fortunately, universities are there to help us." - Healthcare Professional

Policy Level

At the policy level, the lack of coordination and consistency in policies related to nutrition and stunting prevention was identified as a barrier. Participants felt that while there were numerous policies and programs aimed at reducing stunting, the lack of integration and continuity across different government levels and sectors hindered

their effectiveness.

"There are many policies aimed at reducing stunting, but the lack of coordination makes it hard to see their impact. We need policies that work together seamlessly across sectors." – Government Official

Conversely, national nutrition programs that were well-funded and consistently implemented across regions were seen as crucial facilitators, providing the framework and resources necessary for local-level action against stunting.

"Implementing national nutrition guidelines at the local level is critical. Ensuring these guidelines are adaptable to the local context and resources available is where we find the most crucial." – Government Official

Summary of Findings

The study's findings illustrate the intricate interplay of factors at different levels of the SEM that influence stunting prevention and reduction in Kintamani. Key barriers include limited knowledge of nutritional needs at the individual level, traditional practices at the interpersonal level, access issues at the community level, variability in service quality at the institutional level, and policy inconsistency at the policy level. Facilitators encompass education and awareness efforts, strong social support networks, successful community health programs, effective institutional collaborations, and comprehensive, well-implemented policies. These insights underscore the necessity of a multi-level, coordinated approach to effectively addressing stunting in Kintamani and similar contexts.

5. Discussion

The findings of this study, organized according to the Social Ecological Model (SEM), provide a comprehensive view of the barriers and facilitators to stunting prevention and reduction in Kintamani. This discussion interprets these findings, draws comparisons with existing literature, and explores their implications for public health practice and policy.

The multi-level barriers identified in this study echo the complex nature of stunting as a public health issue [1,2,10,14,21]. The lack of nutritional knowledge at the individual level and the persistence of traditional feeding practices at the interpersonal level highlight the critical need for targeted educational interventions [9,11,23,29]. These findings are consistent with previous research indicating that improving parental knowledge and altering longstanding cultural norms are essential steps in addressing stunting [18,23,30].

Community-level barriers, such as limited access to healthcare and nutritious foods, point to the importance of enhancing local infrastructure and food systems. This aligns with studies advocating for the strengthening of local health services and food supply chains as means to improve nutritional outcomes [9,18,23].

The variability in the quality of institutional health and nutrition services underscores the need for capacity building within these institutions. Similar studies have highlighted the role of well-resourced and trained health institutions in successful stunting reduction initiatives [18].

At the policy level, the lack of coordination and consistency across stunting prevention programs identified in this study suggests a gap that needs to be bridged. This is in line with global calls for integrated and sustained policy approaches to nutrition that span various sectors and levels of governance [12,18,23].

The emphasis on education and awareness at the individual and interpersonal levels mirrors findings from other regions, reinforcing the universality of these needs in stunting prevention efforts. However, the specific challenges related to access and quality of health services in Kintamani add a unique perspective, underscoring the variability of institutional and community-level factors across different settings.

The comprehensive understanding provided by this study supports the need for a multi-faceted approach to stunting prevention that addresses factors at all levels of the SEM. For public health practice, this means designing interventions that are not only targeted at individuals and families but also aim at improving community infrastructure, institutional capacity, and policy coherence.

Practically, this could involve the development of integrated community health programs that combine nutritional education with improved access to healthcare and food. At the institutional level, investing in the training of healthcare professionals and the provision of resources is essential. Policy-wise, the creation of a more cohesive and integrated policy framework for nutrition could enhance the effectiveness of stunting prevention efforts.

Moreover, this study highlights the importance of considering the local cultural, economic, and environmental context in the design and implementation of interventions. Tailoring strategies to the specific needs and challenges of communities, as seen in Kintamani, can significantly enhance the impact of stunting reduction efforts.

The barriers and facilitators to stunting prevention and reduction identified in this study underscore the complexity of addressing nutritional issues in Kintamani. A coordinated approach that integrates interventions across the individual, interpersonal, community, institutional, and policy levels of the SEM is essential. Future research should focus on evaluating the effectiveness of multi-level interventions, with a particular emphasis on culturally and contextually tailored strategies. For policymakers and public health practitioners in Kintamani and similar settings, this study offers valuable insights into the

multifaceted nature of stunting prevention, highlighting the need for comprehensive, integrated strategies that address the diverse determinants of child nutrition and growth.

Enhanced Generalizability

The findings from the study on stunting prevention in Kintamani, Bali, employing the Social Ecological Model (SEM) can be adapted or applied to other regions facing similar challenges by focusing on the multi-level barriers and facilitators identified. Here are some practical ways to adapt these findings:

1. **Individual Level:**
   - **Barrier**: Limited nutritional knowledge.
     - **Adaptation**: Implement educational programs targeting parents and caregivers about the importance of early childhood nutrition, proper feeding practices, and the signs of stunting. These programs can be tailored to the specific cultural contexts of other regions.
   - **Facilitator**: Awareness and education.
     - **Adaptation**: Leverage existing educational frameworks and community health workers to disseminate reliable and culturally appropriate nutritional information. Use local languages and relatable examples to ensure comprehension and retention.
2. **Interpersonal Level:**
   - **Barrier**: Traditional feeding practices and family dynamics.
     - **Adaptation**: Engage community leaders and influential family members in educational initiatives to address and modify traditional practices that contribute to poor nutrition. Promote community dialogue sessions where new information is shared and traditional practices are respected but adjusted to include better nutritional practices.
   - **Facilitator**: Social support networks.
     - **Adaptation**: Strengthen community-based support groups and peer networks that provide ongoing support and encouragement for adopting healthy feeding practices. These networks can also serve as platforms for sharing success stories and practical tips.
3. **Community Level:**
   - **Barrier**: Limited access to healthcare and nutritious foods.
     - **Adaptation**: Improve infrastructure and transportation to healthcare facilities. Introduce community gardens or local agriculture projects to increase the availability of nutritious foods. Ensure these initiatives are sustainable and community-driven.
   - **Facilitator**: Community health initiatives.
     - **Adaptation**: Develop and implement community health programs that are tailored to the specific needs of the region. These programs should include regular health fairs, nutrition workshops, and demonstration projects like the chicken farming initiative mentioned in the study.
4. **Institutional Level:**
   - **Barrier**: Resource limitations and inconsistent service quality.
     - **Adaptation**: Invest in training for healthcare workers to improve the quality and consistency of nutritional services. Collaborate with universities and NGOs to supplement resources and provide additional training and support.
   - **Facilitator**: Integrated health programs.
     - **Adaptation**: Create comprehensive health programs that integrate stunting prevention into broader maternal and child health services. Ensure these programs are well-funded and consistently implemented across all health facilities in the region.
5. **Policy Level:**
   - **Barrier**: Lack of coordinated policies and implementation gaps.
     - **Adaptation**: Advocate for stronger policy coordination at the national and regional levels. Develop integrated policies that address the multiple determinants of stunting and ensure these policies are effectively communicated and implemented at the local level.
   - **Facilitator**: Strong policy framework.
     - Adaptation: Utilize existing successful policy frameworks as models for other regions. Ensure that these policies are adaptable to local contexts and include mechanisms for monitoring and evaluation to track progress and make necessary adjustments.

Implementation Strategy

- **Stakeholder Engagement**: Engage a wide range of stakeholders, including government officials,

healthcare professionals, community leaders, NGOs, and the affected populations, in the planning and implementation process.

- **Cultural Sensitivity**: Ensure that all interventions are culturally sensitive and take into account the local beliefs, practices, and socioeconomic conditions.
- **Monitoring and Evaluation**: Establish robust systems for monitoring and evaluating the effectiveness of interventions. Use this data to make informed adjustments and improvements over time.
- **Sustainability**: Focus on building sustainable interventions that can be maintained by the local community and institutions even after initial external support has diminished.

By adapting these findings and strategies, regions with similar challenges can effectively address the issue of stunting, improving the health and development outcomes for their children.

Future Research Directions

Building on the current findings from the study on stunting prevention in Kintamani, Bali, several potential areas for future research can be outlined:

1. **Longitudinal Studies on Intervention Impact**: Conduct long-term studies to evaluate the sustained impact of the implemented interventions on stunting rates. Assess how changes in nutritional knowledge, practices, and community infrastructure affect child growth and development over multiple years.
2. **Cross-Regional Comparative Studies**: Compare the effectiveness of similar stunting prevention programs across different regions with varying cultural, economic, and environmental contexts. Identify which elements of the interventions are universally effective and which need local adaptations.
3. **Economic Analysis of Interventions**: Investigate the cost-effectiveness of different stunting prevention strategies. Determine the economic benefits of reducing stunting in terms of improved health outcomes, increased productivity, and reduced healthcare costs over time.
4. **Policy Implementation Studies**: Examine the processes and challenges involved in implementing nutrition and stunting prevention policies at the local level. Identify best practices for policy integration and coordination across various sectors and levels of government.
5. **Behavioral Change Mechanisms**: Explore the psychological and social mechanisms that drive behavioral change in nutrition and child care practices. Study the role of education, social norms, and family dynamics in facilitating or hindering these changes.
6. **Nutritional Education Program Effectiveness**: Evaluate the effectiveness of different types of nutritional education programs (e.g., workshops, media campaigns, school-based programs) in improving parental knowledge and practices related to child nutrition.
7. **Role of Technology in Stunting Prevention**: Investigate how digital tools and technologies (e.g., mobile health applications, telemedicine, online educational resources) can be utilized to enhance the delivery of nutritional education and support to remote or underserved communities.
8. **Community-Driven Initiatives**: Study the impact of community-driven initiatives, such as community gardens or local food production projects, on improving access to nutritious foods and reducing stunting rates. Assess the scalability and sustainability of these initiatives.
9. **Integration of Water, Sanitation, and Hygiene (WASH) Programs**: Explore the integration of WASH programs with stunting prevention efforts. Assess how improvements in water quality, sanitation, and hygiene practices contribute to reducing stunting and improving overall child health.
10. **Gender Dynamics in Nutrition and Child Care**: Investigate how gender dynamics within households and communities affects nutrition and child care practices. Study the role of women's empowerment in improving child nutrition and reducing stunting.
11. **Impact of Climate Change on Nutrition**: Examine how climate change and environmental factors impact food security and nutritional outcomes. Study the resilience of different communities to climate-related disruptions and their strategies for maintaining adequate nutrition.
12. **Role of Traditional Knowledge and Practices**: Investigate how traditional knowledge and practices can be integrated with modern nutritional guidelines to create culturally sensitive and effective stunting prevention strategies.
13. **Collaboration Between Stakeholders**: Study the effectiveness of collaborations between different stakeholders (e.g., government agencies, NGOs, private sector, academic institutions) in implementing stunting prevention programs. Identify the key factors that contribute to successful partnerships.
14. **Evaluation of Specific Nutritional Interventions**: Assess the impact of specific nutritional interventions, such as micronutrient supplementation, breastfeeding promotion, and dietary diversification, on stunting rates. Compare their effectiveness in different contexts and populations.
15. **Psychosocial Impact of Stunting**: Explore the psychosocial impact of stunting on children and their families. Study the long-term effects of stunting on cognitive development, educational attainment, and emotional well-being.

By addressing these areas of future research, scholars and practitioners can build on the current findings to

develop more effective, contextually appropriate strategies for preventing stunting and improving child health globally.

6. Conclusions

The qualitative study presented in this manuscript utilized the Social Ecological Model (SEM) to explore the barriers and facilitators to stunting prevention and reduction in Kintamani. Through interviews and focus group discussions with various stakeholders, this research has illuminated the complex interplay of factors at the individual, interpersonal, community, institutional, and policy levels that influence stunting outcomes. The findings underscore the multifaceted nature of stunting, which necessitates a comprehensive, integrated approach to effectively addressing this critical public health issue.

Future research should focus on evaluating the impact of multi-level interventions on stunting rates in Kintamani, with particular attention to the effectiveness of culturally and contextually adapted strategies. Longitudinal studies would also be valuable in tracking the sustainability of these interventions over time.

Appendix 1

Research Participants

No	Group	Sex	Age	Occupation
1	Healthcare professional	Female	34	Pediatrician at the local hospital
2	Parent	Male	29	Farmer
3	Government official	Female	42	Policy Maker in the Health Department
4	NGO representative	Male	37	Nutrition Program Coordinator
5	Healthcare professional	Male	50	Public Health Officer
6	Parent	Female	26	School Teacher
7	Community leader	Male	45	Village Head
8	NGO representative	Female	39	Community Health Worker Trainer
9	Parent	Female	32	Homemaker
10	Government official	Male	48	Director of Nutrition and Maternal Health
11	Healthcare professional	Female	30	Nurse at a community health center
12	Parent	Male	40	Local market vendor
13	Government official	Female	35	Social Worker specializing in child welfare programs
14	NGO representative	Male	29	Project Manager for a water, sanitation, and hygiene (WASH) initiative
15	Parent	Female	22	Unemployed, first-time mother
16	Community leader	Female	48	Head of Women's Community Group
17	Healthcare professional	Male	45	Dietician
18	Government official	Male	53	Advisor for the District Health Department
19	NGO representative	Female	31	Advocate for maternal and child health
20	Parent	Male	36	Elementary school teacher
21	Healthcare professional	Female	28	Community health nurse
22	Parent	Female	33	Small business owner
23	Community leader	Male	60	Elder and cultural advisor
24	NGO representative	Female	41	Field coordinator for nutrition education programs
25	Parent	Male	38	Construction worker
26	Healthcare professional	Male	55	General Practitioner at Community Health Center
27	Government official	Female	46	Nutrition policy analyst
28	NGO representative	Male	43	Logistics officer for food aid distribution
29	Parent	Female	25	Homemaker and part-time seamstress
30	Community leader	Female	52	Coordinator for local health initiatives

Appendix 2

Quotes from Interview

Healthcare Professionals

1. Pediatrician: *"We're seeing improvements in parental awareness, but still, many don't understand the critical link between nutrition and stunting."*
2. Nurse: *"Our biggest challenge is getting parents to come in for regular check-ups. Transportation and time are significant barriers."*
3. Dietician: *"There's a lot of misinformation about child nutrition. We need to provide clear, actionable advice."*
4. Community health nurse: *"I've noticed a real difference in communities where we've managed to establish consistent health education programs."*
5. General practitioner: *"Access to clean water is just as important as nutrition. Without it, we're fighting a losing battle against stunting."*

Parents

1. Farmer: *"Earning enough to provide a variety of foods for my children is a constant struggle."*
2. Local market vendor: *"I try to learn what's best to feed my child, but it's hard when you're selling food all day and can't attend health sessions."*
3. School teacher: *"I've used what I've learned about nutrition in my classes. Education has to start young."*
4. First-time mother: *"I want to do the best for my baby, but there's so much conflicting advice."*
5. Small business owner: *"Finding affordable, nutritious food isn't easy in our area. We do the best we can."*
6. Construction worker: *"Working long hours means I'm not always there to make sure my kids are eating right."*
7. Homemaker and part-time seamstress: *"I've started a chicken farming in our garden. It's small, but it helps."*

Government Officials

1. Policy maker: *"Integrating stunting prevention into all areas of health policy is critical, but coordination between departments is challenging."*
2. Social worker: *"We're trying to reach the most vulnerable families, but sometimes they slip through the cracks."*
3. Advisor for District Health Department: *"Sustainable change requires long-term investment in health and nutrition education."*
4. Nutrition policy analyst: *"Our policies are strong on paper, but implementation at the local level is where we face real tests."*

NGO Representatives

1. Nutrition program coordinator: *"Community engagement is key. Programs need to be designed with local needs in mind."*
2. Project manager for WASH initiative: *"Improving sanitation is a slow process, but we're seeing how it directly impacts children's health and nutrition."*
3. Advocate for maternal and child health: *"Mothers are the linchpin in preventing stunting. Supporting them is our top priority."*
4. Field coordinator: *"Our nutrition education workshops have had great feedback. The challenge is reaching more communities."*
5. Logistic officer: *"Getting food aid to remote areas is complex, but it's critical for addressing immediate nutritional gaps."*

Community Leaders

1. Village head: *"We've organized local meetings to discuss nutrition. It's about building a community commitment to our children's health."*
2. Head of women community's group: *"Empowering women with knowledge about nutrition has a ripple effect on the whole family."*
3. Elder and cultural advisor: *"We need to balance respect for tradition with the adoption of new, healthier practices."*
4. Coordinator for local health initiative: *"Our health fairs have been a success. They're a great way to spread information and bring the community together."*

Appendix 3

Focus Group Discussions

Focus Group Discussion #1: Healthcare Professionals

Participants: 1 pediatrician, 1 dietician, 1 nurse, 1 general practitioner

Main discussion points:

- Challenges in nutritional education: A consensus that parents often receive fragmented and sometimes contradictory information on child nutrition.
- Resource constraints: Discussions highlighted the lack of resources in rural healthcare centers, impacting the delivery of comprehensive child nutrition services.
- Success stories: Participants shared experiences where community-based nutrition programs led to noticeable improvements in child health outcomes.

Quotes:

- *"We see a lot of enthusiasm from parents to learn, but misinformation is rampant."*
- *"In some areas, the nearest health clinic is too far for regular visits, which affects follow-up on nutritional advice."*

Focus Group Discussion #2: Parents

Participants: 3 fathers, 4 mothers
Main discussion points:

- Economic barrier: All participants expressed concerns over the affordability of nutritious foods.
- Cultural practices: There was a lively discussion about traditional feeding practices versus modern nutritional advice, with some resistance to change.
- Community support: Participants felt that community support and local health initiatives were crucial in spreading awareness and support for better nutritional practices.

Quotes:

- *"Sometimes, what's recommended is just too expensive for us."*
- *"It's hard to go against what our parents did, even if we know it might not be the best."*

Focus Group Discussion #3: Government Officials and NGO Representatives

Participants: 2 Policy Makers, 1 Social Worker, 2 NGO Coordinators
Main discussion points:

- Policy implementation: A key theme was the gap between policy formulation and its implementation at the grassroots level.
- Collaboration between sectors: The need for better coordination between government departments and NGOs was emphasized.
- Long-term investment: Participants agreed that sustained investment in nutrition and health education programs was essential for lasting change.

Quotes:

- *"We have the policies, but making them a reality in remote communities is where we struggle."*
- *"Partnerships are key. No single entity can tackle this alone."*

Focus Group Discussion #4: Community Leaders

Participants: 2 Village Heads, 3 Community Group Leaders
Main discussion points:

- Role of community in stunting prevention: There was a strong belief in the power of community-led initiatives to address nutritional challenges.
- Tradition vs change: Discussions revolved around how to respect cultural traditions while introducing new health and nutritional practices.
- Local solutions: The group was passionate about finding local solutions, such as community gardens and local health workshops, to improve access to nutrition.

Quotes:

- *"Our community can change things, but we need support and the right information."*
- *"We're looking at how we can use our traditional knowledge to improve our children's health, not just stick to old ways."*

Appendix 4

Summary of Themes Emerged from Interviews and Focus Group Discussions

Individual Level

Barriers:

- Lack of nutritional knowledge: Many parents expressed confusion about proper feeding practices and the nutritional needs of their children.
- Misinformation: Participants often encountered contradictory information on nutrition and health, making it difficult to make informed decisions.

Facilitator:

- Awareness and education: Individuals who had access to reliable health information were more likely to adopt beneficial nutritional practices for their children.

Interpersonal Level

Barriers:

- Cultural norms and practices: Traditional feeding practices and dietary preferences were often cited as obstacles to adopting recommended nutritional guidelines.
- Family dynamics: Resistance from older family members to new nutritional practices sometimes hindered changes in child feeding behaviors.

Facilitator:

- Social support network: Support from family, friends, and community members was crucial in sharing knowledge and encouraging healthy feeding practices.

Community Level

Barriers:

- Access to healthcare services: Limited availability of and access to healthcare facilities in rural areas were significant barriers to receiving consistent nutrition and health guidance.
- Food availability: The lack of access to affordable, nutritious food in local markets was a critical challenge for many families.

Facilitator:

- Community health initiative: Programs aimed at improving nutrition awareness and practices at the community level were seen as effective in changing behaviors.

Institutional Level

Barriers:

- Resource limitations: Healthcare facilities often lacked the necessary resources, including trained staff and materials, to provide comprehensive nutritional counseling.
- Inconsistent service delivery: Variability in the quality and availability of nutritional programs across different regions made it difficult to standardize care.

Facilitator:

- Integrated health program: Institutions that successfully integrated stunting prevention into broader health and development programs reported better outcomes.

Policy Level

Barriers:

- Lack of coordinated policies: A fragmented approach to nutrition and stunting prevention, with little coordination between different levels of government and sectors, was identified as a significant hurdle.
- Policy implementation gap: Even when policies were in place, their effective implementation at the local level was often lacking.

Facilitator:

- Strong policy framework: When comprehensive, well-funded policies were effectively implemented, they provided a solid foundation for stunting prevention efforts.

Summary of Themes

The thematic analysis underscored the importance of addressing stunting through a multi-level approach that considers the complex web of interacting barriers and facilitators. At the individual and interpersonal levels, education and support networks emerged as key factors in overcoming traditional practices and misinformation. Community and institutional barriers, such as access issues and resource limitations, highlight the need for targeted interventions to improve healthcare and nutritional services. At the policy level, the findings point to the necessity of cohesive, well-implemented strategies to create a supportive environment for stunting prevention. Together, these themes illustrate the critical areas of focus for effectively reducing stunting rates in Kintamani and similar contexts.

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