

Exploring Local Wisdom in Addressing Stunting During the Pandemic Era: A Case Study in Arjowinangun, Malang

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Abstract

This research explores the role of local wisdom and the challenges posed by the COVID-19 pandemic in stunting prevention within the Arjowinangun community, Malang. Using a descriptive qualitative method, data were collected through interviews with parents of stunted children and healthcare workers, as well as through document analysis. The findings reveal that a lack of parental awareness and knowledge about stunting, compounded by the disruption of healthcare services during the pandemic, contributed to the persistent prevalence of stunting in the community. The pandemic further exacerbated the problem by causing interruptions in vital public health campaigns and community support systems. Misinformation surrounding COVID-19, fear of visiting healthcare facilities, and traditional practices not aligned with modern nutritional guidelines also hindered effective stunting prevention. This study underscores the need for enhanced education and culturally sensitive interventions that integrate local beliefs with evidence-based health strategies. By adopting a multifaceted approach that combines local knowledge, community engagement, and modern healthcare, efforts to combat stunting can be more effective, even in times of crisis.

Article Info

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1. Introduction

Stunting remains a critical public health issue in Indonesia, characterized by a high prevalence, particularly among children in low-income communities (Prendergast et al., 2014). This condition, which is primarily caused by chronic malnutrition during the most crucial periods of growth and development, has far-reaching implications that extend beyond individual health, influencing the broader socio-economic fabric of the nation (Victora et al., 2008; Black et al., 2013). Stunting not only affects the physical and cognitive development of children, leading to poor cognitive outcomes and reduced academic achievement, but it also perpetuates the cycle of poverty and underdevelopment, thus hindering national economic productivity (Walker et al., 2007; Grantham et al., 2007).

In Indonesia, despite the implementation of various government interventions aimed at reducing stunting, the prevalence remains stubbornly high, particularly in rural and underserved regions (Onis et al., 2013). The persistence of this condition can be attributed to a complex interplay of factors, including socioeconomic status, limited access to healthcare, and deep-seated cultural practices (Frongillo Jr et al., 1997; Alderman et al., 2006). Socioeconomic disparities in Indonesia have resulted in unequal access to nutritious food, adequate healthcare, and education, all of which are crucial for preventing stunting. These disparities are further exacerbated by

cultural practices and local beliefs that can either facilitate or hinder effective nutritional practices (Astutik et al., 2024).

The community of Arjowinangun in Malang City exemplifies the challenges faced by many rural and peri-urban areas in Indonesia. Although geographically close to urban centers, these communities often experience significant barriers to accessing healthcare services, compounded by low levels of health literacy (Rachmi et al., 2016; Phillips & Smith, 1991). Health literacy, which refers to the ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions, is crucial in the fight against stunting (Nutbeam, 2000). However, in Arjowinangun, as in many similar communities, low health literacy limits the effectiveness of public health campaigns and interventions.

During the COVID-19 pandemic, these existing challenges were further exacerbated as healthcare services were disrupted, and public health campaigns were deprioritized in favor of immediate pandemic response efforts (Roberton et al., 2020). The pandemic placed unprecedented strains on health systems, particularly in low-resource settings, leading to a resurgence in preventable conditions like stunting (Ashish et al., 2020; Sherr et al., 2017). The reallocation of healthcare resources to address the immediate threat of COVID-19 meant that essential services for maternal and child health, including stunting prevention, were often neglected. This neglect had serious repercussions in communities like Arjowinangun, where stunting was already a significant issue.

Local knowledge, defined as the cultural beliefs and practices that shape health behaviors, plays a significant role in stunting prevention (Pelto et al., 2003; Pappas et al., 1993). In many Indonesian communities, local knowledge is deeply intertwined with daily practices and decision-making processes. In Arjowinangun, for example, cultural practices and parental beliefs about child feeding and nutrition have been found to influence stunting rates, either by supporting or hindering appropriate nutritional practices (Mahdhiya et al., 2024; Moreno et al., 2023). Traditional weaning practices, for example, which are often rooted in local wisdom, sometimes conflict with modern nutritional guidelines. These practices can lead to inadequate dietary intake among children, contributing to stunting (Armansyah et al., 2023; Mukhsin et al., 2023).

Furthermore, the pandemic has introduced additional challenges to stunting prevention efforts. Misinformation and fear related to COVID-19 have altered healthcare-seeking behaviors and disrupted community support networks, both of which are essential for effective stunting prevention (Findling et al., 2022; Binuko & Maulindar, 2024). For example, fear of contracting the virus led many parents to avoid healthcare facilities, even when their children needed routine check-ups or nutritional support. This avoidance further compromised the health and nutritional status of children in Arjowinangun, exacerbating the stunting problem.

The interaction between local knowledge and public health interventions is particularly complex in times of crisis like the COVID-19 pandemic. Local knowledge can either be a valuable resource or a significant barrier, depending on how it aligns with evidence-based public health practices (Dam et al., 2023; Gaddy, 2020). In Arjowinangun, the disruption of healthcare services during the pandemic revealed the limitations of relying solely on traditional knowledge without the support of modern healthcare systems. However, it also highlighted the potential of integrating local cultural contexts into public health strategies to enhance their effectiveness and sustainability (Chambers, 1997).

Stunting is not just a health issue but a multifaceted problem that requires a comprehensive approach. The persistence of stunting in Indonesia, despite various interventions, underscores the need for strategies that go beyond simply providing food and healthcare. It requires an understanding of the social, cultural, and economic contexts in which stunting occurs (Pelto et al., 2003). Local knowledge and cultural practices, while often overlooked in conventional public health strategies, can play a crucial role in shaping health behaviors and outcomes. Therefore, integrating these aspects into stunting prevention programs could enhance their effectiveness and sustainability.

The COVID-19 pandemic has also shown that health systems need to be more resilient and adaptable to crises. The pandemic's impact on stunting rates in Arjowinangun and similar communities reveals the vulnerabilities in the current healthcare infrastructure and the need for more robust, community-based interventions that can withstand such disruptions (Roberton et

al., 2020). These interventions should not only focus on immediate nutritional needs but also address the broader social determinants of health, such as education, poverty, and gender inequality, which are closely linked to stunting (Scott et al., 2020).

The role of education in stunting prevention cannot be overstated. Research has consistently shown that higher levels of maternal education are associated with better child health outcomes, including lower rates of stunting (Frongillo Jr et al., 1997). Educated mothers are more likely to understand the importance of nutrition, hygiene, and timely healthcare, all of which are critical for preventing stunting. However, in many low-income communities like Arjowinangun, educational opportunities for women and girls are limited, perpetuating a cycle of poor health and poverty (Alderman et al., 2006). Addressing these educational disparities is therefore an essential component of any comprehensive strategy to reduce stunting.

Another important factor in stunting prevention is the role of gender. Gender inequality, particularly in terms of access to education and healthcare, significantly affects child nutrition and health outcomes. In many communities, cultural norms prioritize the health and well-being of male children over female children, leading to disparities in nutrition and healthcare access that can contribute to stunting (Onis et al., 2013). Moreover, women's role as primary caregivers means that their health and nutritional status directly impact their children's health. Therefore, empowering women through education, economic opportunities, and healthcare access is crucial for breaking the cycle of stunting (Scott et al., 2020).

Economic factors also play a significant role in the persistence of stunting. Poverty limits access to nutritious food, clean water, and healthcare, all of which are essential for preventing stunting (Victora et al., 2008). In Indonesia, economic disparities are stark, with rural and peri-urban areas like Arjowinangun often experiencing higher levels of poverty compared to urban centers. This economic marginalization is compounded by inadequate infrastructure, such as poor transportation networks and limited access to clean water and sanitation, which further contributes to poor health outcomes (Frongillo Jr et al., 1997). Addressing these economic and infrastructure challenges is therefore critical for reducing stunting rates.

Moreover, the COVID-19 pandemic has exacerbated these economic challenges, particularly in low-income communities. The economic impact of the pandemic, including job losses, reduced incomes, and increased food insecurity, has made it even more difficult for families to provide adequate nutrition for their children (Ashish et al., 2020). This has likely contributed to the observed increase in stunting rates in communities like Arjowinangun during the pandemic. To mitigate these effects, targeted economic support for vulnerable families, such as cash transfers or food assistance programs, is essential (Alderman et al., 2006). In addition to economic support, improving access to healthcare is crucial for preventing stunting. As mentioned earlier, the disruption of healthcare services during the pandemic has had a significant impact on stunting rates. However, even before the pandemic, access to healthcare was a challenge in many rural and peri-urban areas of Indonesia (Rachmi et al., 2016). Improving healthcare infrastructure, including the availability of trained healthcare professionals and the accessibility of healthcare facilities, is essential for reducing stunting (Armansyah et al., 2023).

Furthermore, integrating healthcare services with community-based interventions can enhance their effectiveness. Community health workers, for example, can play a vital role in delivering healthcare services and education to remote and underserved communities. These workers are often trusted members of the community, which allows them to bridge the gap between formal healthcare systems and local knowledge and practices (Pelto et al., 2003). By training and supporting community health workers, healthcare systems can extend their reach and ensure that even the most vulnerable populations receive the care and support they need to prevent stunting (Black et al., 2013).

The intersection of local knowledge and public health strategies is particularly relevant in the context of stunting prevention. Local knowledge, while sometimes at odds with modern healthcare practices, can also be a valuable asset if integrated into public health strategies in a culturally sensitive manner (Gore et al., 2024). In Arjowinangun, for example, understanding and respecting local beliefs about child rearing and nutrition could help to design more effective and acceptable interventions. For example, involving local leaders and traditional healers in public

health campaigns could help to reinforce key messages and encourage community-wide participation in stunting prevention efforts.

Additionally, the role of local food systems in stunting prevention should not be overlooked. In many rural communities, local food production and traditional diets play a central role in nutrition. However, these food systems are often vulnerable to environmental changes, economic pressures, and shifts in cultural practices (Mahdhiya et al., 2024). Supporting local food systems through agricultural programs, education on nutrition, and efforts to preserve traditional diets can contribute to improved nutrition and reduced stunting (Moreno et al., 2023)

The COVID-19 pandemic has also highlighted the importance of resilience in public health systems. Resilience, in this context, refers to the ability of health systems to adapt and respond to crises while maintaining essential services (Robertson et al., 2020). The pandemic has exposed significant weaknesses in health systems worldwide, particularly in low-resource settings. These weaknesses include inadequate infrastructure, limited human resources, and poor coordination between different levels of the health system (Ashish et al., 2020). Building resilience into health systems, through investments in infrastructure, workforce development, and emergency preparedness, is crucial for ensuring that essential services like stunting prevention can continue during future crises (Sherr et al., 2017).

In summary, stunting is a complex and persistent public health issue in Indonesia, particularly in rural and underserved areas like Arjowinangun. It is driven by a combination of factors, including socioeconomic status, access to healthcare, cultural practices, and, more recently, the impacts of the COVID-19 pandemic. Addressing stunting requires a multifaceted approach that integrates local knowledge with evidence-based public health strategies, strengthens healthcare systems, and addresses the broader social determinants of health. By focusing on these areas, this research aims to contribute to a more nuanced understanding of stunting prevention and to inform the development of more effective and sustainable interventions.

2. Methods

Research Design This study uses a descriptive qualitative method. This method was chosen to understand in depth how local wisdom and the COVID-19 pandemic affect stunting rates in the Arjowinangun community, Malang. Descriptive qualitative methods are very suitable for exploring community perceptions and experiences related to stunting issues because they allow for in-depth exploration of complex and dynamic phenomena (Sandelowski, 2000; Creswell & Poth, 2016).

Data Sources Data sources in this study consist of two types, namely primary data and secondary data. Primary data were collected through in-depth interviews with parents who have toddlers with stunting categories, health workers at the Arjowinangun Health Center, and local Posyandu cadres. The use of in-depth interviews in this study aims to obtain a rich and detailed understanding of the perspectives and experiences of the research subjects (Patton, 2015). Secondary data were obtained from official documents, such as health reports from the Health Center and data from the Malang City Health Office. This approach ensures that the study utilizes diverse sources of information to understand the context of the problem as a whole (Bowen, 2009).

Data Collection Techniques Data were collected through in-depth interviews and document studies. Interviews were conducted face-to-face, following COVID-19 health protocols, and focused on gathering information on local knowledge and health practices related to stunting prevention. Document studies were conducted to complement the data obtained from the interviews with available quantitative data. In-depth interview techniques are effective in exploring hidden knowledge and practices that may not be revealed through other methods . (Armansyah et al., 2023); (Bryson et al., 2015).

Data Validity To ensure data validity, this study uses data triangulation techniques. Triangulation is done by comparing data obtained from interviews, observations, and document studies. This method of triangulation is important to increase the credibility and reliability of research findings. In addition, researchers also validated by member checking, where the

interview results were reconfirmed to participants to ensure the accuracy of interpretation (Lincoln et al., 1985).

Data Analysis The collected data were analyzed using a thematic analysis approach. The analysis process began with data coding to identify key themes related to local wisdom, the COVID-19 pandemic, and stunting. Thematic analysis is a useful technique for systematically organizing qualitative data and identifying patterns or themes that emerge in the data (Braun et al., 2006). The results of the analysis are presented in narrative form that describes the relationships between these variables.

3. Results and Discussion

Results

Stunting Categories and Causal Factors

This study identified several categories of stunting based on the Body Length for Age (PB/A) and Body Height for Age (TB/A) indices in the Arjowinangun community, Malang. The stunting category is divided into "Very Short" with a Z-Score $< -3SD$ and "Short" with a Z-Score between $-3SD$ to $-2SD$. Children with stunting in the Arjowinangun area show typical characteristics, such as shorter bodies, lower body weight, brownish hair, eyes that tend to be convex, and a shriller voice. The COVID-19 pandemic has worsened this situation, as many health control activities and integrated health post programs have been halted.

The factors causing stunting in Arjowinangun can be categorized into two main groups: family and household factors and environmental factors. Family factors include inadequate maternal nutrition during preconception, pregnancy, and breastfeeding, and infection during pregnancy. Environmental factors include lack of child stimulation and activity, poor sanitation, and limited access to and availability of adequate food.

Stunting Data in Arjowinangun

Data collected from several integrated health posts in Arjowinangun show that stunting rates are still high in this area. Based on observations and interviews, the number of toddlers experiencing stunting in the working areas of several integrated health posts was recorded as quite significant. For example, at the Bougainville Integrated Health Post in RW 01 there were 8 cases of stunting, while at the Anggrek Integrated Health Post in RW 03 there were 15 cases.

In the period from March to August 2020, there was a significant increase in the number of toddlers experiencing stunting, especially in the "Very Short" category. In March, 2 toddlers were recorded as being in the "Very Short" category, but this number increased to 74 toddlers in August.

Tables and Data Visualization

To visualize stunting data in Arjowinangun, here is a modified table in a different format, using colors and clear separation for each variable:

| Integrated Health Service Post | Work Area (RW) | Number of Stunting Cases | Stunting Cases in the "Very Short" Category | Stunting Cases in the "Short" Category |
|--------------------------------|----------------|--------------------------|---|--|
| Bougainvillea | RW 01 | 8 | 2 | 6 |
| Beautiful Island | RW 02 | 14 | 4 | 10 |
| Orchid | RW 03 | 15 | 5 | 10 |
| Dahlia | RW 04 | 14 | 3 | 11 |
| Rosella | RW 09 | 14 | 6 | 8 |

| | | | | |
|------------------|-------|----|---|---|
| Sun | RW 10 | 10 | 2 | 8 |
| Cempaka | RW 05 | 10 | 3 | 7 |
| Carnation | RW 06 | 6 | 1 | 5 |
| Pine | RW 07 | 10 | 3 | 7 |
| Lotus | RW 08 | 10 | 2 | 8 |

The following is a line graph showing the development of stunting cases in Arjowinangun during the period March to August 2020. This graph illustrates the increasing trend in the number of "Very Short" and "Short" cases from month to month.

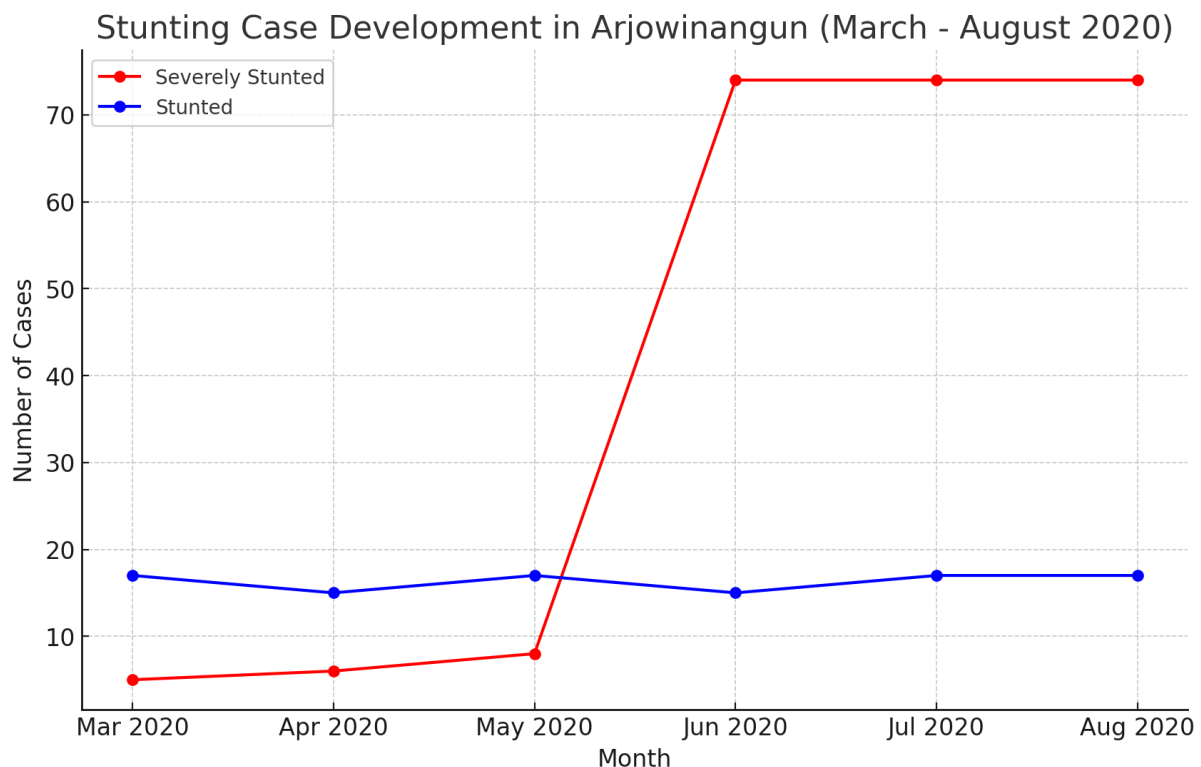


Figure 1. Development of Stunting Cases in Arjowinangun (March - August 2020)

In addition to the table, data on the development of stunting in Arjowinangun during the period March to August 2020 is also visualized in the form of a line graph to illustrate the trend of increasing cases.

Discussion

The COVID-19 pandemic has had a tremendous impact on various aspects of people's lives around the world, including in Arjowinangun, Malang. One significant impact of this pandemic is the increase in cases of stunting in children in the region. Stunting, defined as failure of linear growth caused by chronic malnutrition, has become a major concern in public health efforts, especially in developing countries such as Indonesia (Victora et al., 2008). In the context of Arjowinangun, the closure of integrated health posts and the cessation of routine control activities during the pandemic contributed greatly to the lack of monitoring of children's growth. This is very crucial considering that routine monitoring at integrated health posts is one of the initial steps in detecting stunting and ensuring that nutritional interventions can be provided in a timely manner (Astutik et al., 2024).

Posyandu, as a community-based health service unit, has a very important role in monitoring children's growth and development. During the pandemic, with the implementation

of social restrictions and the temporary closure of health facilities such as posyandu, many children lost the opportunity to have their nutritional and health status monitored regularly. This lack of monitoring resulted in the loss of a "window of opportunity" for early intervention which is very important in preventing stunting, especially in the first 1000 days of a child's life which is a critical period for physical growth and brain development (Black et al., 2013; Dewey & Begum, 2011). As a result, many children who experience malnutrition are not detected and do not receive the necessary intervention, increasing their risk of stunting.

In addition to the closure of integrated health posts, this study also found that socialization regarding the dangers of stunting and efforts to prevent it could not be carried out optimally during the pandemic. This is not a unique phenomenon in Arjowinangun, as various studies have shown that the pandemic has disrupted public health programs in various countries, including programs aimed at raising awareness of the importance of balanced nutrition and good health practices (Roberton et al., 2020; Ashish et al., 2020). As a result, important information related to stunting prevention is not conveyed properly to the community, especially to parents who have children of an age vulnerable to stunting.

Another surprising finding from this study is the misperception among the Arjowinangun community that stunting is caused more by genetic factors than environmental factors such as malnutrition or repeated infections. This perception greatly hampers prevention efforts that parents should be able to do. Although genetic factors can play a role in child growth, previous studies have consistently shown that stunting is more dominantly caused by environmental factors, including inadequate nutritional intake and repeated exposure to infections (Victora et al., 2008; Black et al., 2013). This misperception suggests that there is an urgent need to improve education and outreach to the community regarding the true causes of stunting and the importance of early intervention to prevent it.

The study also found that during the pandemic, community access to basic health services, including nutrition and maternal and child health services, was very limited. Social restrictions and temporary closures of health facilities not only hampered physical access to these services but also led to decreased interaction between health workers and the community. This has the potential to lead to decreased community knowledge about the importance of balanced nutrition and health practices that support child growth, which could ultimately worsen stunting conditions in Arjowinangun (Ruel & Alderman, 2013; Bhutta et al., 2008).

The decline in access to health services is also closely related to the increased economic burden experienced by many families during the pandemic. With reduced income and increased economic uncertainty, many families are struggling to meet basic needs, including the nutritional needs of their children. This puts children at higher risk for stunting, due to the inability of families to provide sufficient and nutritious food (Alderman et al., 2006). Overall, the findings of this study emphasize the importance of better understanding the causes of stunting among the Arjowinangun community. Misperceptions about the causes of stunting, lack of optimal socialization and education, and limited access to basic health services are interrelated factors that contribute to high stunting rates during the pandemic. Therefore, more effective interventions are needed to educate the community about the importance of adequate nutritional intake and good health practices, and to ensure that basic health services remain accessible to the community, even in crisis situations such as the COVID-19 pandemic.

This discussion will explore the results of research showing that stunting in Arjowinangun is influenced by a combination of genetic and environmental factors, with an emphasis on the dominant role of environmental factors in the context of the COVID-19 pandemic. In theory, stunting occurs when children experience malnutrition for a long period of time, especially during the first 1000 days of life, which are critical for their growth and development (Dewey et al., 2011). However, in practice, many people in Arjowinangun have the mistaken view that stunting is more influenced by genetic factors, and this reduces their motivation to carry out preventive interventions.

This misperception shows the importance of more intensive socialization and evidence-based education to correct the public's view of the main causes of stunting. In previous studies, education for parents, especially mothers, has been shown to be effective in changing nutritional behavior and improving the nutritional status of their children (Pelto et al., 2003 ;Bhutta et al.,

2008). Therefore, one of the main recommendations from this study is to increase the intensity and scope of education and counseling programs for the community regarding the importance of balanced nutrition and ways to prevent stunting.

In addition, these findings also indicate that stunting prevention activities should focus on improving maternal and child nutritional intake, as well as increasing access to essential health services. This is in line with previous research results showing that nutritional interventions targeted at pregnant women and early childhood can significantly reduce the risk of stunting (Bhutta et al., 2008). In the context of Arjowinangun, programs that promote exclusive breastfeeding, nutritional supplementation, and improving the diet of pregnant and lactating mothers should be a top priority in efforts to prevent stunting.

The COVID-19 pandemic has also exposed weaknesses in community-level health monitoring systems, which must be addressed to prevent further increases in stunting. One of the major weaknesses revealed during the pandemic was the high reliance on face-to-face health services that were disrupted by social restrictions. Therefore, this study recommends that future health programs be more adaptive and use information technology to continue health education and monitoring activities during times of crisis.

Leveraging information and communication technologies (ICTs) to continue health services, including health education and monitoring, can be an effective solution to overcome the barriers caused by the pandemic. For example, mobile applications and digital platforms can be used to provide health information to the public, monitor children's nutritional status remotely, and connect parents with health workers without the need for face-to-face interaction (O'Grady et al., 2020). Previous research has shown that the use of these technologies can improve people's access to health information and services, especially in remote or crisis-affected areas (Lassi et al., 2014).

However, the use of information technology also requires an inclusive approach to ensure that all levels of society, including vulnerable groups and those without adequate access to technology, can remain involved in health programs. This is important to prevent the occurrence of a digital divide that can exacerbate inequalities in access to health services (Bhutta et al., 2008). In addition to the use of technology, this study also highlights the importance of strengthening the role of communities in stunting prevention efforts. Community-based approaches, where communities are actively involved in planning, implementing, and monitoring health programs, have been shown to be effective in increasing the success of nutrition and health interventions (Pelto et al., 2003). In the context of Arjowinangun, strengthening collaboration between health workers, community leaders, and local organizations can help ensure that stunting prevention programs can be implemented effectively and sustainably, even in the midst of a crisis.

Furthermore, this study also underlines the importance of increasing awareness of maternal and child nutrition and health as one of the main strategies in preventing stunting. Continuous nutrition education is essential to change community behavior in terms of good eating patterns and health habits. For example, interventions that focus on promoting nutritious supplementary feeding, education on the importance of exclusive breastfeeding, and providing nutritional supplements to pregnant women and children have been shown to be effective in reducing stunting rates.

In the context of a pandemic, where direct interaction with health workers is very limited, evidence-based counseling and education delivered through various channels, including social media, can be an effective tool to reach the wider community (Black et al., 2013). Social media and other digital platforms can be used to disseminate accurate information on nutrition, maternal and child health, and stunting prevention, in a way that is easily accessible to the community.

This study also highlights the importance of inter-sectoral collaboration in addressing stunting. Efforts to prevent stunting cannot be carried out by the health sector alone, but require close collaboration with other sectors such as education, social, and economic. For example, social assistance programs that provide economic support to poor families can help them meet the nutritional needs of their children, which can ultimately prevent stunting (Alderman et al., 2006). In addition, educational programs that integrate nutrition and health education into the school curriculum can help increase public knowledge and awareness from an early age about the importance of good nutrition for child growth and development (Grantham et al., 2007)

Ultimately, this study suggests that future health programs should be more adaptive and responsive to crisis situations, such as the COVID-19 pandemic. One key recommendation is the development of emergency response protocols that include strategies to continue basic health services, including child growth monitoring, even under conditions of social distancing. The use of a hybrid approach that combines face-to-face services with digital technology can help ensure that stunting prevention efforts are not disrupted by emergencies (Lassi et al., 2014).

Overall, the results of this study highlight the need for a more comprehensive understanding of the causes of stunting, as well as the need for more targeted and evidence-based interventions to address this issue, especially in the context of a crisis such as the COVID-19 pandemic. In addition, the findings also suggest that community-based approaches and information technology can play an important role in increasing the effectiveness of future health programs. Inter-sectoral collaboration is also needed to ensure that stunting prevention efforts can be carried out holistically and sustainably, involving all components of society in efforts to improve the health and well-being of children.

4. Research Implications

This study provides a number of significant implications, both in the context of public policy, implementation of public health programs, and development of community-based intervention strategies. Stunting is a complex and multidimensional public health problem, and the findings of this study highlight the urgent need to strengthen interventions that not only focus on providing adequate nutrition but also consider the underlying social, cultural, and economic factors.

1. **Strengthening Community-Based Health Policies:** One of the main implications of this study is the need to strengthen community-based health policies that integrate local knowledge with modern health interventions. This study shows that local knowledge and practices play a critical role in determining the success of health interventions, especially in preventing stunting. Therefore, effective health policies must value and utilize this local knowledge, and actively involve communities in the planning and implementation of health programs.
2. **Community-based health policies must also be more adaptive and responsive to changing conditions,** such as those experienced during the COVID-19 pandemic. The pandemic has exposed weaknesses in health systems that rely too heavily on face-to-face interactions and formal health facilities. Therefore, health policies must encourage the development and use of information and communication technologies (ICTs) to support health monitoring and community education during times of crisis.
3. **Improving Health Literacy and Nutrition Education:** The findings of this study also emphasize the importance of improving health literacy among the community, especially in terms of nutrition and stunting prevention. Low levels of health literacy are a major obstacle in efforts to prevent stunting, because the community often does not understand the importance of adequate nutritional intake and a balanced diet for child growth.
4. **Therefore, educational programs that focus on improving health literacy should be a top priority.** These programs should be designed to be easily accessible and understandable to the wider community, using language and media that are appropriate to the local cultural context. In addition, health education should involve all family members, including fathers and other family members involved in childcare, to ensure that health messages can be effectively implemented in everyday life.
5. **Integration of Multisectoral Approach:** Another implication of this study is the need for a multisectoral approach in preventing stunting. Stunting is not only influenced by health factors, but also by economic, educational, and environmental factors. Therefore, efforts to prevent stunting must involve various sectors, including the education, economic, and infrastructure sectors.
6. **For example, social assistance programs aimed at reducing poverty should be linked to efforts to improve child nutrition.** In addition, educational programs that integrate nutrition and health education into the school curriculum can help increase knowledge and awareness of the importance of good nutrition from an early age. In this regard, collaboration between government, non-governmental organizations, and the private

sector is essential to ensure that interventions reach all levels of society, including the most vulnerable.

7. 4. Developing More Resilient Health Systems: The study also highlights the importance of developing more resilient health systems that are able to adapt to crises. The COVID-19 pandemic has exposed weaknesses in existing health systems, including an over-reliance on face-to-face health services and a lack of infrastructure to support telehealth services.
8. To address these weaknesses, health systems need to be developed to be more resilient and able to respond effectively to future crises. This can be done by increasing the capacity of health facilities, expanding the health service network through digital technology, and improving the skills of health workers in using these technologies. In addition, there is a need for investment in health infrastructure, including the procurement of medical equipment needed for remote health monitoring and the development of mobile applications that can be used for real-time health monitoring.
9. 5. Women Empowerment in Health and Nutrition: Another implication of this study is the need for women empowerment, especially in health and nutrition. Women, especially mothers, have a key role in childcare and meeting the nutritional needs of the family. Therefore, efforts to empower women through education, skills development, and access to quality health information are essential to ensure that they can make informed decisions about their children's health and nutrition.
10. Women's empowerment programs should also include efforts to improve women's access to economic resources, such as decent work and access to credit, which can help them provide nutritious food for their families. In addition, policies that support gender equality and equal access to health services should be strengthened to ensure that women can fully participate in stunting prevention efforts.
11. 6. The Role of Technology in Supporting Health Interventions: Information and communication technology (ICT) has great potential to support health interventions, especially in the context of the pandemic. This study shows that the use of ICT, such as mobile applications and digital platforms, can help address limited access to health services during the pandemic. Therefore, the development and implementation of these technologies should be an integral part of future stunting prevention strategies.
12. However, the use of this technology must be accompanied by efforts to ensure that all levels of society have equal access to the technology. This includes efforts to address the digital divide that may exist in society, as well as ensuring that the technology used is easily accessible and usable by everyone, including those with low levels of digital literacy.
13. Collaboration between Government and Community: The final implication of this study is the importance of close collaboration between government and community in preventing stunting. Community should be actively involved in planning, implementing, and monitoring health programs, as their involvement can increase the effectiveness and sustainability of these programs.

The government, on the other hand, must provide adequate support for community-based health programs, including financial, technical, and logistical support. In addition, the government must ensure that health policies are tailored to local needs and conditions, and that they are implemented consistently across the region.

5. Conclusion

This study highlights the complexity of stunting in Indonesia, particularly in communities such as Arjowinangun, Malang, where multiple social, economic, and cultural factors are intertwined and influence stunting prevalence. The COVID-19 pandemic has exacerbated this situation by disrupting health services and worsening the economic conditions of communities. Despite various interventions by the government, stunting rates remain high, highlighting the need for a more comprehensive and integrated approach that combines local knowledge with modern health practices. The main conclusion of this study is that stunting prevention must be carried out through a multisectoral approach involving various stakeholders, including the government, communities, the private sector, and non-governmental organizations. Effective

interventions must not only provide adequate food and health services, but must also consider the social and cultural contexts that influence people's health behaviors.

The study also shows that health literacy and nutrition education play a critical role in stunting prevention, and that empowering women and strengthening health systems are key to the success of these interventions. In addition, the use of information and communication technology can help address challenges faced in stunting prevention, especially in crisis situations such as the pandemic.

Finally, collaboration between the government and the community is essential to ensure that stunting prevention programs can be implemented effectively and sustainably. By strengthening community-based health policies and integrating local knowledge into health programs, it is hoped that stunting rates in Indonesia can be reduced significantly in the next few years. Although this study provides valuable insights into the factors influencing stunting in Arjowinangun, Malang, there are several limitations that need to be considered. First, this study was only conducted in one specific community, so the results may not fully represent the situation in other areas in Indonesia. Different social, economic, and cultural conditions in each area may produce different findings if similar studies are conducted elsewhere. Second, this study used a qualitative approach that relied on interviews and observations to collect data. While this approach allowed for in-depth exploration of people's views and experiences, the data generated is subjective and may not be widely generalizable. Furthermore, time and resource constraints also limited the number of participants that could be interviewed, so there may be important perspectives that were not represented in this study. Third, this study was conducted in the context of the COVID-19 pandemic, which affected how data were collected and analyzed. Social distancing and strict health protocols limited researchers' access to communities and participants, which may have affected the quality and depth of the data obtained. Furthermore, the ever-changing impact of the pandemic made the analysis more complex, as the situations faced by participants could change over time. Fourth, this study did not conduct an in-depth quantitative analysis of the relationship between certain factors and stunting prevalence. Although interviews and observations provide insights into factors that may contribute to stunting, further research with a quantitative approach is needed to test these hypotheses and provide stronger evidence on the factors that cause stunting. Fifth, this study also does not fully explore the role of gender in stunting prevention. Although women's empowerment is identified as an important factor, this study does not explore how gender roles affect access and control over resources needed to prevent stunting. Further research is needed to better understand gender dynamics in this context.

Further Research Recommendations Based on the findings and limitations of this study, there are several recommendations for further research that can broaden our understanding of stunting prevention in Indonesia.

1. **Inter-Regional Comparative Research:** To understand regional variations in the prevalence and contributing factors of stunting, inter-regional comparative research is needed. This research can involve various communities across Indonesia with different social, economic, and cultural conditions. By comparing findings from different regions, researchers can identify general patterns as well as specific factors that influence stunting in different contexts.
2. **Quantitative Approaches to Test Hypotheses:** Future research should involve quantitative approaches to test the association between specific factors and stunting prevalence. For example, research could measure the direct impact of nutritional interventions, access to health services, and maternal education on stunting rates. Statistical analysis can provide stronger evidence on the causal factors of stunting and help in designing more effective interventions.
3. **Research on Gender Roles:** More research is needed to explore the role of gender in stunting prevention. This research could look at how gender differences affect access to resources, household decision-making, and acceptance of health programs. In addition, research could explore how empowering women can improve the effectiveness of nutrition and health interventions.

4. Technology Development and Evaluation for Stunting Prevention: Further research could focus on the development and evaluation of information and communication technologies (ICTs) used for stunting prevention. For example, studies could test the effectiveness of mobile applications in monitoring child growth, providing nutrition education to parents, or connecting communities with health workers. Systematic evaluation of these technologies would help determine their effectiveness and potential future use.
5. Long-term studies on the impact of the pandemic: As the impact of the COVID-19 pandemic on stunting may continue to be felt in the long term, further research is needed to understand these long-term impacts. Longitudinal studies that track children affected by the pandemic can provide insights into how interventions can be designed to address these impacts and prevent future stunting.

By addressing existing limitations and exploring understudied research areas, further research can make significant contributions to our understanding of stunting prevention in Indonesia and inform the development of more effective policies and programs.

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