

The Hexa Helix Collaboration Model For Stunting Reduction: A Collaborative Governance Perspective On Public Health Improvement

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ABSTRACT

This study aims to analyze the Hexa Helix collaboration model in addressing stunting and improving public health. The study employs a qualitative approach using a literature review method. Data were collected from academic publications, policy documents, and reports related to stunting prevention and collaborative governance. The findings show that stunting is a multidimensional problem that cannot be addressed through sectoral interventions alone. Effective stunting reduction requires collaboration among six key actors: government, academia, the private sector, communities, media, and non-governmental organizations. Each actor contributes distinct resources and capacities that complement one another in supporting nutrition interventions, health promotion, public awareness, and community empowerment. However, challenges remain in terms of intersectoral coordination, resource distribution, and policy implementation. Therefore, strengthening Hexa Helix collaboration is essential for achieving sustainable stunting reduction and improving public health outcomes in Indonesia.

KEY WORDS

Stunting, Health, Hexa Helix collaboration, multiple sectors

Introduction

Stunting is a highly complex and multidimensional public health issue, particularly in developing countries such as Indonesia. This problem is not only related to nutritional deficiencies but also involves a range of interacting social, economic, and environmental factors. For example, limited family income may restrict access to nutritious food, while parental education plays a significant role in shaping their understanding of the importance of proper nutrition for child growth. In addition, poor living conditions such as inadequate sanitation and limited access to healthcare services can further compromise children's health and increase the risk of stunting. According to the 2023 Indonesian Health Survey (SKI), the prevalence of stunting in Indonesia was recorded at 21.5%. This figure indicates that the country has not yet achieved its national target of 14% by 2024. Despite ongoing efforts to reduce the problem, the slow decline

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suggests that existing interventions remain insufficient, underscoring the need for more effective and coordinated approaches (Khoirunnisaa, 2025).

Chronic malnutrition and recurrent infections are among the main causes of stunting in children, particularly during the First 1,000 Days of Life (the period from pregnancy to a child's second birthday). Children affected by stunting are typically characterized by a height-for-age more than two standard deviations (-2 SD) below the median of the WHO growth standard. This prolonged nutritional deficiency often begins in utero and continues through infancy, inhibiting both physical and cognitive development. Inadequate intake of vitamins and minerals, low dietary diversity, and insufficient animal protein are commonly identified as key contributors to stunting. Furthermore, maternal factors and poor childcare practices, particularly regarding feeding behaviors, significantly exacerbate the risk. Children are especially vulnerable to growth retardation when their mothers fail to provide sufficient nutrition, which can have long-term consequences for their health and development (Ministry of Health of the Republic of Indonesia, 2024).

Stunting is not caused by a single factor but rather results from the interaction of multiple determinants. The direct causes include inadequate nutritional intake during pregnancy and the first two years of life, compounded by repeated infections such as diarrhea or respiratory diseases that impair nutrient absorption and hinder growth. Beyond these direct causes, indirect factors also heighten the risk of stunting. Living environments lacking access to clean water and proper sanitation increase the likelihood of infectious diseases. Meanwhile, low levels of parental education and nutritional knowledge especially among mothers often create barriers to proper child feeding and care practices. Inadequate healthcare services, both in terms of facilities and medical personnel, also lead to many cases of stunting remaining undetected or poorly managed (Agustina, N., 2022).

The impacts of stunting extend far beyond physical growth restrictions. It can also affect various aspects of a child's life, including cognitive development. Stunted children often face challenges in learning, which may translate into poor academic performance in school. Research indicates that growth-impaired children are more likely to struggle with understanding fundamental concepts, which in turn can undermine their self-confidence and motivation to learn (Saavedra & Dattilo, 2017).

Furthermore, stunting has the potential to reduce individual productivity in the future. Physical and mental limitations caused by stunting may hinder individuals from fully participating in the workforce. Those who experience stunting may be unable to engage in jobs requiring high levels of physical or cognitive skills, thereby reducing their potential to contribute optimally to the economy. This impact extends beyond the individual, affecting society and the nation as a whole, as the loss of productivity potential can constrain economic growth. In addition, children affected by stunting face a higher risk of developing chronic diseases later in life, such as diabetes, hypertension, and cardiovascular disease. Studies have shown that these adverse health conditions can persist into adulthood, ultimately diminishing overall quality of life. Thus, stunting is not merely a child health issue but also a public health challenge with long-term implications for sustainable social development (Saavedra & Dattilo, 2017).

Globally, stunting remains a critical concern, as impaired child growth due to chronic malnutrition and recurring infections continues to prevail. More than 160 million children under the age of five worldwide are stunted, and without adequate interventions, this figure is projected to remain at 127 million by 2025 (Azizah, 2023). In Indonesia, the prevalence of stunting also remains high, with rates reaching 21.5% in early 2025, despite a decline from 24.4% in 2021. Stunting not only affects children's physical health but also impairs cognitive development, often resulting in reduced IQ levels and lower productivity in adulthood. This challenge requires serious attention from all stakeholders to develop effective and sustainable solutions, thereby improving children's quality of life and supporting the growth of future generations (Tempo, 2025).

Preventing stunting requires integrated strategies, including proper nutrition programs and increased public awareness regarding the importance of adequate nutrition during the early stages of life a critical period for child growth and development. Nutritional interventions such as micronutrient supplementation for pregnant women, the promotion of exclusive breastfeeding, and the provision of appropriate complementary feeding have been proven to reduce stunting prevalence by up to 20%, saving millions of children from its long-term consequences. Community education is also essential to ensure sustained behavioral change in dietary and childcare practices. However, despite initiatives such as the *Foster Parents Movement to Prevent Stunting* launched in several countries, progress toward achieving the global targets set by the World Health Organization (WHO) remains insufficient (Cochrane Public Health Group/Goudet, S.M., 2019).

Collaboration also plays a vital role in maintaining social tolerance. To preserve and strengthen interfaith harmony, cooperation between local governments, civil society, businesses, religious leaders, academics, and other stakeholders is required. One key element of collaborative governance in managing religious tolerance is the establishment of forums and platforms for dialogue, as well as expanding opportunities for inclusive engagement. Such platforms allow differences in perspectives and interests to be addressed constructively, enabling inclusive and sustainable solutions (Adjie, 2024). The concept of collaborative governance has emerged as a new strategy in public administration, involving cooperation between government and various stakeholders, including the private sector, to jointly design and implement policies. Although the government retains the highest authority, all parties involved share responsibility for policy outcomes (Ansell & Gash, 2018).

This approach is highly relevant to the hexa-helix collaboration model in addressing stunting and improving public health, wherein six key actors government, academia, business, media, community, and civil society work in an integrated and synergistic manner. By adopting the principles of collaborative governance, the hexa-helix model enables the involvement of diverse stakeholders in designing and implementing more comprehensive, effective, and accountable stunting prevention programs. Such cross-sectoral synergy not only optimizes available resources and expertise but also enhances public awareness and outreach, making it a crucial strategy for reducing stunting prevalence and improving sustainable public health outcomes (Ibrahim, 2024).

The Hexa Helix model is an extension of the Penta-Helix framework, incorporating an additional element such as non-governmental organizations (NGOs) or religious institutions into the collaboration scheme. This inclusion aims to strengthen synergy among stakeholders in addressing stunting. Within this framework, each actor plays a specific role: the government functions as a regulator, academia as a conceptualizer, businesses as enablers, communities as implementers, the media as information disseminators, and NGOs or religious institutions as facilitators and overseers (Putri & Hertati, 2023).

Implementation of the Hexa-Helix model across various regions has demonstrated promising outcomes in stunting prevention. For example, Jombang Regency successfully reduced stunting rates by 8.43% through an expanded Penta-Helix collaboration that engaged civil society organizations. This success highlights the importance of involving diverse actors in creating effective synergies. Similarly, Brebes Regency adopted collaborative governance through the Penta Helix approach, effectively integrating resources and enhancing stakeholder coordination. By engaging government, academia, businesses, and communities, these regions illustrate how holistic collaboration can produce innovative and sustainable solutions for combating stunting. Such positive experiences serve as models for other regions to adopt the Hexa-Helix framework, thereby accelerating stunting reduction and improving child health nationwide (Absor & Ratriana, 2022).

Previous studies have demonstrated that collaborative approaches, including the Penta Helix model and collaborative governance, can support the acceleration of stunting reduction in various regions of Indonesia. However, most existing studies focus on implementation experiences in specific local contexts and tend to examine the roles of stakeholders separately. Research that comprehensively integrates the roles of government, academia, the private sector, communities, media, and non-governmental organizations within a Hexa Helix framework to explain stunting reduction remains relatively limited. Therefore, this study aims to analyze the Hexa Helix collaboration model in addressing stunting and to identify the contributions of each stakeholder in supporting sustainable improvements in public health. The novelty of this article lies in its effort to position stunting not merely as a public health issue, but also as a collaborative governance challenge that requires the integration of six key actors within the Hexa Helix framework. By adopting this perspective, the study highlights the importance of cross-sectoral collaboration and stakeholder synergy in developing more comprehensive and sustainable strategies for stunting reduction.

This study employs a qualitative approach using a literature review method. Data were collected from academic journal articles, books, government reports, publications of international organizations, and policy documents related to stunting prevention, collaborative governance, and the Hexa Helix model. The collected literature was analyzed descriptively and thematically by identifying the roles of key stakeholders, patterns of collaboration, and challenges in stunting reduction efforts. Through this approach, the study seeks to develop a comprehensive understanding of how the Hexa Helix framework can contribute to improving public health through integrated stunting prevention strategies.

Result and Discussion

Stunting and Its Threat to Public Health

Stunting is a condition of impaired growth in children resulting from chronic malnutrition that occurs from pregnancy through the first two years of life. This condition is marked by a child's height being significantly below the age-appropriate standard and often goes unnoticed until the child reaches toddler age. Beyond physical growth delays, stunting also affects brain development, immune function, and learning capacity (Ministry of Health, Republic of Indonesia, 2023). Children who experience stunting are more susceptible to infectious diseases, cognitive impairments, and, in the long term, non-communicable diseases such as diabetes and cardiovascular illnesses. Moreover, reduced productivity due to delayed cognitive development negatively impacts the competitiveness of Indonesia's human resources, adding further strain on the national economy (Ministry of Health, Republic of Indonesia, 2024).

According to the 2022 Indonesian Nutritional Status Survey (SSGI), the national prevalence of stunting was 22.6%, declining from 24.4% in 2021 (Ministry of Health, Republic of Indonesia, 2023). However, data from the 2023 Indonesian Health Survey (SKI) showed only a slight decrease to 21.5%, reflecting just a 0.8% reduction from the previous year. Provinces such as Papua Pegunungan (37.3%), East Nusa Tenggara (37.9%), and Central Papua (39.2%) recorded the highest stunting rates (Ministry of Health, Republic of Indonesia, 2024). To improve nutritional intake, the government has launched intervention programs such as free nutritious meals for pregnant women and schoolchildren. This initiative forms part of a long-term strategy, backed by an investment of IDR 432 trillion through 2029 (Financial Times, 2025). Nevertheless, challenges in implementation including distribution, food quality, and cross-sectoral coordination remain significant obstacles (AP News, 2025).

Globally, the scale of the problem is equally concerning. UNICEF, WHO, and the World Bank reported that in 2020 approximately 149 million children under five suffered from stunting. This figure underscores the urgent need for effective interventions to address malnutrition worldwide. Stunting not only restricts physical growth but also hinders cognitive development and learning abilities, thereby reducing productivity in adulthood. Addressing stunting thus requires cross-sectoral efforts encompassing health, education, and social policy. Holistic collaboration is essential to ensure children gain access to adequate nutrition, educational opportunities, and social support systems necessary for optimal development. Parental education on balanced nutrition, along with improved healthcare access, is particularly crucial in enabling children to reach their full potential (UNICEF, WHO, & World Bank, 2020).

Stunting can be detected as early as pregnancy up to a child's second year, reflecting inadequate nutrition and weak support systems for optimal growth. Its impact extends beyond children's physical health to cognitive ability, immunity, and future productivity. This presents a long-term challenge for national development. Despite government programs such as nutritious food provision and significant budget allocations, problems persist in field implementation, especially regarding equitable distribution and efficiency. This condition demonstrates that stunting is not an issue

solvable by one sector alone, as its root causes extend beyond nutrition to sanitation, education, basic health services, and socioeconomic conditions. Consequently, stunting must be recognized as a complex, cross-sectoral issue requiring collaborative efforts from both central and local governments.

Hexa Helix Collaboration in Combating Stunting

Stunting is a major public health issue with long-term consequences for children's physical and cognitive development, which in turn affects the quality of human resources in the future. Addressing stunting requires a holistic and integrated approach that engages multiple sectors and stakeholders. One of the effective models for tackling this challenge is the Hexa-Helix Collaboration, which integrates the roles of six key actors: government, academia, the private sector, communities, media, and non-governmental organizations (NGOs). Each actor plays a complementary role with the shared objective of reducing stunting prevalence and improving children's nutritional quality, particularly during the critical first 1,000 days of life (Candranegara, 2022).

This collaborative model creates strong synergy among essential elements, such as government policy, academic innovation, logistical and economic support from the private sector, and active community engagement alongside other sectors (Tuthaes et al., 2024). Within this framework, each sector carries strategic responsibilities that complement one another in tackling stunting through the Hexa Helix approach. This paper explores in greater depth the contributions and responsibilities of each stakeholder while highlighting how integrated and systematically coordinated interventions can yield sustainable positive impacts on community well-being (Rachim et al., 2020).

The Government's Role in Addressing Stunting

In combating stunting, the government must take strategic measures, including the formulation of comprehensive policies, adequate budget allocation, and cross-sectoral program coordination at both national and local levels. Strengthening primary healthcare services is a top priority, particularly ensuring wider access to quality healthcare, regular health check-ups, and nutritional counseling. Providing affordable, nutritious food supplements for at-risk children is also essential to secure sufficient dietary intake. Regular monitoring of child nutrition is necessary to identify nutritional issues early and enable timely interventions.

Through these responsibilities, the government ensures that all elements of stunting prevention operate effectively and in an integrated manner. However, success cannot rely solely on government efforts; collaboration with communities, the private sector, and NGOs is crucial. Such partnerships are necessary to design creative programs that address local needs and to raise public awareness of the importance of child nutrition and health. A holistic and collaborative approach is expected to generate a significant and sustainable impact on child well-being in Indonesia.

Despite the introduction of various strategic programs, implementation continues to face significant challenges. One of the main obstacles is the uneven distribution of nutritious food, which limits access for children in remote areas. Moreover, program quality at the grassroots level often varies depending on local resource capacity and implementation. Suboptimal coordination among agencies is another challenge, as stunting prevention requires strong cross-sectoral synergy to function effectively. These issues highlight the need to strengthen monitoring, evaluation, and stakeholder collaboration to achieve greater progress in reducing stunting prevalence (Rachim, 2020).

One of the government's notable efforts has been the introduction of strategic policies with a holistic and integrated approach, including the Supplementary Food Program (Program Makanan Tambahan/PMT) based on local food sources. This initiative aims not only to improve the nutritional intake of children and pregnant women but also to promote the use of local resources, thereby enhancing food security and supporting community economies. With Indonesia's stunting prevalence currently at 21.5%, PMT is expected to make a significant positive contribution to children's health and development (Setkab RI, 2022).

In addition, the government has established the Stunting Reduction Acceleration Team (Tim Percepatan Penurunan Stunting/TP2S), involving multiple ministries and agencies, such as the Ministry of Health, the Ministry of Education, and the Ministry of Social Affairs. The formation of this team seeks to ensure effective coordination in program implementation, so that each intervention reinforces and complements the others. TP2S is responsible for formulating strategies, monitoring program execution, and evaluating outcomes. Through the participation of local governments, NGOs, and communities, stunting prevention efforts are expected to become more focused and sustainable. With these integrated policies and programs, the government reaffirms its commitment to creating an environment that fosters optimal growth and development for Indonesia's children (Setkab RI, 2022).

The Role of Academic in Promoting Nutritional Awareness for Stunting Prevention

Nutrition education and counseling play a crucial role in preventing stunting, particularly by increasing the knowledge of mothers, families, and health workers regarding adequate nutritional fulfillment for children. Evidence-based nutrition education can help transform dietary behaviors and reduce stunting prevalence. Through counseling delivered by academics and health professionals, both directly and via digital platforms, awareness of balanced nutrition can be disseminated more broadly. This provides deeper understanding of the adverse impacts of stunting as well as the preventive measures that can be undertaken. In addition, academics contribute to developing educational materials and training modules for frontline health workers, ensuring that nutrition counseling is structured, effective, and capable of reaching communities in need. Integrated educational efforts establish nutrition education as a key element in reducing stunting rates.

Empirical evidence reinforces this role. A study by Ruwiah et al. (2021) found that effective nutrition education enhances awareness of the importance of balanced dietary

intake, particularly during the first 1,000 days of life (HPK), a critical period of child development. Employing a systematic and literature-based approach, the study emphasizes that appropriate nutrition education interventions can reshape eating habits more broadly, fostering healthier dietary patterns across society (Ruwiah et al., 2021).

Beyond education, academics actively design and implement training programs for both communities and health professionals. These initiatives aim to increase awareness of the importance of providing nutritious complementary foods for breastfed infants (MP-ASI), thereby ensuring adequate macro- and micronutrient intake for optimal child growth. Through such programs, healthcare workers and community cadres acquire essential knowledge and skills for delivering nutrition education and effectively assisting families. As a result, academics provide contributions not only through research but also through education and training, which directly enhance community well-being, particularly in the prevention and management of stunting (Ruwiah et al., 2021).

Private Sector Initiatives in Stunting Reduction

Within the context of stunting prevention, the private sector particularly through Corporate Social Responsibility (CSR) programs plays a strategic and significant role. A notable example is the CSR initiative of PT. Adaro Indonesia in Balangan District, which has been shown to positively impact local stunting reduction. According to Susanti (2025), the CSR program was designed to address multiple dimensions of stunting prevention holistically. CSR represents the commitment of corporations to mitigate the social, environmental, and economic impacts of their business operations while contributing positively to surrounding communities. Such programs often encompass education, health, environmental management, economic empowerment, and social infrastructure development (Susanti, 2025).

PT. Adaro's CSR program focuses on providing affordable, nutritious food to communities in stunting-prone areas. By collaborating with health counselors, the company ensures accurate targeting of food distribution, particularly for pregnant women and children under five the most vulnerable groups. Furthermore, the program incorporates community education on the importance of healthy eating patterns as a preventive measure against stunting.

Equally important, the program improves access to sanitation and clean water, addressing two critical determinants of child nutrition. Poor sanitation and limited clean water supply often exacerbate malnutrition and stunting by increasing infection and diarrheal disease. PT. Adaro responded by constructing improved sanitation facilities, such as hygienic latrines, and by upgrading water distribution systems in underserved communities (Susanti, 2025).

The company also strengthened access to basic healthcare services by investing in health facilities, including local clinics and community health centers, thereby improving maternal and child access to routine check-ups and nutrition monitoring. Additionally, PT. Adaro forged partnerships with local governments, academics, and NGOs to develop data-driven solutions for stunting prevention. These collaborations

included capacity-building programs for local health workers, education on early detection of stunting, and the dissemination of practical guidance for communities (Susanti, 2025).

This example demonstrates that CSR can contribute meaningfully to reducing stunting prevalence by integrating nutrition support, sanitation improvements, healthcare access, and education. When implemented holistically, such initiatives promote sustainable improvements in community health and nutrition outcomes.

Community Contributions to Stunting Reduction

As the group most directly affected, communities require intensive support and guidance in stunting prevention efforts. Community participation is often reflected in their engagement with initiatives such as *posyandu* (integrated health posts), family nutrition workshops, and child growth monitoring at household and community levels. These activities not only expand knowledge about nutrition and child health but also empower communities to act as change agents in supporting children's growth. Community-based social monitoring strengthens government programs by helping to identify risk factors and address stunting at an early stage (Kemenkes, 2022).

Maternal health is a critical determinant in stunting prevention. Nutritional intake during pregnancy directly influences fetal growth and development. Pregnant women who experience anemia or chronic energy deficiency face higher risks of delivering low birthweight infants, a key indicator of stunting. Ensuring balanced nutrition during pregnancy particularly in the first trimester, when organ development is rapid is therefore vital. Exclusive breastfeeding for the first six months further supports optimal growth and immunity, reducing the risk of stunting later in life. Promoting maternal and child nutrition thus establishes a strong foundation for effective stunting prevention (Hardinsyah & Supriasa, 2016).

Socioeconomic and educational factors also play significant roles. Poverty often limits access to adequate nutrition, healthcare, and education. Families with low educational attainment, particularly mothers, may lack sufficient knowledge of appropriate feeding practices and child-rearing behaviors that support growth. Moreover, disparities between urban and rural areas exacerbate inequalities in stunting prevention nationwide. For sustainable progress, communities must be supported not only as program implementers but also through ongoing supervision, capacity building, and technical assistance from health workers and stakeholders (Bappenas, 2021).

Media and NGOs in Stunting Advocacy

The mass media plays a vital role in disseminating educational information about stunting prevention, particularly regarding the importance of nutrition during the first 1,000 days of life. Public campaigns and media coverage can heighten awareness of the long-term consequences of stunting for human capital. By providing accurate and accessible information, the media bridges the gap between government programs and the broader public, ensuring effective outreach across diverse social groups (UNICEF, 2021).

Media outlets also highlight success stories and local innovations that have effectively reduced stunting. Such coverage serves as both inspiration and practical

guidance for regions facing similar challenges. By amplifying best practices and facilitating knowledge exchange, the media enhances replication of effective interventions nationwide. At the same time, media serves as a tool for public advocacy, promoting accountability and transparency in stunting prevention initiatives. Its role as a social watchdog ensures that interventions remain evidence-based, equitable, and impactful (WHO, 2020).

At the global level, comparative media reporting showcases best practices from other countries. For example, Malaysia's community based nutrition programs and Thailand's use of digital media in family nutrition campaigns have proven effective in changing dietary behavior (Ministry of Health Malaysia, 2016; UNICEF Thailand, 2019). Such examples offer valuable lessons for Indonesia in adapting and scaling successful interventions (FAO, 2021).

Non-governmental organizations (NGOs) also act as strategic partners linking governments and communities. Beyond service delivery, NGOs contribute to stunting prevention through capacity building, training community cadres, and providing policy advocacy tailored to local contexts. Their emphasis on culturally sensitive interventions ensures that stunting prevention programs align with local realities and community needs. NGOs also deliver evidence-based policy recommendations, thereby strengthening government programs with grounded perspectives (UNICEF, 2021).

One notable organization actively engaged in addressing stunting in Indonesia is the Tanoto Foundation, a philanthropic institution established by Sukanto Tanoto and Tinah Bingei Tanoto. Since its inception, the Tanoto Foundation has been committed to supporting national strategies aimed at reducing stunting, which remains a significant public health challenge in the country. In close collaboration with UNICEF, the Foundation has implemented an innovative program entitled *"Unlocking Future Potential with Nutrition: Towards Zero Stunting in Indonesia."* This initiative is designed to promote positive behavioral change in relation to nutrition, with a particular focus on raising public awareness of the importance of adequate nutrition for children's growth and development (Tanoto Foundation & UNICEF, 2022).

Beyond awareness campaigns, the program has also produced operational standards that can be adopted by provincial governments to support and evaluate behavior and social change communication (KPP) initiatives at the district level. By following these recommendations, local governments are expected to be better equipped to design and implement context-specific interventions, thereby enhancing the effectiveness of stunting reduction programs. The collaboration between Tanoto Foundation and UNICEF further emphasizes stakeholder engagement, particularly by involving communities at every stage of the program. Such participation fosters a sense of ownership and shared responsibility in combating stunting. In addition to addressing nutritional challenges, the Tanoto Foundation contributes to strengthening local capacity and fostering collaboration between the public sector, private sector, and communities. This comprehensive and sustainable approach is expected to generate long-term impacts on child health and well-being, ultimately contributing to the development of a healthier and more productive future generation in Indonesia (Tanoto Foundation & UNICEF, 2022).

The effectiveness of the Hexa Helix model does not merely depend on the presence of six stakeholders, but on the quality of interaction and coordination among them. In the context of stunting reduction, the government plays a central role in formulating policies and coordinating interventions, while academic institutions contribute evidence-based knowledge, research findings, and educational programs. These academic contributions become more effective when translated into community-based initiatives through collaboration with local governments, health workers, and civil society organizations. At the same time, the private sector can complement government programs through corporate social responsibility initiatives, nutritional assistance, and support for community development programs. Media organizations play a strategic role in disseminating information, increasing public awareness, and encouraging behavioral change related to nutrition and child health. Meanwhile, non-governmental organizations function as facilitators that bridge government policies and community needs, ensuring that interventions are responsive to local conditions and social realities.

Therefore, the Hexa Helix model should not be understood as a collection of independent actors, but as an integrated collaborative ecosystem in which each stakeholder contributes different resources, capacities, and networks. The success of stunting reduction efforts largely depends on the ability of these actors to establish sustainable partnerships, coordinate interventions, and pursue shared goals in improving public health outcomes. Within the Hexa Helix framework, collaboration occurs through interconnected relationships among stakeholders rather than through isolated sectoral interventions. The government provides policy direction, coordination, and resource allocation, while academic institutions contribute scientific evidence and innovation to support program design and evaluation. These knowledge resources are then translated into practical interventions through collaboration with communities, non-governmental organizations, and local health workers. At the same time, the private sector supports program implementation through funding, infrastructure, and social responsibility initiatives, whereas the media facilitates information dissemination and public awareness. Through these interconnected roles, the Hexa Helix model functions as a collaborative ecosystem in which each actor reinforces the contributions of others in achieving sustainable stunting reduction outcomes.

Conclusion

Stunting remains a multidimensional public health challenge that cannot be addressed through sectoral interventions alone. The literature reviewed in this study demonstrates that the causes and impacts of stunting extend beyond nutritional issues, encompassing healthcare access, sanitation, education, socioeconomic conditions, and community awareness. Consequently, effective stunting reduction requires integrated interventions that involve multiple stakeholders working toward shared objectives.

This study finds that each actor within the Hexa Helix framework plays a distinct yet complementary role. The government functions as a regulator and coordinator of stunting reduction programs; academic institutions contribute research, innovation, and nutrition education; the private sector supports interventions through corporate social responsibility initiatives and resource mobilization; communities serve as key actors in implementing healthy behavioral practices; the media disseminates information and

raises public awareness; while non-governmental organizations facilitate community empowerment and strengthen policy advocacy. The effectiveness of stunting reduction efforts depends not only on the performance of individual actors but also on the quality of collaboration among them.

Conceptually, this study highlights the relevance of the Hexa Helix model as a collaborative governance framework for addressing complex public health challenges. The model provides a mechanism for integrating resources, knowledge, networks, and capacities across sectors, thereby supporting more comprehensive and sustainable stunting interventions.

However, several challenges remain, including limited intersectoral coordination, unequal resource distribution, variations in local institutional capacity, and the need for more integrated data systems. These challenges indicate that collaborative efforts must be continuously strengthened to ensure the effectiveness and sustainability of stunting reduction programs. Therefore, future stunting reduction strategies should focus not only on nutritional interventions but also on strengthening collaborative governance mechanisms among stakeholders. Through stronger coordination, shared commitment, and integrated action, the Hexa Helix approach can contribute significantly to improving public health outcomes and supporting the development of healthier and more productive future generations.

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