

Health Communication Management for Stunting Reduction: A Case Study of Lhokseumawe

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ABSTRACT

In Indonesia, stunting is a critical public health concern, with Aceh suffering from a nationally significant increase in the third prevalence of 33.2% in 2021. However, Lhokseumawe has achieved a substantial decrease this year, reducing stunting become 17.4% in 2024, below the national average. This qualitative exploratory study investigates the role of integrated health communication management in this success, focusing on the PPS (Diet, Parenting, Sanitation) program in four sub-districts. Through in-depth interviews with nine informants (healthcare workers, posyandu cadres, and community members), validated through triangulation, this study identifies key strategies: the BAAS program, the Gampong Nutrition House, and Supplementary Feeding, supported by pentahelix collaboration and media campaigns. This initiative promotes behavioural change by increasing nutritional awareness and community engagement. Challenges include misunderstandings about stunting, low stunting literacy, and socioeconomic barriers. The stunting management model in Lhokseumawe City aligns with the National Action Plan for Stunting Prevention (RAN PASTI) and global SDG targets, offering a replicable framework for regions with high prevalence. The findings emphasise the need for culturally sensitive communication and synergy across communication fields to sustain the decline. This study fills a gap in understanding how structured health communication transforms knowledge into action, providing insights to improve stunting prevention in Aceh and surrounding areas.

Keywords: *Management communication, health issue, reduce stunting, pentahelix model, stunting in Lhokseumawe City.*

INTRODUCTION

The development of every nation is fundamentally directed at fulfilling the basic human rights of citizens to achieve prosperity, including the right to health as stipulated in the UN Declaration of Human Rights. In the new health paradigm, health is no longer considered "static," or a dichotomy of health and illness, but rather dynamic, progressive, and continuous. This implies that health comprises physical, mental, social, and economic dimensions. Consequently, an individual who is physically, mentally, and socially healthy but lacks economic or social productivity cannot be considered fully healthy. Economic productivity can be measured by work, while social productivity is measured by activities related to improving the quality of life for individuals, others, and society through positive initiatives. Health is a basic and natural potential of every human being, which is certainly necessary in the early life and growth of each individual. When a child is exposed to unhealthy environmental conditions from conception through growth and development, the consequence is low human resource quality (Vinet & Zhedanov, 2011).

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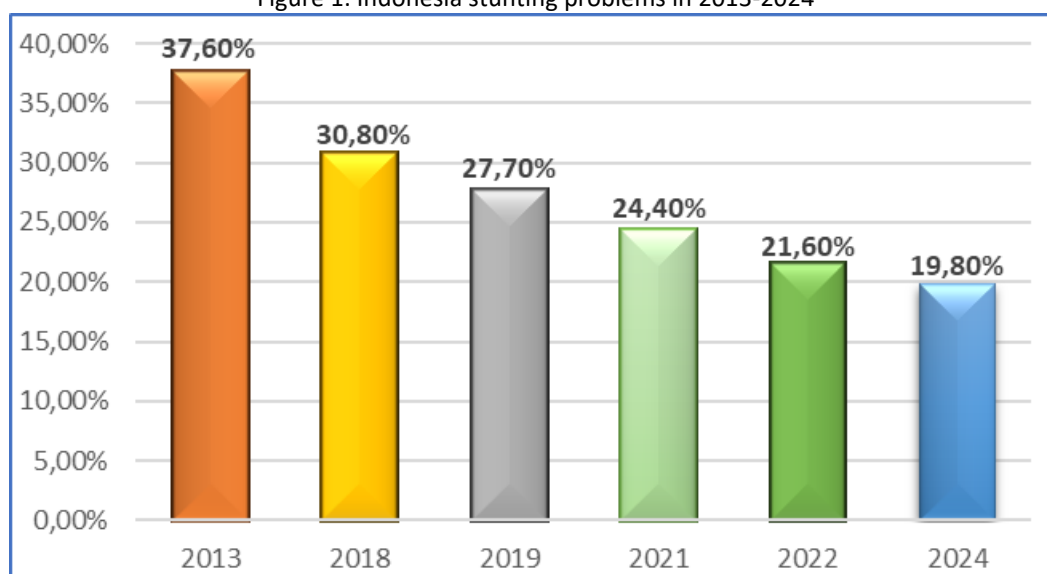
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In general, stunting has become a global issue and is part of the third goal of the 2030th Sustainable Development Goals (SDGs), which focuses on good health and well-being. The primary goal is to ensure healthy lives and support the well-being of people of all ages. The World Health Organization (WHO) recommends that stunting should not exceed one-fifth of children, or approximately 20% of the population. However, the rates in Indonesia have consistently exceeded this threshold. In 2021, the WHO labelled Indonesia as a country with poor nutritional status. Although there has been a decline of up to 7%, the percentage of stunted children remains at 30.7%. These cases reflect failure in child growth and development due to chronic malnutrition (Makarim, 2023). Indonesia is listed as the 5th-largest country with the highest prevalence of stunting worldwide. Various programs are currently being implemented to improve nutritional interventions across regions, making stunting a significant health concern both nationally and internationally.

Figure 1: Indonesia stunting problems in 2013-2024



Source: UNICEF (2025)

The impact of stunting on children is evident both in the short and long term. In the short term, it generally affects physical development, resulting in a below-average height relative to age. Stunting also impacts cognitive development due to impaired brain growth, which may lead to decreased intelligence. In the long term, stunting increases vulnerability to diseases such as obesity, diabetes, heart disease, blood vessel narrowing, cancer, stroke, and disability in old age. Additionally, it affects the future quality of human resources. Effective communication is generally crucial for conveying messages and developing solutions to complex social issues, such as stunting. Health Office, Posyandu (Integrated Service Post) cadres, and others engaged in managing stunting act as key communicators by providing data, information, and services for children's health. This fosters a collaborative approach that comprises community members and affected individuals. Stunting, a condition characterized by failure to thrive due to chronic malnutrition, is a global health issue impacting millions of children worldwide.

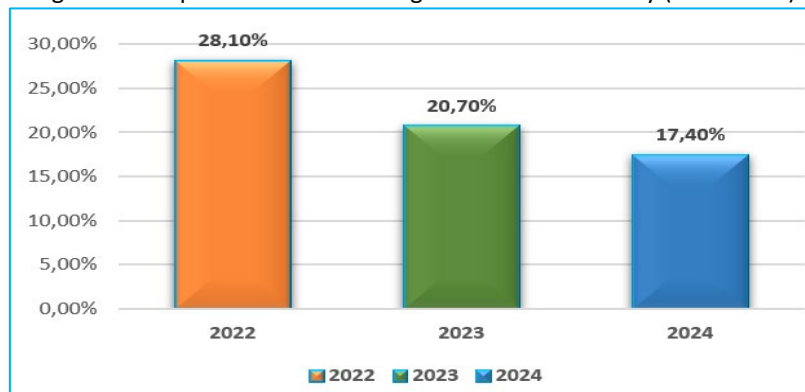
Although investigations on stunting interventions have grown considerably, studies specifically focused on the role of health communication management in the context of successful reduction programs at the local level remain limited. Most studies tend to focus on factors such as nutrition, sanitation, and access to health services. At the same time, the

communication dimension is often considered a supporting aspect, rather than a key factor in success. A major gap was identified regarding the lack of in-depth understanding of how a well-structured and well-managed communication strategy can effectively transform knowledge into behavioural change in the community. This is particularly relevant in the context of effective health communication management to foster significant stunting reduction at the local level. Most studies tend to focus on the results of clinical interventions or large-scale programs, without delving into how a planned and integrated health communication strategy actually facilitates behavioural change and increases public awareness.

In 2021, Aceh Province ranked third in Indonesia for the highest prevalence of stunting. This is shown in Databooks, which reports Indonesian Nutritional Status Study (SSGI), with an estimated 33.2% of children under five in Aceh Province experiencing stunting (Kusnandar, 2022). This implies that 1 in 3 children in the province is shorter than the typical height for the age. Three regions with the highest stunting prevalence have an estimated rate of about 40%. These regions are Gayo Lues Regency (42.9%), Subulussalam City (41.8%), and Bener Meriah Regency (40%) (Muharso, 2025). Lhokseumawe City was ranked tenth in Aceh (2021), with stunting prevalence of 27.4%, the lowest among the 23 regencies/cities (Muhawarman, 2025). The data indicate that the city has the lowest number of stunting cases in the province. Consequently, this study was conducted to examine the role of health communication in addressing stunting in the city by analysing both the strategies implemented and the challenges faced.

Based on SSGI data from 2024, the prevalence of stunting in Aceh reached 28.6% in 2025, ranking the province seventh among a total of 38. Dr. T. M. Thaib (M.Kes., Sp.A.) a subspecialist as well as the Head of the Growth and Development and Social Pediatrics Work Unit of the Indonesian Pediatric Society (IDAI) Aceh Branch, emphasized during the Indonesian Mosaic Dialogue that stunting can affect the quality of future human resources. Without adequate treatment, Indonesia demographic bonus could turn into a demographic burden (Muharso, 2025). Despite the challenges, Lhokseumawe City in Aceh showed a significant decrease in stunting rates. The results of the 2023 Indonesian Health Survey (SKI) show a significant decrease in the prevalence of stunting in Lhokseumawe City, dropping by 7.4%. From 28.1% in 2022, it has now decreased to 20.7% in 2023.

Figure 2: The prevalence of stunting in Lhokseumawe City (2022-2024)



Source: Indonesian health survey (SKI) (Kemenkes, 2023)

This achievement makes Lhokseumawe City the second city/district with the lowest stunting prevalence in Aceh Province (Mardhiah, 2024). Based on data in 2024, from Lhokseumawe Health Office, Safwaliza, the city reduced stunting rate by 17.4%, which is well below the national average (Maimun, 2025) (See Figure 2). This success is significant and warrants further investigation, particularly regarding the factors contributing to the drastic reduction. Presently, there has been no comprehensive scientific study detailing how health communication management in Lhokseumawe has effectively bridged the gap between knowledge and practice, shifted social norms, and empowered the community to independently adopt behaviours that prevent stunting.

The Pentahelix Model

Following the COVID-19 pandemic, stunting has become a major challenge for global health development, causing a significant decline in the number of healthy generations. Data from WHO show that Indonesia has the highest rate of stunting among children. This indicates the need to strengthen efforts in prevention, detection, and cross-sectoral response. One effective prevention and reduction approach is cross-sector collaboration, which emphasizes synergistic communication using the pentahelix model. The decrease in stunted children has not been evenly distributed across Aceh Province. Consequently, accelerative efforts should be made by fostering collaboration and cohesive communication among various parties, including local governments, academics, business actors, the community, and the media. Enhancing stunting reduction program can be achieved by integrating communication efforts across the five pentahelix elements

Pentahelix model has been implemented in stunting management in Lhokseumawe City. Stakeholders who play a significant role include the government (the Lhokseumawe City Health Office and healthcare facilities), the community (the role of BAAS—Foster Parents for Stunting Children), academics (stunting researchers), business actors (PMT—Supplementary Food Provision donors), as well as the media (BAAS movement publications and Stunting Campaign) (See Figure 3.).

Figure 3: Pentahelix model

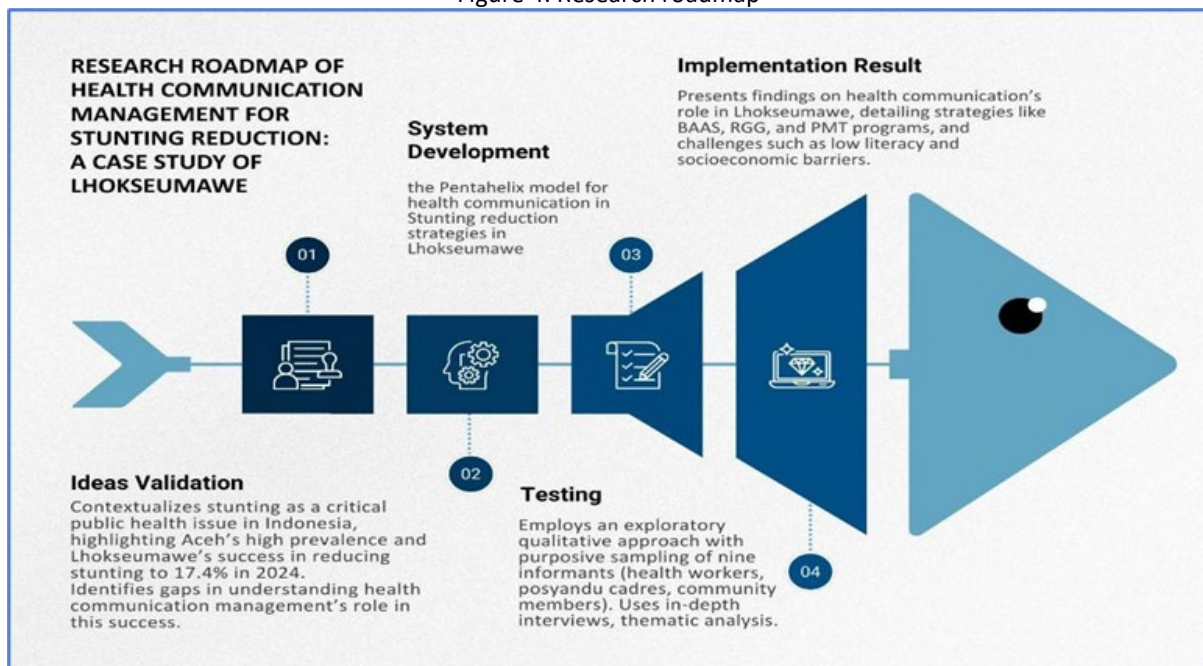


Source: Pentahelix collaborative development model (Tohopi et al., 2024)

The government plays a role in policies aimed at reducing the prevalence of stunting. Through the development of various studies and community service initiatives on stunting, using pentahelix model, efforts are being made to slow down the rise of stunting in Aceh Province. According to Soemaryani (2016), pentahelix serves as a reference for developing synergy between agencies to achieve common goals (Soemaryani, 2016). Similarly, Rampersad et al. (2010) reported that pentahelix collaboration innovated and contributed to regional socioeconomic progress (Rampersad et al., 2010). This study connects the pentahelix model, in the field of health communication to the development of innovative concepts that provide solutions for strengthening health resilience (Suminar et al., 2025). Therefore, support is needed through the roles of business actors, government, communities, academics, and the media to prevent stunting in early childhood, which impacts future generations.

The role of integrated health communication management, particularly collaboration among the government, community health centres (Puskesmas), and community leaders in the success of stunting reduction program through PPS (Dietary, Parenting, and Sanitation) program in 4 sub-districts (Nasrullah, 2025). The results are expected to serve as a guide for analysing strategies and challenges in addressing high stunting rates in other areas of Aceh Province. Previous studies have examined the relationship between slow growth in children height with future health, educational, and economic issues (Dewey & Begum, 2011). Therefore, this study aims to examine health communication management as a driver of stunting reduction in Aceh, particularly in Lhokseumawe City. Aside from exploring health communication strategies that have been implemented, the analysis also considers the challenges affecting the effectiveness of health communication in supporting stunting reduction (see Figure 4).

Figure 4: Research roadmap



Source: Research interpretation (2024)

LITERATURE REVIEW

Stunting remains a pressing global health issue, particularly in Indonesia, where nutritional, socioeconomic, and parenting factors are interconnected. This literature review builds upon previous analyses by incorporating more in-depth details from the article "Health Communication Strategies to Accelerate the Reduction of Stunting in Children in Lubuk Pakam, Deli Serdang" by M. Rizki Irwan and Faustyna (2023). The study strengthens the relationship between previous reports by showing the practical implementation of health communication strategies at Puskesmas level, which supports community behaviour change to reduce stunting. Previous studies provide a scientific foundation for understanding the causes of stunting, which is then connected to effective communication strategies (Irwan et al., 2023), through education on nutrition and early prevention. Communication management is essential to address varying results, such as the association between exclusive breastfeeding and stunting, with an approach that focuses on changing maternal and family behaviours. Stunting among children in Indonesia is closely related to nutritional factors such as exclusive breastfeeding, age, and birth length, although evidence remains mixed. Globally, this phenomenon is referred to as 'stunting syndrome', which is caused by chronic malnutrition affecting 165 million children.

Poor parenting, including inadequate nutrition during pregnancy and postnatal care, and low socioeconomic status, are factors that worsen stunting in children aged 12-59 months. These factors are interconnected throughout the life cycle from fetus to adulthood, with early malnutrition leading to pathological changes such as increased morbidity, mortality, and the risk of metabolic diseases in adulthood. Poor parenting is also often caused by a lack of maternal knowledge about nutrition, hygiene, and access to health facilities, which can be addressed through educational communication. A literature review by (Aurima et al., 2021) found a significant association between stunting and exclusive breastfeeding, although some sources indicate no significant association (Prendergast, A.J; Humphrey, 2014) also identified stunting as a global priority with a 40% reduction target (2010-2025), supported by data on 165 million affected children. A cross-sectional study (Noorhasanah & Tauhidah, 2021) showed a relationship between maternal parenting patterns and stunting, with good parenting patterns preventing early stunting. (Ahyana et al., 2022) found a significant relationship between poor parenting patterns, low socioeconomic status, and stunting in children aged 24-59 months through cluster sampling of 101 mothers. Therefore, health communication management will be successful when focused on exclusive breastfeeding education and parenting patterns from pregnancy, as this improves children immunity and the quality of future human resources. The relationship is relevant to government programs, where effective communication can reduce variation in reports by increasing public awareness, supporting primary prevention of stunting, which is then implemented through Puskesmas strategies (Irwan et al., 2023)

Irwan and Faustyna (2023) provided in-depth details on communication strategies at Lubuk Pakam Puskesmas, complementing (Maulida & Suriani, 2021) by emphasizing the role of leadership and interpersonal dialogue. Both studies connect the nutrition factors from the previous section with practical actions, demonstrating that successful health communication management through direct engagement fosters trust and leads to behavior change for stunting reduction. Health communication strategies used by Puskesmas, including interpersonal dialogue, direct approaches, and sharing of experiences, are effective in accelerating the reduction of stunting (Irwan et al., 2023; Maulida & Suriani, 2021). Furthermore, the communication and mobilization of Posyandu cadres have a significant

influence on stunting prevention through behavioural change. The 2022 stunting reduction acceleration program relies on the role of Puskesmas in building community relationships through conversation and dialogue, which fosters comfort and active participation. This is lack of multi-stakeholder involvement, article (Irwan et al., 2023) does not connect to health centres with academics, businesses (PMT donors), or the media. This is a synergy gap of this research, where cross-sectoral coordination is often a barrier (such as a lack of guidance from search results).

Health communication fosters community trust and enthusiasm. A clear vision and mission from the head of the Puskesmas, supported by the mobilization of cadres, enables sustainable behaviour change, particularly in addressing factors including parenting and nutrition, as mentioned in previous studies. Interpersonal communication, as emphasized by Edward T. Hall (Alizadeh Afrouzi, 2021) interacts with local culture to influence health behaviours, accelerating stunting reduction with a focus on disease prevention and health promotion. Therefore, the success of health communication management is evident through the role of Puskesmas and cadres in community mobilization, which is interconnected with nutritional factors identified in other studies. Irwan and Faustyna (2023) confirmed that a dialogue-based strategy and a clear vision can significantly reduce stunting, supporting the performance of government programs without exception, with an emphasis on direct interaction to build familiarity and community participation in early prevention. The success of health communication management is also evident in the ability to combine qualitative and quantitative approaches to reduce stunting prevalence, with a focus on Puskesmas leadership and community dialogue. It supports global and national targets, suggesting further studies on the integration of digital technologies in health communications to expand impact in rural areas such as Lubuk Pakam.

Stunting, a chronic nutritional problem in children in Indonesia, has a complex interplay between biological factors, parenting styles, and socioeconomic status, which can be addressed through effective health communication management. This literature review updates previous analyses by emphasizing the relevance of studies by Noorhasanah and Tauhidah (2021), with Ahyana et al. (2022), which complement other studies such as Aurima et al. (2021), Prendergast and Humphrey (2014), Irwan et al. (2023), Maulida and Suriani (2021). The previous studies connect maternal parenting styles and socioeconomic factors to stunting incidence, emphasizing the need for health communication to educate parents about nutrition, hygiene, and access to healthcare services from pregnancy onward. Based on the results, successful health communication management relies on behavioural change through interpersonal education and community mobilization, which supports the global target of reducing stunting by 40% (2010-2025) with a focus on early prevention at the Puskesmas level. Therefore, integrating education on parenting and socioeconomic factors from pregnancy guarantees successful health communication management, as mothers with good knowledge are well equipped to prevent stunting through early nutritional monitoring. This is relevant to government programs, where effective communication reduces the negative impact of poor parenting, connecting to cadre mobilization in other studies for community empowerment. Success is evident in the ability to combine quantitative (cross-sectional) and qualitative approaches to reduce stunting prevalence.

The chronic global problem of stunting, affecting millions of children, can have long-term implications for health, education, and the economy. Studies by Beal et al. (2018), de Onis and Branca (2016), Latif and Riana (2020), also with Susilo and Harliantara (2023)

examined the success of health communication management. These studies focused on stunting determinants, socioeconomic impacts, as well as collaborative and digital communication strategies that support community behaviour change. Based on the results, successful health communication management integrates multi-stakeholder approaches (such as the pentahelix) and digital media to address stunting risk factors, in line with the 2025 Global Nutrition Targets and SDGs. The determinants and global-local Impacts of stunting provide a foundation for health communication, as emphasized by Beal et al. (2018) and de Onis and Branca (2016). Together, these studies complement each other by showing the determinants of stunting at the national (Indonesian) and global levels, which form the basis for health communication interventions. Successful communication management requires conveying information about risk factors, such as nutrition and sanitation, to foster early behavioural changes, which are then integrated with collaborative and digital strategies. Stunting in Indonesia is influenced by factors such as non-exclusive breastfeeding, low socioeconomic status (SES), premature birth, poor sanitation, and limited health access, with a national prevalence of around 37%. Globally, the condition affects 161 million children in 2013 (de Onis & Branca, 2016) causing social inequality, which is often unrecognized by the public because it is considered normal. The determinants are interconnected with social inequality and the lack of routine assessment of linear growth in primary health care, which leads to pathological disorders such as increased morbidity, mortality, cognitive decline, and the risk of chronic diseases in adulthood.

Health communication is essential for raising awareness and promoting early prevention, thereby reducing the risk of obesity. Using the WHO framework, a literature review by Beal et al. (2018) identified consistent evidence from Indonesian studies connecting stunting to non-exclusive breastfeeding, low SES, prematurity, inadequate sanitation, and poor access to healthcare in rural areas, with data gaps emphasizing the need for targeted interventions (Beal et al., 2018). de Onis and Branca (2016) showed that stunting starts in utero and continues for 2 years post-birth. Although the prevalence had decreased by 37% at the time of the study, 161 million children remained affected, with a lack of visual recognition and routine assessment causing delayed identification (de Onis & Branca, 2016). Health communication management is most successful when focused on educating the community about the determinants of stunting, supporting primary prevention, and reducing social inequalities. This relationship is relevant to collaborative strategies such as pentahelix and digital strategies to expand information reach in Indonesia.

Susilo and Harliantara (2023) complemented previous studies by focusing on digital communication on Instagram, connecting stunting determinants (Beal et al., 2018; de Onis & Branca, 2016) and collaboration (Latif & Riana, 2020) through persuasion for prevention. This is relevant because it shows that successful health communication management through digital media can build awareness and future investment, in line with SDGs. Digital communication and health promotion persuasion on Instagram are effective for stunting prevention, a major problem in Indonesia due to past crises and digital disruption. This represents a sustainable investment for a healthy generation. Stunting due to poor diet and inadequate parenting may be prevented through digital persuasion that influences audience acceptance, specifically amid information disruption in line with SDGs, such as zero hunger, health, and gender equality. Susilo and Harliantara (2023) found that stunting prevention is not only moral but also strategic, with digital disruption from political buzzers requiring informative media to address neglected cases. The study found that health communication management through digital platforms was successful in persuading anti-stunting behaviour

change, interconnected with determinants and collaborations from other studies. Therefore, media integration is crucial to achieve SDGs and reduce stunting prevalence in Indonesia. Collectively, the studies reviewed demonstrate how determinants of stunting (Beal et al., 2018; de Onis & Branca, 2016) can serve as focal points of collaborative and digital communication (Susilo & Harliantara, 2023) supporting the efficacy of health communication management by addressing behavioral change and knowledge dissemination gaps. Success is reflected in the ability to integrate WHO framework, the pentahelix model, and social persuasion to reduce stunting prevalence by the 2025 target. Further studies should examine hybrid communication (digital-collaborative) for vulnerable areas in Indonesia.

METHODOLOGY

This study used an exploratory qualitative approach to examine stunting management in Aceh, particularly in Lhokseumawe City. This approach was selected to gain a better understanding of the formulated problem and to develop initial hypotheses. The primary data collection method was in-depth interviews, supported by observation and document utilization. According to Bogdan and Taylor (in Moleong, 2021), a qualitative study is a procedure that generates descriptive data in the form of written words, spoken words, and observable behaviours. This study focuses on the role of health communication management in driving stunting reduction in Aceh, supporting the National Action Plan for the Acceleration of Stunting Reduction (RAN PASTI), both in terms of strategy and challenges.

In line with qualitative study traditions, selecting key informants was essential for gathering valid data on the subject. Informants were selected through purposive sampling, in which individuals were selected based on relevance and direct engagement with the study focus. The samples included key stakeholders engaged in health communication management related to stunting. The informants consisted of (1) government policy implementers, such as representatives from Lhokseumawe City Health Office; (2) Posyandu cadres responsible for health resilience; (3) the general public, including individuals affected by stunting or families; and (4) community members. A total of 9 informants were interviewed, including 4 from health communication team (including health centre and health office staff) as primary informants, and 5 from the community (those aware of or who had received BAAS program) who were secondary informants. Interviews were conducted face-to-face at locations convenient for the informants, lasting approximately 45 to 60 minutes each.

Table 1: Informants data

Informants Status	Primary Informants					Secondary Informants				
	Representatives from Lhokseumawe City Health Office		Posyandu cadres			The general public / community members				
Initial Name of Informants	LN		MD	LS	AM	YS	SR	RM	NA	HS
Coding Name	R1		R2	R3	R4	R5	R6	R7	R8	R9

The data collection instrument consisted of a semi-structured interview guide that included open-ended questions designed to explore key themes, such as the role of health communication, strategies implemented, and challenges encountered. The interview guide structure was divided into three sections, namely (1) introduction and background, (2) core questions related to experiences and perceptions of stunting program, and (3) a closing with follow-up questions for clarification. Additionally, a document analysis protocol was applied

to review secondary sources, including Health Office Reports, SSGI data, and RAN PASTI program documents, with a focus on extracting relevant data through repeated reading and identifying key themes.

Data analysis was conducted thematically using an inductive coding approach, which is data analysis, a process that moves from facts (data) to theory. Validity was confirmed through data triangulation methods (combining interviews, observations, and documents), peer debriefing (discussions with fellow researchers), and an audit trail (comprehensive documentation of the study process), all aimed at verifying the results. Ethical considerations were a top priority, and to protect anonymity, the identities of informants were anonymized with initials (e.g., R1-R9), and personal information was not included in the report. Recordings and transcripts were securely stored on an encrypted server. Ethical considerations, Informed consent was secured verbally and in writing, emphasizing voluntary participation and withdrawal rights. Anonymity was protected by were assigned coded initials (R1–R9), and identifiable details were excluded from reports. All recordings and transcripts were stored on an encrypted server accessible only to the research team. Reflexivity was maintained via researcher journal entries to address potential biases in a culturally sensitive context.

RESULTS

The results described practical communication management, focusing on the roles, strategies used, and challenges faced in addressing stunting in Lhokseumawe City demonstrated in the pentahelix model.

The Role of Health Communication in Addressing Stunting in Lhokseumawe City

According to SSGI data, Aceh was among the provinces with the highest stunting rates in Indonesia. However, one region, namely Lhokseumawe City, did not fall into the category of the highest stunting prevalence. This implies that the city had the lowest stunting rate, achieving satisfactory results according to RAN PASTI. Therefore, this study described the implementation of Lhokseumawe City Health Office in the collaborative pentahelix model to achieve RAN PASTI. Through interviews about the key role of health communication management in stunting in Aceh, the informants identified key points shown in Table 2.

Table 2: Interview results with informants on the role of health communication in stunting management in Lhokseumawe City

Informants' Initial	Interview's on the Role of Health Communication Management Addressing Stunting in Lhokseumawe City
(R1)	Stunting was reduced by up to 7.4% (2023) through BAAS program, coordination among Regional Apparatus Organizations (OPD), Puskesmas, Youth Empowerment Program (PPD Adolescent), Nutrition Action (Aksi Bergizi), screening pregnant women, and monthly Posyandu with local PMT based on a balanced menu (rice, soup, tofu, quail, vegetables, eggs, fruit, and pudding). Strict monitoring exceeds 90% each month.
(R2)	BAAS in villages focused on stunting, providing high-protein PMT; supplying 2 eggs daily for 3 months; and offering 90 days of healthy meals.
(R3)	Monthly stunting case audit meetings organized by the DP3AKB (Women Empowerment, Child Protection, and Family Planning Office); discussions on stunting within the village; RGG; PMT from the village government, BAAS, and other agencies; focusing on preventing malnutrition; prospective bride and groom programs with FE tablets and education; promoting cross-sectoral collaboration through media and advocacy.

(R4)	Collaborates with the Sanitation and Health Office on discussions about feeding, outfits, and stunting at the city level, led by the Acting Head; allocates village funds; and implements interventions according to the technical guidelines of the Ministry of Health and Ministry of Home Affairs.
(R5), (R6), (R7), (R8), (R9)	Knowledge about stunting comes from Puskesmas extensions, BAAS Program, TV, social media, and government campaigns such as extensions for pregnant women and children; information is easily accessible today.

Based on statements from informants, the decline in stunting rates in Lhokseumawe City, the second lowest in the entire Aceh region, was closely tied to the monitoring and implementation programs by Health Office, which aimed to achieve RAN PASTI. Strengthening stunting program, alongside the hard work and commitment of Posyandu cadres at Puskesmas, combined with the implementation of nutrition programs in the villages, enabled the smooth operation, thereby reducing stunting rates in the city. This study aims to offer a detailed understanding of health communication strategies by analysing the programs carried out by Health Office to decrease stunting rates. Each strategy implemented presents distinct challenges. In addition, challenges faced during implementation and the effectiveness of the program were also evaluated. Health communication, through stunting management programs, was executed by each Puskesmas cadre across the four sub-districts of Lhokseumawe City. As shared by Informant R2 (Muara Satu Puskesmas), Informant R4 (Banda Sakti Puskesmas), Informant R3 (Muara Dua Puskesmas), and Informant R8 (Blang Mangat Puskesmas), programs and campaigns aimed at combating stunting have been carried out. Based on the interview results, PMT with a healthy, balanced menu has been implemented as part of the routine measures to prevent stunting.

The interview results conveyed by informant R3 from Muara Dua Puskesmas showed that BAAS program activities, recognized as the main strategy for preventing stunting in Lhokseumawe City, have been carried out thoroughly and consistently. RGG (Rumah Gizi Gampong/Village Nutrition House) program has been implemented in every village. According to an interview with AM from Banda Sakti Puskesmas, the focus on RGG is a key component of stunting management program. RGG is crucial for the implementation of stunting prevention, as Posyandu cadres/midwives in the village have been actively engaged in reducing stunting. Informant R7 from Blang Mangat Puskesmas also confirmed the operation of BAAS as Stunting Care Program. The interview results generally indicate that Lhokseumawe City has consistently and routinely taken measures to prevent high stunting rates. This implies that all strategies by policymakers to meet RAN PASTI goals are being implemented. Consequently, Lhokseumawe is the lowest-ranked region in Aceh in achieving RAN PASTI target.

Health Communication Strategy for Addressing Stunting in Lhokseumawe City

Health communication strategy for addressing stunting in Lhokseumawe City starts with policies from Health Office and is driven by Posyandu cadres, including village midwives and Posyandu cadres, as well as extensions on nutrition and family health from adolescence. Effective nutrition education during adolescence can serve as a long-term preventive measure, since adolescents play a crucial role in the quality of human resources (Maulidiyanti et al., 2024). The evolution of media technology and the media landscape have changed the communication patterns of society (Chew et al., 2021). This stage also functions as a planning phase in the strategy, covering both strategic and operational planning.

The role of health communication in assessing strategies to reduce stunting rates reflects the efforts of Lhokseumawe City community as a whole and health programs promoted by Health Office. The stages of the strategy, as found in interviews, include educational extensions on stunting. One strategy, starting with adolescent girls, comprises administering iron tablets simultaneously in secondary schools. Interventions for pregnant women include counselling, such as at the Posyandu, outpatient visits to Puskesmas, and information about stunting. Monitoring and evaluation of stunting audit interventions were conducted. In this case, the focus was on pregnant women with Chronic Energy Deficiency at home. Support for stunted children was also provided, especially for those in villages. For example, in Muara Dua Informant R3, a 'Class Stunting' program has been established to provide targeted interventions. Sharing health information, specifically about stunting, with the public through media channels was considered more effective.

Table 3: Strategies used by health communication implementers to address stunting in Lhokseumawe City

Informants Initial	Interview's on The Strategies of Health Communication Implementers in Handling Stunting at Lhokseumawe City
(R1)	Health communication through village midwives and Posyandu cadres; Infant and Young Child Feeding (PMBA) training; monthly Posyandu with local PMT; and breastfeeding practices every three months for cadres.
(R2)	Introduction to stunting in the community; iron tablets for adolescent girls in schools; counselling for pregnant women at Posyandu/ Puskesmas; high-calorie protein consumption; monitoring and evaluation of Chronic Energy Deficiency and stunting in children; stunting classes in villages with PMT.
(R3)	The Sanitation and Health Office is already in place, including stunting prevention initiatives and discussions at the city level, village fund allocation, and interventions based on technical guidelines.
(R4)	Introduction to stunting via social media/TV; direct extensions; government campaigns for pregnant women and children.
(R5), (R6), (R7), (R8), (R9)	Communication strategies: social media, TV, and extensions; extensions at Puskesmas; easy access to information from various sources.

In the statement, Informant R9 also reinforced the strategy by stating that stunting campaign was effective due to the positive impact on both mothers and children. This is because mothers are typically more informed about children health information. As confirmed by Informant R7 from the BlangMangat Village community, information can be easily obtained from various sources, including television, and socializations held every few months at the nearest Puskesmas. The interview results in Table 3. provide evidence about the openness of information through media channels accepted and understood by the audience as part of stunting management strategy in Lhokseumawe City.

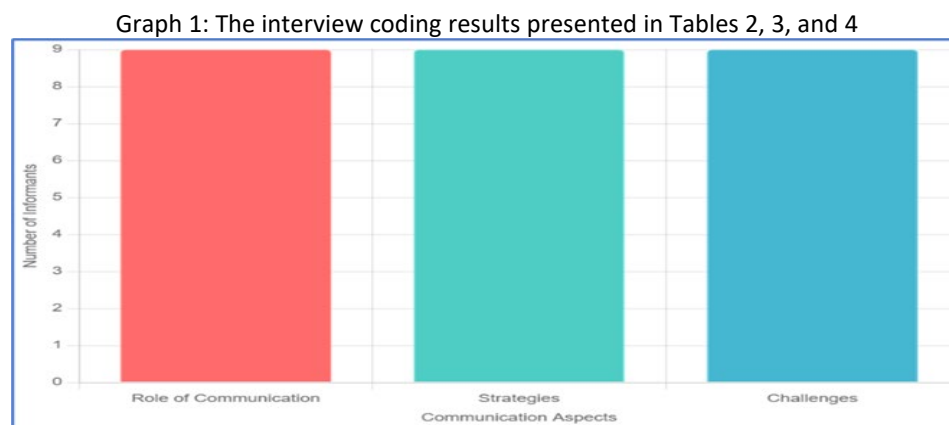
Health Communication Challenges in Addressing Stunting in Lhokseumawe City

Based on the difficulties encountered by activity implementers and Puskesmas cadres, interpersonal communication plays a crucial role in interpreting messages about stunting in the program stage, as shown in Table 4.

Table 4: Interview's of informants concerning challenges in health communication for addressing stunting in Lhokseumawe City

Informants' Initials	Interview's on Health Communication Challenges in Addressing Stunting in Lhokseumawe City
(R1)	Educational communication; mother's will.
(R2)	Indifference due to low education/knowledge; weak economy.
(R3)	Families get angry if their child is called stunted (understood as a disease); a misconception (healthy child but short, genetics from grandparents).
(R4)	Parents are angry or misunderstand stunting as a disease; children are considered healthy even though they are short.
(R5), (R6), (R7), (R8), (R9)	Challenges: angry/misunderstanding families(R6); low level of understanding (R7); low economy (R8); lack of maternal literacy (R9).

Based on the interview coding results presented in Tables 2, 3, and 4, the overall data are summarized in the following Graph 1.



Source: Interpretation results of interview data from informants

Graph 1 shows that all nine informants (R1 – R9) consistently emphasized the role, strategies, and challenges of health communication, demonstrating comprehensive engagement across these dimensions in efforts to reduce stunting in Lhokseumawe. Based on the analysis of interview data (Informants R1 to R9), the results show three key aspects in health communication management, namely pre-emptive action, strategies, and challenges. The data, in general, demonstrates a successful reduction in stunting prevalence to 17.4% (the second lowest in Aceh, 2024), supported by collaborative programs such as BAAS, PMT, RGG, and consultations. These programs focus on prevention through nutrition education, close monitoring, and direct intervention, aiming to achieve RAN PASTI target. All informants emphasized the dominant role of health communication in cross-sectoral coordination, including ODP, Puskesmas, and village governments.

Table 5: Results of interpretation data analysis on health communication management in addressing stunting in Lhokseumawe City

No.	Result	Interpretation	Informants	Description
1	The Role of Health Communication in Addressing Stunting in Lhokseumawe City	<ol style="list-style-type: none"> 1. Monthly monitoring >90% through integrated health posts with a balanced menu 2. BAAS with high protein PMT and case audit 3. The public gains knowledge from extension, social media, television, and government campaigns through RRI.co.id publications 	<p>R1</p> <p>R2 & R3</p> <p>R5, R6, R7, R8, R9</p>	Health communication bridges detection (Code 1), support (Code 2), and education (Code 3) to tackle root causes poverty, misinformation, and environmental factors in Lhokseumawe
2	Strategies implemented by Health Office, from policy formulation to field execution	<ol style="list-style-type: none"> 1. Explain cadre training, TTD (Iron Supplement Tablets) for adolescents, counselling for pregnant women, and monitoring and evaluation for KEK (Chronic Energy Deficiency) and children. 2. City-level stunting discussions, village fund allocation, and interventions according to the technical guidelines of the Ministry of Health/Ministry of Home Affairs 3. Effective strategies through social media, television, and direct extension, which facilitate access to information and encourage behavioural changes, such as high protein consumption and education for prospective brides and grooms 	<p>R1 & R2</p> <p>R3 & R4</p> <p>R5, R6, R7, R8, R9</p>	The community assessment of the implemented programs is positive.
3	Challenges in the spotlight include:	<ol style="list-style-type: none"> 1. The family's angry reaction when the child is said to have stunting 2. Highlighting the weak family economy 3. Lack of parental literacy 	<p>R3 & R4</p> <p>R2</p> <p>R5 & R9</p>	These challenges hinder the interpretation of messages, but have been overcome through effective interpersonal communication and a culturally sensitive approach within the socio-cultural context.

Table 5 based on result of interpretation data analysis, shows the consistency of all nine informants in emphasizing the three dimensions, demonstrating comprehensive engagement that supports sustainable stunting reduction. Therefore, the success in reducing stunting to 17.4% in Lhokseumawe reflects effective health communication management, integrating top-down policies (Health Office) with grassroots implementation (Posyandu cadres, RGG). BAAS and PMT programs address immediate nutritional needs, while educational campaigns and media extension focus on promoting long-term behavioural change. Pentahelix collaboration model ensures resource alignment and community support, in line with the results of Susilo Daniel and Harliantara (2023) on the role of multi-stakeholder and digital communication in stunting prevention. However, challenges such as

misunderstandings and socioeconomic barriers underscore the need for tailored and culturally sensitive messaging (Alizadeh Afrouzi, 2021).

Compared to other regions in Aceh with higher stunting rates (e.g., Gayo Lues 42.9%), Lhokseumawe success is grounded in the consistent and diverse approach. The integration of dialogue and media persuasion has bridged the knowledge gap, consistent with global targets such as the SDGs and the WHO goal of reducing stunting by 40% by 2025. This model serves as a guide for other regions, although scaling up requires adjustments to local socio-cultural and economic contexts. In the context of health communication, health campaign activities are expected to reduce these problems (Febrina et al., 2024). Digital communication can be improved by expanding social media campaigns to counter misinformation and reach younger demographics. Developing targeted programs to address misconceptions, emphasizing stunting as a preventable nutritional issue, rather than a disease, also strengthens community literacy about stunting. Furthermore, to address socioeconomic barriers, integrating economic support (e.g., subsidies for nutritious food) into stunting programs will improve compliance with health security measures.

DISCUSSION

The relevance of the pentahelix model is evident in the results, as stunting management in Lhokseumawe City is characterized by a collaborative effort to achieve RAN PASTI. The model fosters multi-sector synergy, with health communication serving as the primary bridge. Central roles include policy initiators and coordinators, such as the Health Office, DP3AKB, and OPD, that implement BAAS, PMT, and stunting consultation programs. This includes village fund allocation, case audits, and interventions in accordance with national technical guidelines, ensuring effective top-down execution. Although not explicitly mentioned, the academic element of pentahelix is also reflected in educational approaches, such as cadre training (R1), educational extension (R2), and data-driven monitoring and evaluation (R3). Business actors play a role through resource support, such as collaboration with the sanitation office for feeding (R3), and the BAAS program, which comprises potential "foster parents" from the private sector or donors. The allocation of village funds (R4) also indicates local business participation in PMT subsidies, addressing the economic barriers cited by informants.

The most active element at the grassroots level is community assessment of the involvement of Posyandu cadres, village midwives, and residents (R1-R9). RGG program and monthly Posyandu (R1, R3) demonstrate community participation in prevention, although challenges such as misunderstandings (R3-R4) require interpersonal communication to build trust and compliance. Finally, the media element serves as a channel for information dissemination, with informants (R5-R9) emphasizing the effectiveness of social media, television, and government campaigns in raising awareness about stunting. The strategy of publishing the results of management activities in non-mainstream media (RRI.co.id) also helps address the challenge of low literacy, in line with recommendations to expand digital communication and counter disinformation. In general, the pentahelix model is a holistic collaborative ecosystem, where health communication connects all elements to address stunting. This model can be replicated in other regions with an emphasis on sensitive and digital communication, in line with SDGs and WHO 2025 targets.

Table 6: Implementation and outcomes of the pentahelix model in stunting reduction in Lhokseumawe

Pentahelix Model	Implementation Actions	Outcomes	Data Source
Government	Policy formulation, >90% monthly monitoring via health posts with balanced menus, cadre training, TTD for adolescents, counseling for pregnant women, village fund allocation, city-level stunting discussions	High program coverage (>90%), positive community assessment, alignment with national guidelines	The Role (BAAS Program)
Academia	Design of training modules and evaluation frameworks, development of culturally relevant communication strategies.	Enhanced program effectiveness, addressed misinformation	The Role
Private Sector	BAAS program with high-protein PMT, case audits	Improved nutritional outcomes for children and pregnant women	Strategy
Community	Education on high-protein diets for brides/grooms, culturally sensitive interpersonal communication	Behavioral changes, increased program acceptance despite initial resistance	Challenges
Media	Social media, TV, and RRI.co.id campaigns for awareness	Increased knowledge, adoption of better nutrition practices	Effective Strategies (Media Campaigns)

The pentahelix model, which brings together government, academia, the private sector, community, and media, is driving Lhokseumawe's health communication strategy to reduce stunting. The table 6. above summarises the implementation actions of the pentahelix model and the results of health communication management for each stakeholder, based on qualitative data from interviews with the informants (R1–R9). This model effectively addresses the root causes of stunting—poverty, misinformation, and environmental factors—by achieving over 90% monitoring coverage, positive community feedback, and mitigating challenges such as family resistance through culturally sensitive communication. This collaborative framework ensures sustainable and impactful stunting reduction outcomes in Lhokseumawe.

CONCLUSION AND FUTURE RECOMMENDATIONS

In conclusion, this study showed that effective health communication management has played a crucial role in reducing the prevalence of stunting in Lhokseumawe City, Aceh. The reduction to 17.4% demonstrates the strength of an integrated health communication strategy, which combines policy-based programs, community mobilization, and media extension, in line with RAN PASTI targets. The results from interviews with nine informants (health workers, Puskesmas cadres, and the community) show three main aspects, including the role of health communication, the strategies implemented, and the challenges faced. The implications of this study are the potential for replicating the pentahelix model in other regions, with recommendations for improving digital communication (anti-disinformation social media campaigns), integrating economic support (nutritious food subsidies), and targeting programs for literacy (emphasizing stunting as a preventable nutritional problem). This not only strengthens community health resilience but also ensures sustainable reductions in stunting through inclusive collaboration. By addressing nutritional, behavioural, and socioeconomic factors through initiatives such as BAAS, RGG, and PMT, Lhokseumawe

City has achieved the goals of RAN PASTI. Addressing challenges such as misunderstandings and economic barriers requires sustained and culturally sensitive communication. This study fills a gap by detailing how structured health communication has transformed knowledge into action, offering a blueprint for reducing stunting in a high-prevalence region.

To ensure sustainable stunting reduction, the research recommends enhancing digital communication through anti-disinformation social media campaigns to reach young demographics and combat misconceptions about stunting, integrating economic support such as nutritious food subsidies to improve compliance among low-income families, developing culturally sensitive stunting literacy programs to emphasise that stunting is a preventable nutritional issue, and replicating the pentahelix model in other regions with adjustments for socio-cultural and economic context. This recommendation aims to sustain Lhokseumawe's success and expand its impact to other regions in Aceh and Indonesia, focusing on early prevention, digital innovation, and inclusive collaboration, while suggesting further studies to evaluate its implementation.

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