Improving Health Communication For The Deaf And Mute Community In Stunting Prevention In Bengkala Village, Buleleng Regency, Bali Province

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Abstract.

Bengkala Village in Buleleng Regency,Bali, is an inclusive village inhabited by the Kolok community, a deaf-mute group that has developed a local sign language system.This community faces serious challenges in accessing health information,particularly related to stunting prevention efforts.This article aims to identify inclusive and effective health communication strategies for people with disabilities in the local context. Disabled groups remain vulnerable due to limited communication access.Through an equity-based communication approach and a disability-inclusive development framework, health communication needs to be developed using visual media, local sign language, and community-based participatory strategies.The analysis also shows that legally based interventions, such as Presidential Regulation No.72 of 2021 and Law No. 8 of 2016,are important stepping stones, although their implementation remains limited.This study emphasizes the importance of transforming health communication, not only to inform but also to transformative efforts in reaching marginalized groups like the Kolok community to reduce stunting rates equitably and inclusively.

Keywords: *Inclusive Health Communication; Deaf and Mute; Kolok Community; Stunting; and Equity-Based Communication.*

I. INTRODUCTION

Bengkala Village in Buleleng Regency, Bali Province, is known as a unique inclusive village, home to the Kolok community, a deaf-mute community that has established a local sign language-based communication system. The existence of this community demands a health communication approach that is not only verbal but also considers cultural sensitivity and accessibility of visual and gestural communication. This public health approach, particularly in preventing stunting, requires specific interventions that are responsive to the communication needs of this disabled group. This aligns with Nutbeam's perspective.(Don Nutbeam & Lloyd, 2020);(Don Nutbeam & Muscat, 2021);(D. Nutbeam, 2000)Effective health communication must be able to bridge the gap in understanding and access to information between population groups, especially those with functional and social limitations.The latest stunting data shows that nationally there has been a decline in prevalence from 21.5% in 2023 to 19.8% in 2024. Bali Province ranks lowest nationally with a stunting rate of only 8.7% in the same year.(BKPK, 2025);(Prisie, 2025);(Cindy Mutia Annur, 2023); (Antara News, 2024; Databoks, 2023). However, Buleleng Regency, where Bengkala Village is located, recorded a slightly higher figure, at 8.9%, based on 2021 data. This means that stunting remains a crucial issue in this region due to its long-term impact on children's quality of life, both in terms of physical growth and cognitive development, as well as future socioeconomic productivity.

(PMK, 2025);(Daldukkbpppa, 2025).The main challenge in addressing stunting in the Kolok community lies in the less inclusive aspect of health communication.Children with disabilities are significantly more likely to experience all forms of malnutrition, making it critical to accelerate efforts to improve inclusion within nutrition programs.analyzes included 229 621 children aged 2–4 across 30

countries, including 15 071 children with disabilities (6.6%). Overall, children with disabilities were more likely to be stunted (adjusted risk ratio (aRR) 1.16, 95% CI 1.11 to 1.20), wasted (aRR 1.28, 95% CI 1.18 to 1.39) and underweight (aRR 1.33, 95% CI 1.17, 1.51) than children without disabilities(Rotenberg et al., 2024). This demonstrates the dual vulnerability experienced by people with disabilities: physical and information barriers. On the other hand, health care facilities in many areas, including Bali, have not fully implemented the principles of inclusion, particularly in the provision of sign language interpretation services and alternative communication media accessible to people with disabilities.(Pramesi, 2021)Conceptually, the health communication approach for disabilities must adopt the principle of equity-based communication, ensuring that all messages, media, and information channels can be understood and utilized fairly by all target groups.

(Calanan et al., 2023)This is reinforced by the universal health coverage (UHC) and disability-inclusive development (DID) frameworks, which require integration between public health policies and the empowerment of vulnerable groups. A WHO study found that the effectiveness of health communication increases dramatically when accompanied by adaptations of language and visual message formats for the disability community.(WHO, 2020).Legal aspects provide a strong foundation for implementing inclusive health programs. Presidential Regulation (Perpres) Number 72 of 2021 concerning the National Strategy for Accelerating Stunting Reduction emphasizes a holistic, integrative, and inclusive approach, targeting children aged 0–59 months, pregnant women, and adolescents.(Development, 2021)Law Number 8 of 2016 concerning Persons with Disabilities guarantees the right to information, equal health services, and health aids for people with disabilities. Constitutionally, Article 28H of the 1945 Constitution also states that everyone has the right to live in physical and spiritual prosperity, to receive health services, and to benefit from science and technology. Implementation of this legal mandate remains limited, particularly as the new Health Law only includes one article on disability without adequate implementation details.Health promotion using an inclusive communication approach has proven effective and has been implemented by the Ministry of Health since 2022. These efforts include the use of visual media, telemedicine, sign language videos, and the involvement of the disability community in producing educational content.

Examples of good practices also emerged from Bali, which implemented social media workshops and produced visual educational materials during the COVID-19 pandemic, the rabies outbreak, the Clean and Healthy Living Behavior (PHBS) program, and empowerment for people with disabilities through inclusive digital communication.(PAIR, 2023)Programs such as BISA (Better Investment for Stunting Alleviation) run by Save the Children Indonesia demonstrate the effectiveness of a gender- and disability-based social change communication strategy in stunting prevention efforts.(Save the Children Indonesia, 2023). The stunting rate in Bali is relatively low nationally, while disability groups such as the Kolok community in Bengkala Village remain in the vulnerable category. More accessible health communication strategies are needed, utilizing visual media and local sign language, and utilizing a participatory and equitable community-based behavior change approach.

II. LITERATURE REVIEW

Stunting is a condition of failure to thrive in toddlers due to chronic malnutrition that persists for a long time, especially during the first 1,000 days of life. From a legal perspective, stunting is understood as a structural problem closely related to children's rights to health, nutritious food, and a decent living environment, as guaranteed in Articles 28B and 28H of the 1945 Constitution and the Convention on the Rights of the Child (CRC).(UNICEF, 2018)Law No. 36 of 2009 concerning Health(Tri Nuke Pudjiastuti, Sri Sunarti Purwaningsih, et al., 2022)and Law no. 35 of 2014 concerning Child Protection(Ministry of State Secretariat, 2014)The government emphasized the state's obligation to guarantee comprehensive nutrition and basic health services for children. However, reality shows that there is still a gap between legal norms and implementation, as reflected in the relatively high national stunting rate, particularly among vulnerable groups such as children with disabilities.(Rotenberg et al., 2024).From a communication perspective, stunting prevention is not only about providing food or medical services but also involves effective, sustainable, behavior-change-based health communication.(Wempi et al., 2023). Nutbeam(Don Nutbeam &

Lloyd, 2020)emphasizes that health communication must improve health literacy and empower individuals to make informed health decisions. This is particularly relevant for deaf-mute communities like those in Bengkala Village, who face language barriers and barriers to accessing visual information. When health messages are not delivered in inclusive formats, such as sign language or appropriate visual media, the chances of changing nutritional behavior are slim.

The behavior change communication (BCC) approach is important as a strategy to form new norms in child nutrition and health practices, especially in communities with limited access to communication.(Mansur et al., 2023);(Pal Kaur, 2022)The implementation of a legal and communication-based stunting reduction program must address the social and cultural determinants that influence diet, breastfeeding practices, and access to healthcare. A 2020 WHO study emphasized that the success of health communication depends on the ability to reach vulnerable groups in a participatory and interactive manner, not merely through information. The role of the state, society, and health workers in building equitable and contextually transformative communication is crucial. Especially in communities like Kolok, the success of the stunting program depends heavily on the state's ability to deliver nutrition interventions through an inclusive legal approach and communication based on the community's real needs. Inclusive communication in healthcare is a strategic approach that emphasizes open access, equal participation, and adaptation of health messages to all community groups, including people with disabilities. This concept stems from participatory and equity-based communication theories, which reject top-down, one-way communication models and emphasize the importance of dialogue and cross-cultural understanding and functional limitations.(Gray et al., 2024);(Calanan et al., 2023). Health services, inclusive communication means that health workers must be able to convey health information in various formats that are accessible to all groups, including the use of sign language, images, videos, simple symbols that are easy to understand, especially for communities with sensory impairments such as the deaf and mute.

(Tri Nuke Pudjiastuti, Sri Sunarti Purwaningsih, et al., 2022).Don Nutbeam's Health Literacy Theory also reinforces the importance of inclusive communication. Effective health communication not only conveys information but also enhances individuals' ability to understand, evaluate, and use that information to make informed health decisions.(Don Nutbeam & Lloyd, 2020);(D. Nutbeam, 2000);(Lopes & McKay, 2020);(Stellarosa & Ikhsano, 2022)In practice, this requires healthcare workers and healthcare institutions to adapt their counseling and education methods so that they do not rely solely on verbal communication but instead utilize a multimodal approach tailored to the patient's needs. Especially for people with disabilities, the principle of reasonable accommodation, as mandated in Article 5 of the Convention on the Rights of Persons with Disabilities (UNCRPD), must be applied in public service interactions, including healthcare services.(Tri Nuke Pudjiastuti, Marthella Rivera Roidatua, et al., 2022).The implementation of inclusive communication in the health sector has begun to be widely implemented in various countries, including Indonesia. For example, since 2022, the Indonesian Ministry of Health has been encouraging the use of visual media and sign language in health promotion through digital platforms and community-based education (Ministry of Health of the Republic of Indonesia, 2023). In areas like Bali, several community health centers have begun involving sign language interpreters in health education for the deaf-mute community, as well as using infographics tailored to patients' visual and cognitive abilities. Other innovations have also been implemented by civil society organizations such as Save the Children Indonesia in its BISA program, integrating a gender equality, disability, and social inclusion (GEDSI) approach into behavior change communication to prevent stunting.

(Save the Children Indonesia, 2023)Challenges facing the realization of systematic, inclusive communication include a lack of training for healthcare workers, a lack of accessible educational media, and limited technical regulations guaranteeing the right to information for people with disabilities. Therefore, stronger policies, cross-sector collaboration, and investment in the development of technology-based communication media and local culture are needed to ensure the principle of inclusivity truly becomes an integral part of Indonesia's healthcare system.Visual communication and sign language are two important components in building an inclusive health education system, especially for groups with hearing or speech impairments. This model is based on the multimodal communication paradigm of Krees & Van

Leeuwen.(Kress & Van Leeuwen, 2002)namely a communication approach that combines various channels (visual, gestural, textual) to expand access to understanding the message(Fakalou & Kitsiou, 2022)In health education, multimodality enables important messages such as nutritional information, immunizations, or disease prevention to be conveyed effectively through images, symbols, videos, and meaningful gestures, especially for people with sensory disabilities. Theoretically, this approach aligns with Howard Giles' Communication Accommodation Theory.

This theory emphasizes adapting communication styles to audience characteristics to increase the effectiveness of interactions between individuals and groups.(Barlow et al., 2024);(Giles et al., 2023)The use of sign language and visual media is not merely a supplement but a primary medium for deaf/mute groups to understand complex health information. This adaptation is a concrete form of convergence, the adjustment of communication to suit the cognitive and linguistic patterns of the target community.The role of visual communication is vital because graphic media such as infographic posters, anatomical illustrations, or simple animations can bridge language barriers and enhance information absorption. This approach has been implemented in various countries and programs. In Indonesia, several hospitals and community health centers have begun using sign language interpreters for medical counseling and consultations, although the number remains very limited (Ministry of Health of the Republic of Indonesia, 2023). Furthermore, the use of educational videos based on images and simple symbols has become part of the risk communication strategy during the COVID-19 pandemic, particularly to reach communities with special needs. In Bengkala Village, for example, visual communication-based stunting education has been implemented in the form of a child nutrition care simulation using images and gestures adapted to the local sign language of the Kolok community.This model has also been adopted in international programs such as the UNICEF Accessible Information Initiative project, which develops inclusive infographics and video content for children and parents with disabilities.

A WHO study (2020) found that visual and sign language-based communication interventions have been shown to increase patient engagement, adherence to health protocols, and understanding of the risks of chronic diseases such as malnutrition, tuberculosis, and HIV/AIDS. The main obstacles to implementing this model are the low capacity of health workers in non-verbal communication, the lack of standardized inclusive media resources, and the lack of technical regulations requiring accessible communication services in health facilities. The success of visual and sign language communication models in health education requires policy integration, the development of a medical personnel training curriculum, and the support of technology based on local culture and community wisdom.Empirical studies on health communication for people with disabilities show significant gaps in access, participation, and utilization of health information, both at the national and global levels.(Chrisdina et al., 2022). In Indonesia, the main challenge faced is the low capacity of health facilities to provide appropriate media and communication methods for groups with sensory, intellectual, and mental disabilities. The National Commission on Human Rights (Komnas HAM) report (2023) and data from the Ministry of Health show that most hospitals and community health centers do not have standard policies or human resources trained in disability communication, such as sign language interpreters, symbol-based visual materials, or non-verbal communication training for medical personnel (Komnas HAM, 2023; Ministry of Health, 2022). A study by Save the Children Indonesia through the BISA Program found that children with disabilities are twice as likely to experience stunting and three times more vulnerable to exclusion from health services than children without disabilities.

The main factors are limited educational media, lack of family involvement in promotive and preventive communication, and social stigma against disability (Save the Children Indonesia, 2023).Similar research conducted by the WHO (2020) showed that people with disabilities in developing countries have 50% lower access to health information and services due to communication barriers, including content that is not tailored to sensory or intellectual needs. Countries such as Australia and Sweden have adopted a universal communication model, or universal design for communication in healthcare, which integrates accessibility principles across all service lines. In Sweden, for example, every primary care center is required to provide educational materials in easy-to-read formats, infographics, and videos with subtitles and sign language. Meanwhile, in Australia, the National Disability Strategy approach places sign language

interpreters and disability advocates as part of the health care team in public hospitals (Australian Government, 2021). A comparison of the models shows that the success of inclusive health communication is heavily influenced by a country's policy structure, human resource investment, and public service oversight system. In Indonesia, most health communication still uses a traditional top-down model that relies on one-way verbal counseling without mechanisms to adapt to the needs of people with disabilities.

In the local context, Bengkala Village in Buleleng Regency, Bali Province, serves as a prominent example of inclusive community-based health communication practices. The village is inhabited by the Kolok community, a deaf-mute group that has developed a unique local sign language system used by the majority of the population, including those without disabilities. Bengkala Village's strength lies in its ability to create a comprehensive communication environment where counseling, integrated health post (Posyandu) activities, and interactions between residents naturally use local sign language. Several community-based initiatives, including nutrition education and stunting prevention, are conducted through visual demonstrations of healthy eating practices and family mentoring by local cadres fluent in the local sign language. This makes Bengkala Village a model of organic inclusivity built on local wisdom, not merely external institutional intervention. Bengkala Village's primary strength lies in its community's tolerant attitude toward disabilities and its inclusion of sign language as part of its daily culture. This supports egalitarian interactions in health education, as people with disabilities do not feel marginalized in the communication process.Lessons learned from Bengkala Village demonstrate that inclusive communication is not just about assistive devices or technology, but also encompasses fostering a culture of communication that is responsive to the diversity of bodily functions and social expressions. Strategic solutions that can be broadly implemented in Indonesia encompass three main aspects.

First, standardizing inclusive communication policies within the healthcare system, for example by mandating the use of sign language, visual materials, and assistive technology. Second, strengthening training for medical personnel on empathy- and inclusion-based communication approaches. Third, involving the disability community and families as communication partners in the design and distribution of health messages. Models like Bengkala Village can be replicated through a participatory approach based on local culture in other regions. Thus, health communication for people with disabilities is not merely a discourse but can become a systemic practice toward an equitable and transformative health system.

III. METHODS

This community service activity to improve health communication for the deaf and mute community in preventing stunting was held on June 8–9, 2025, at the Bengkala Village Hall, Kubutambahan District, Buleleng Regency, Bali Province. This location was chosen because it is the center of interaction for the Kolok community, as well as a representative public space for community-based educational activities. Participants consisted of various community elements that play important roles in the community health ecosystem. They included children and parents from the Kolok community, Posyandu cadres, local health center officers, and sign language volunteer assistants. The activity also involved students and accompanying lecturers, especially if this activity was part of a university's Community Service (PKM) program. The presence of these various elements is expected to create synergy between the local community, health workers, and academics.The activity stages were implemented over two days in stages and interactively. On the first day, the activity began with an opening and program introduction, followed by a briefing on stunting delivered through visual media and accompanied by a sign language interpreter so that the material could be fully accessed by all participants, especially the Kolok community.

After the briefing session, participants were divided into small discussion groups facilitated by sign language facilitators, with the aim of exploring the understanding, needs, and challenges of communication in family health practices. The second day focused on participatory training, where participants were invited to create simple educational media, such as illustrated posters with local symbols and visual-based educational videos, which were easily understood by the community. Next, a two-way communication simulation was conducted between parents and health cadres, to practice effective and inclusive interaction skills in the context of delivering nutrition and child care messages. At the end of the activity, a joint

evaluation and reflection session was held, which aimed to assess the extent to which the activity had an impact on the knowledge, attitudes, and skills of participants, documenting input for improvement and replication of similar activities in other areas.Evaluation and Mentoring Phase. At this stage, evaluation and mentoring are conducted to ensure partners' capabilities improve, reaching 90% of the achievement indicators, after receiving training. The reporting and output stages include activity videos, scientific journal articles in the Community Service Journal, and additional outputs in the form of intellectual property rights (IPR).

IV. RESULTS AND DISCUSSION

This activity is expected to have a tangible impact on increasing the capacity of the Kolok community to understand and apply the principles of balanced nutrition to prevent stunting. One of the main targeted outputs is increasing family nutrition knowledge, particularly among deaf and mute parents, through an inclusive and accessible visual communication approach. Furthermore, this activity aims to develop locally based visual communication models such as illustrated educational posters, sign symbols for nutrition messages, and simple audiovisual media developed in collaboration with the community.This model is expected to be used sustainably by Posyandu cadres and Community Health Center staff in future outreach activities. As part of the documentation and accountability of the activity, a comprehensive activity report and a documentary video will be prepared that captures the implementation process, interactions with participants, and testimonials on the activity's impact. If this activity is implemented within the framework of a community service program (PKM), the product will also serve as a form of academic dissemination and evidence of higher education's involvement in strengthening the health of marginalized communities.

The success of the activity in Bengkala Village is also expected to serve as a model for replication that can be applied to other inclusive villages in Indonesia, especially in areas characterized by sensory disability communities and similar communication access challenges. This output will not only have a local impact but also contribute to national efforts to reduce stunting prevalence in an inclusive and equitable manner.The evaluation was conducted by interviewing 5 participants by answering several questions related to (1) How can children grow and develop healthily? (2) What should parents do? (3) How to maintain family health? This provides a picture of the target participants' situation regarding what topics need to be discussed, what goals they want to achieve, what benefits are expected and how activities should be carried out.The success of community service activities in Bengkala Village, Bali, can be measured by audience behavior and interview results, such as: Participants felt enthusiastic and satisfied with the event. Participants learned, understood, and were aware of maintaining a clean and healthy environment despite their hearing and speech impairments.

Participants learned about how to prevent stunting through nutrition, hygiene, sanitation, and health.The results of the community service activities can be broadly discussed in several aspects: target participants, objectives of the community service activities, training materials, and participant satisfaction. In terms of target participants, the number of participants who met the target, namely all Bengkala residents with hearing and speech impairments, is expected to become agents of change who can share the material learned with other residents.The participants' enthusiasm during the event was evident, as they appeared cheerful and happy, even participating in the material and enthusiastically answering every question in the quizzes and games. Furthermore, they enthusiastically followed the presenters' explanations. The material presented was highly relevant to the participants' needs. The presenters answered every question in detail and thoroughly. Thus, all questions were answered according to the participants' needs.

Fig 1. Implementation of Community Service activities

V. CONCLUSION

Overall, community service activities are aboutImproving Health Communication for the Deaf and Mute Community in Stunting PreventionThe community service program held in Bengkala Village, Bali, ran smoothly. The event proceeded as outlined in the rundown. Participants were enthusiastic, evident in the critical questions they posed to the presenters. Finally, participant satisfaction with the community service activity was very good. This was evident in responses that stated the material presented met their needs, and that they participated in the activity from beginning to end. Furthermore, participants were cooperative and provided feedback relevant to the presenters' presentations.

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