



THE EFFECT EVALUATION OF HEALTH PROMOTION STRATEGIES IN REDUCING STUNTING INCIDENCE BASED THE PRECEDE-PROCEED MODEL AT UPT. PUSKESMAS TERJUN MEDAN CITY

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Abstrak

Stunting menjadi salah satu indikator penting dalam Sustainable Development Goals (SDGs). Prevalensi *stunting* di Provinsi Sumatera Utara tercatat sebesar 22% pada tahun 2024, meningkat 3,1% dibandingkan tahun sebelumnya. UPT. Puskesmas Terjun mencatatkan jumlah anak *stunting* tertinggi di Kota Medan dengan 23 balita pada Juni 2024. Tujuan mengevaluasi strategi promosi kesehatan dalam upaya penurunan kejadian *stunting* di UPT. Puskesmas Terjun Kota Medan berdasarkan PRECEDE-PROCEED Model. Metode penelitian kualitatif dengan metode Rapid Assessment Procedure (RAP). Data diperoleh melalui wawancara mendalam, observasi lapangan, dan telaah dokumen terhadap tujuh informan kunci yang terdiri dari kepala puskesmas, tenaga promosi kesehatan, tenaga gizi, kader posyandu, dan keluarga balita. Analisis data dilakukan secara tematik dengan triangulasi sumber dan metode. Hasil pada fase PRECEDE, faktor predisposisi seperti pengetahuan dan perilaku gizi keluarga masih menjadi tantangan utama. Faktor penguat berasal dari dukungan kader dan keluarga, sedangkan faktor pendukung meliputi dukungan pemerintah dan fasilitas kesehatan. Pada fase PROCEED, strategi promosi kesehatan telah dilaksanakan melalui penyuluhan, kunjungan rumah, dan media edukatif sederhana. Namun, keterbatasan sumber daya manusia dan koordinasi lintas sektor masih menjadi kendala. Kesimpulan hasil penelitian menunjukkan bahwa strategi promosi kesehatan di UPT. Puskesmas Terjun Kota Medan telah efektif dalam menurunkan angka *stunting*. Pengetahuan dan perilaku gizi keluarga yang masih terbatas menjadi tantangan utama, sementara dukungan dari kader, keluarga, dan fasilitas kesehatan menjadi kekuatan utama. Kegiatan seperti penyuluhan dan kunjungan rumah mampu meningkatkan kesadaran masyarakat meskipun terdapat keterbatasan sumber daya.

Kata Kunci: *Stunting, Promosi Kesehatan, Precede-Procede Model, Evaluasi Program, Puskesmas Terjun.*

Abstract

Stunting is one of the key indicators in the Sustainable Development Goals (SDGs). The prevalence of stunting in North Sumatra Province reached 22% in 2024, an increase of 3.1% from the previous year. UPT. Puskesmas Terjun recorded the highest number of stunted children in Medan City with 23 children in June 2024. Objectives to evaluate health promotion strategies in reducing stunting at UPT. Puskesmas Terjun, based on the PRECEDE-PROCEED Model. Materials and methods qualitative research using the Rapid Assessment Procedure (RAP) method. Data were collected through in-depth interviews, field observations, and document reviews involving seven key informants, including the head of the health center, health promotion staff, nutrition officers, posyandu cadres, and families of children under five. Data analysis was conducted thematically using source and method triangulation. Results in the PRECEDE phase, predisposing factors such as family nutrition knowledge and behavior remained the main challenges. Reinforcing factors came from the support of cadres and families, while enabling factors included government and health facility support. In the PROCEED phase, health promotion strategies were implemented through counseling, home visits, and simple educational media. However, limited human resources and cross-sectoral coordination remain obstacles. Conclusion the study found that health promotion strategies have been effective in reducing stunting rates. Limited family knowledge and nutritional behavior remain key challenges, while support from cadres, families, and health facilities act as major strengths. Activities such as counseling and home visits improved community awareness despite limited resources.

Keywords: *Stunting, Health Promotion, Precede-Procede Model, Program Evaluation, Puskesmas Terjun*

INTRODUCTION

Stunting is a condition of impaired growth and development among children under five years old, primarily caused by chronic nutritional deficiencies that affect both physical growth and brain development (1). This issue represents one of the key indicators of the Sustainable Development Goals (SDGs), particularly under Goal 2, which aims to end hunger, achieve food security, and improve nutrition. The Government of Indonesia has committed to reducing the national prevalence of stunting to 14% by 2024 through a combination of specific and sensitive interventions (2).

Health promotion plays a crucial role in addressing stunting by improving knowledge, shaping healthy behaviors, and empowering communities to adopt sustainable nutrition and health practices (3). Effective health promotion strategies are essential to ensure that families and communities understand the importance of balanced nutrition, exclusive breastfeeding, adequate sanitation, and regular health check-ups during the first 1,000 days of life—an important window for child growth and development.

The PRECEDE-PROCEED model offers a comprehensive planning framework for health promotion and community health programs. Developed by Green and Kreuter (2005), this model consists of nine phases, ranging from social assessment to program evaluation, enabling systematic identification of health needs, behavioral and environmental determinants, and implementation strategies. Previous studies, have demonstrated its applicability in evaluating and improving public health programs (4).

However, there remains a research gap regarding the comprehensive evaluation of health promotion strategies specifically aimed at reducing stunting within the context of primary health care facilities. In particular, little is known about the application of the PRECEDE-PROCEED model in the UPT Puskesmas Terjun, Medan—one of the prioritized areas for stunting reduction. This study seeks to address this gap by systematically evaluating the effectiveness of health promotion strategies using the PRECEDE-PROCEED framework.

METHODS

This study employed a qualitative approach using the Rapid Assessment Procedure (RAP) design (5),(6). The research was conducted from September to October 2025 in the UPT. Puskesmas Terjun Medan City. The study site was selected based on secondary data from the Medan City Health Office, which indicated that this area had one of the highest stunting rates in the city.

Informants were selected using purposive sampling, totaling seven participants. They included three key informants (the head of the health center, the health promotion program coordinator, and the nutrition program coordinator), three main informants (a mother with a stunted child, a mother without a stunted child, and a *posyandu*—community health post cadre), and one supporting informant (a family member of the mother without a stunted child).

The inclusion criteria for key informants required them to be civil servants at UPT Puskesmas Terjun with educational qualifications relevant to their official positions. Main informants were selected based on their ability to provide a comprehensive understanding of the issues related to stunting and health promotion.

Data were collected through three main methods: in-depth interviews, field observations, and document review. In-depth interviews followed a structured guide developed according to the nine phases of the PRECEDE-PROCEED Model. Field observations involved direct participation and observation of informants’ daily activities to contextualize behaviors and community engagement. Document reviews included stunting-related reports, the health center’s profile, and photographic records of program activities.

Data validity was ensured through source triangulation and method triangulation, allowing comparison across informant types and data collection methods to strengthen the study’s objectivity.

Data analysis followed a thematic approach through five steps: (1) transcription of recorded interviews into full text, (2) data reduction by summarizing and selecting relevant portions, (3) coding and categorization into themes and subthemes, (4) identification of emerging patterns linked to theoretical frameworks, and (5) interpretation and synthesis of findings into coherent narratives aligned with the research objectives (7).

RESULTS AND DISCUSSION

1. Results

Characteristics of Informants

This study involved a total of seven informants aged 26 to 55 years, consisting of six females and one male. The predominance of female participants reflects the crucial role of mothers and female health workers in child health promotion and nutrition-related activities within the community.

The key informants included the Head of the UPT. Puskesmas Terjun Medan City, the Coordinator of the Health Promotion Program, and the Coordinator of the Nutrition Program. All key informants possessed a minimum educational background of a diploma degree and held formal positions as civil servants (Aparatur Sipil Negara) at the Terjun Community Health Center. Their roles involved planning, implementing, and evaluating health promotion and nutrition initiatives aimed at reducing stunting in the local area.

The main informants consisted of two mothers—one with a stunted child and one with a non-stunted child—and one *posyandu* cadre who actively participated in health education and community nutrition programs. The main informants generally had a senior high school (SMA) level of education, and their husbands worked in low-income occupations, such as construction laborers, drivers, and factory workers. This socioeconomic profile provides contextual insight into the environmental and behavioral determinants

influencing child nutrition and stunting risk in the community.

Additionally, one supporting informant, a family member of the mother without a stunted child, was included to provide supplementary perspectives on household health practices, caregiving patterns, and family support systems.

The diversity of informants—based on their roles, education levels, and socioeconomic backgrounds—allowed for a comprehensive understanding of how health promotion strategies are perceived, implemented, and sustained in the community setting at the UPT. Puskesmas Terjun Medan City

Table 1. Characteristics of Informants

Main Informants				
No	Inisial (Kode)	Usia	Jenis Kelamin	Pendidikan
1.	W (IU1)	43	Female	SMA
2.	SR (IU2)	25	Female	SMA
3.	Y (IU3)	42	Female	SMA
Key Informants				
1.	TRH (IK1)	50	Female	Profesi Dokter
2.	NY (IK2)	55	Female	S1
3.	AAK (IK3)	26	Female	D3
Supporting Informant				
1	S (IUP1)	54	Male	SMK

The informants consisted of seven individuals divided into three categories: main informants (n=3), key informants (n=3), and a supporting informant (n=1). The majority were female (six out of seven participants) and aged between 25 and 55 years. Educational backgrounds ranged from senior high school to professional and undergraduate degrees. The key informants—comprising the head of the health center and program coordinators—possessed formal health qualifications, while main and supporting informants represented community and household perspectives relevant to stunting prevention programs.

Phase 1: Social Assessment

In the social assessment phase, the overall quality of life among residents in the working area of the UPT Puskesmas Terjun was found to be moderate, with a generally low level of awareness regarding the importance of child growth and development, particularly related to the risks of stunting. The community has not fully recognized that child health directly influences the family’s future and overall household economic stability.

One participant (IU1) stated, *“Actually, I think it’s normal. My first child was once said to be undernourished; it’s just that now there’s a new term called stunting.”* This response illustrates that stunting prevention has not yet been perceived as a crucial issue by many community members.

The majority of the residents work as laborers or fishermen, representing a lower-middle socioeconomic group. Knowledge about stunting remains limited to a general understanding of the term without practical application in daily childcare practices. As IU2 explained, *“Stunting*

means lack of nutrition, the body becomes thin. The cause could be a lack of food.” Similarly, IU3 mentioned, *“The cause comes from pregnancy, when the mother doesn’t eat properly. If the nutritional intake during pregnancy is low, of course it affects the baby.”*

Community perceptions regarding the impacts of stunting were also minimal. IU1 admitted having no knowledge about its long-term consequences, while IU3 shared, *“Their activity decreases; they become weak and thin, and their learning ability is reduced.”*

These findings highlight that stunting is not yet considered a major health concern within the community. The limited understanding and low perception of risk underscore the importance of strengthening health promotion strategies focused on awareness-raising, behavioral change, and parental empowerment to prevent stunting in the UPT Puskesmas Terjun.

Phase 2: Epidemiological Assessment

The most prominent health issue identified in the UPT Puskesmas Terjun service area is stunting among children under five years old. According to key informant IK1, *“At Terjun Health Center, we have a stunting program that includes supplementary feeding (PMT) for stunted children, underweight children, and those with no weight gain. Out of around 20 children, only about 8 to 10 receive PMT due to limited funding, which lasts for two months.”* Other interventions include the distribution of fortified milk (PKMK program), health counseling, and nutrition education sessions targeting mothers and caregivers.

The stunting situation has shown improvement in recent years as a result of these ongoing programs. IK2 mentioned, *“The condition of stunted children has improved a lot lately, mainly because of the support and assistance provided.”* Similarly, IU3 observed, *“There are not many stunted children now; the number has decreased. We used to hear more reports, but now it’s rare.”* These testimonies suggest a positive trend in stunting reduction, although sustainability remains a challenge due to resource limitations.

Several risk factors contributing to stunting were identified from both environmental and behavioral dimensions. IK1 emphasized, *“Basically, if parents understand how to handle it, their children wouldn’t become stunted. But because of limited knowledge and sometimes parental indifference, it’s difficult. Most stunted children come from lower-income families.”* This highlights parental knowledge and socioeconomic status as key determinants of stunting prevalence.

IK3 further identified sanitation conditions as a contributing factor: *“In my view, in Labuhan Deli subdistrict, it’s rather slum-like since it’s a coastal area. Some households still share latrines.”* Poor sanitation and hygiene practices thus exacerbate the risk of infection and malnutrition, reinforcing the multifactorial nature of stunting in the region.

These findings demonstrate that while interventions have improved child nutritional

outcomes, limited resources, low parental awareness, and poor environmental sanitation remain critical barriers to fully eradicating stunting in the UPT Puskesmas Terjun area.

Phase 3: Behavioral and Environmental Assessment

Behavioral determinants of stunting in the Terjun Community Health Center catchment area primarily involve suboptimal infant and young child feeding (IYCF) practices, limited participation in *posyandu* (community health post) activities, and age-inappropriate complementary feeding. As IU3 noted, *“It comes down to the mother’s awareness—ideally, from pregnancy she should realize the child needs adequate nutrition.”* Key informants linked these behaviors to both knowledge and resources; IK2 emphasized that *“mother’s awareness, the economy, and the environment all play roles... in Labuhan Deli the number of stunted children is higher; mostly where maternal awareness is low.”*

Household feeding routines also emerged as a concern. IU1 reflected, *“All my children are small; they do get fed, but they’re still small,”* suggesting possible issues with dietary quality, frequency, or nutrient density despite regular meals. IU2 added, *“Some mothers are lazy to feed their child, and the economy also matters,”* while IU3 highlighted antenatal and early-life gaps: *“During pregnancy the mother lacked nutrition, didn’t take vitamins or milk; after birth the baby did not receive exclusive breastfeeding.”* These accounts indicate missed opportunities across the first 1,000 days—insufficient maternal nutrition and supplementation, low adherence to iron–folic acid, early cessation or non-initiation of exclusive breastfeeding, and inadequate complementary feeding.

Environmental determinants varied by neighborhood. IK1 described Labuhan Deli as *“rather slum-like since it’s a coastal area; some households still share latrines,”* conditions that heighten enteric infection risks and nutrient losses. In contrast, areas near the health center—Paya Pasir and Terjun—were reported to have fewer sanitation deficits. IK2 and IK3 further associated housing quality and sanitation with household economic status. Consistent with this heterogeneity, IU3 reported, *“In Neighborhood 2 the environment is clean; no one uses shared latrines anymore.”*

Overall, low maternal nutrition literacy, inconsistent engagement with preventive services, and inequitable WASH conditions jointly contribute to stunting risk. These findings underscore the need for integrated behavior-change strategies (antenatal counseling, breastfeeding support, responsive feeding) coupled with context-specific WASH improvements targeting high-burden areas like Labuhan Deli.

Phase 4: Educational and Ecological Assessment

The predisposing factors influencing community motivation to prevent stunting varied among participants. IU1 admitted having limited understanding of the underlying motivations, while IUP1 stated, *“To live a better and more prosperous life.”* IU2 identified maternal willingness as the main driving force, and IU3 emphasized the importance of maternal knowledge. These responses indicate that awareness and understanding among

mothers are the most critical predisposing elements in preventing stunting. Limited health literacy, low motivation, and cultural habits surrounding child feeding appear to constrain proactive health behaviors.

Reinforcing factors primarily emerged from family support, especially from mothers and husbands. IUP1 pointed out that mothers act as the main source of encouragement, while IU2 emphasized the role of the husband in decision-making related to nutrition and child care. IU3 explained, *“Everyone must play a role, not just the mother. The husband and the whole family must support her.”* This underscores the importance of a collective, family-centered approach in health promotion, where emotional, social, and logistical support from family members enhances program adoption and adherence to recommended practices.

The enabling factors included the availability of health services and support from various stakeholders. IUP1 identified the community health center (Puskesmas) as the main resource, IU3 highlighted the role of health workers, and IU4 stressed the shared responsibility between individuals, families, health staff, and government authorities. Nevertheless, accessibility challenges persist. As IK3 stated, *“As an evaluation, transportation for parents to the health center or posyandu is difficult; there’s no vehicle. It would be good if transport support were provided.”*

Overall, this phase reveals that maternal knowledge, family involvement, accessible health facilities, and community empowerment are pivotal for successful stunting prevention. Addressing structural barriers such as transportation and service reach is equally vital to strengthen program equity and effectiveness

Phase 5: Administrative and Policy Assessment

At UPT Puskesmas Terjun, stunting prevention is operationalized through a portfolio of programs, notably Supplementary Feeding (PMT) for stunted/underweight children, fortified milk provision (PKMK), and a community “stunting kitchen” (*dapur stunting*). As IK1 described, *“We once organized a stunting kitchen, seeking support from the ward head and community cadres who used their own funds. The program ran for three months with involvement from local leaders.”* Complementary initiatives—such as “foster mother/foster father” (*ibu asuh/bapak asuh*) sponsorships—have been mobilized with backing from civic groups and private partners. IK2 noted that support also came from Pelindo and other organizations.

Intersectoral collaboration is a salient strength. The ward government (*lurah*), PKK, District Health Office, and private companies coordinate resource pooling and implementation. IK1 highlighted, *“Community support is strong—the ward head coordinates with cadres; we contribute together to feed stunted children through the stunting kitchen.”* Echoing this, IK2 said, *“We received support from the subdistrict, individual donors, and many private actors.”* IU3 similarly recalled, *“A company—Pelindo—had donated previously.”* These accounts reflect a whole-of-community approach consistent with the PROCEED

emphasis on organizational, administrative, and policy alignment.

Despite these assets, administrative and operational barriers persist, undermining program reach and continuity. IK2 reported adherence and logistics constraints around centralized feeding and home delivery: *“We prepare the meals and milk, arrange pick-up at one place, even send someone to deliver, but some families still don’t engage.”* IK3 underscored surveillance and coverage gaps, stating, *“We cannot register all stunted children because some mothers are unwilling to bring their children to the posyandu.”* These challenges indicate bottlenecks in case-finding, follow-up, and beneficiary management, which are critical for program fidelity.

Overall, the administrative landscape shows strong multisectoral commitment but requires system strengthening—including outreach-based case detection, decentralized distribution points, transport/conditional support for caregivers, and improved beneficiary tracking—to ensure equitable access, sustained participation, and measurable impacts on stunting reduction.

Phase 6: Implementation

Advocacy. Implementation at Terjun Community Health Center (UPT Puskesmas Terjun) begins with cross-sector advocacy to strengthen stakeholder commitment through coordination meetings. As IK1 explained, *“Our advocacy focuses on reinforcing cross-sector commitments and stakeholders in our service area. We advocate to the village and subdistrict offices, community leaders, and posyandu cadres to support the stunting-reduction program.”* While impacts are not immediate, this advocacy has facilitated smoother program execution.

Social support. Community support is operationalized via a healthy kitchen initiative financed by multiple partners. IK1 noted, *“For the healthy kitchen, partners provide funds; we set up the kitchen; Rumah Zakat monitors. The subdistrict identifies eligible children, and meals are delivered daily.”*

Community empowerment. Capacity building includes cadre training and household accompaniment for families with young children. IK1 stated, *“We also provide cadre training on a regular basis. For example, during PMT distribution we assign cadres to conduct monitoring.”* Cadres serve as the frontline: IK3 described their tasks, *“We handle registration, weighing, filling in the KMS, and recording in the ‘Book 5.’ I cover Neighborhood 2 (Paya Pasir). Each neighborhood has cadres—five per neighborhood.”* Oversight is integrated under health promotion; IK2 added, *“All cadres are under Promkes supervision. Many cadres help. They deliver counseling once a week during supplementary feeding.”*

Intersectoral collaboration and communication. The health center collaborates with the Medan City Health Office, Bank BRI, PT Pelindo, and Rumah Zakat to provide financial support for stunting programs. IK1 judged these partnerships effective, citing observed declines in stunting. Health promotion methods most

commonly used are face-to-face counseling, flyers, and social media. As IK1 summarized, *“Flyers, direct counseling, and social media,”* with IK2 and IK3 affirming that in-person sessions are most effective given local conditions.

Human resources and infrastructure. The health center has two trained health promotion officers, but—per IK1 *“there is no dedicated nutrition staff, so we maximize existing personnel and provide training/orientation so they can manage the nutrition program.”* Infrastructure is generally adequate—*“We have an ambulance and physicians who have been trained,”* said IK1—though IK2 reported constraints due to damaged information, education, and communication media, which limits education reach and consistency.

Phase 7: Process Evaluation

The implementation of the health promotion program was assessed as running well and according to plan. IK1 explained, *“We usually hold routine meetings—mini-workshops once a month to discuss progress.”* IK2 expressed the hope that the foster-parent scheme will continue so that children with stunting remain a priority. Activities were carried out on schedule with coordination from the District Health Office.

The family’s role in stunting prevention was deemed crucial. IK1 stated, *“In essence, the parents eventually become active. We do our best, because the father’s role is very important.”* IK2 emphasized the importance of family and maternal awareness. However, IK3 noted a challenge: *“Of course they play a role, but the issue is that the parents themselves look healthier than the child, who is stunted. Sometimes the mother does not pay enough attention to the child’s development because she relies on government assistance.”*

Family responses after counseling varied. IK1 observed, *“Parents tend to get actively involved only once they see their child making progress.”* IK2 noted that parents of non-stunted children are often more enthusiastic about attending the posyandu. Barriers to applying health information relate to parental education and economic conditions. As IK1 explained, *“Parental education level and the economy shape mindsets. In Labuhan Deli, many girls give birth at a young age; some already have three children and still intend to have more.”*

The largest barrier to program delivery is the community mindset. IK1 remarked, *“In my view, free assistance for those who don’t fully understand can reduce their sense of responsibility. Because it’s free—like the PKH program—some may have up to four children, yet all are stunted, assuming they will always receive aid.”* IK2 and IK3 also cited economic constraints and low maternal awareness. The recommended response is to continue providing education and optimal accompaniment to address these challenges.

Phase 8: Impact Evaluation

Changes in community knowledge, attitudes, and behaviors have become evident following the implementation of the health promotion program. IK1 stated, *“Of course, there are changes. Several stunted children have gained weight over the past*

few years.” Similarly, IK2 added, “Yes, there are changes because many of the stunted children have now become healthy.” However, IK3 pointed out a challenge in evaluating knowledge improvement: “We can’t really assess knowledge because there are no measurements for that. It hasn’t been recorded or quantified.”

Utilization of health services has also shown improvement. IK1 mentioned, “Yes, certainly, everything runs as it should.” Both IK2 and IK3 confirmed that the posyandu (community health post) continues to operate regularly every 13th of the month and that other health programs remain active.

These findings indicate that the health promotion program has effectively increased community participation in health service utilization, improved awareness of child nutrition, and contributed to positive behavioral change—though further structured evaluation is needed to systematically measure changes in knowledge and practice levels.

Phase 9: Outcome Evaluation

The health promotion program was considered successful in contributing to the reduction of stunting cases. IK1 stated, “Yes, that’s right—it involves all parties, not only health promotion. Nutrition and environmental factors are also involved.” IK2 and IK3 confirmed a decrease in stunting rates and an improvement in children’s nutritional status. IK3 explained, “From what I see, yes, there are now children who have become healthy. Even though the program has ended, the milk distribution (PKMK) is still continuing.”

Data show that the number of stunted children decreased from 23 in June 2024 to 18 in December 2024, and continued to decline to 2 children by July 2025. Expectations for the future of stunting prevention programs varied among informants. IK1 emphasized the importance of parental engagement and limitations on assistance, saying, “We hope the government will actively monitor conditions in the field and ensure that free programs are not for everyone. For mothers who have had stunted children, there should be limits to the assistance if they become pregnant again. Parents must have responsibility and awareness for that.”

IK2 suggested that prevention should begin during the premarital period through education and counseling for prospective brides and grooms. Meanwhile, IK3 hoped for greater parental awareness, emphasizing that prevention should start from pregnancy.

Discussion
Social and Epidemiological Assessment

Findings indicate that the overall quality of life in the Terjun Community Health Center catchment is moderate, yet awareness of early child growth and development—particularly the risks of stunting—remains low. This aligns with Siregar (2025), who underscores the importance of appropriate complementary feeding to address nutritional gaps not fully met by breast milk. Low awareness in this context is plausibly shaped by education and economic constraints, consistent with

Bazzano et al. (2017) who identify household dietary patterns as a key determinant of stunting prevention.

Stunting among under-fives emerged as the most salient health problem, with multiple risk factors identified. This is consistent with WHO (2013), which classifies stunting determinants into four broad categories: (1) household and family factors, (2) inadequate complementary feeding, (3) suboptimal breastfeeding, and (4) infection. Predisposing factors—especially caregiver nutrition knowledge and practices—remain a central challenge, echoing Ahmad et al. (2006), who show that infant complementary feeding and nutritional status are strongly influenced by family knowledge and practices.

Behavioral and Environmental Factors

Behavioral contributors include limited caregiver awareness of balanced diets, low attendance at *posyandu*, and age-inappropriate complementary feeding. These results support Rao et al. (2011), who identify inappropriate complementary feeding as a major driver of stunting, and Kronborg et al. (2014), who report adverse growth effects when complementary foods are introduced before six months.

Environmental influences vary across neighborhoods; sanitation deficits persist in some areas. This mirrors Maxwell (2011), who highlights the bidirectional relationship between malnutrition and infection. In Labuhan Deli—a coastal area with pockets of inadequate sanitation—environmental exposures likely exacerbate growth faltering relative to Paya Pasir and Terjun.

Predisposing, Reinforcing, and Enabling Factors

Within the PRECEDE-PROCEED framework, predisposing factors (knowledge, attitudes, beliefs, values, perceptions) are led by maternal knowledge and awareness (Green & Kreuter, 2005). Reinforcing factors derive largely from family support, notably mothers and husbands; this is consistent with Darmstadt et al. (2005), who emphasize family engagement in child-health interventions. Enabling factors include accessible primary care services and support from families and government, though transport barriers limit service uptake—congruent with Sari et al. (2022), who document infrastructure and logistics as persistent bottlenecks in stunting programs. These findings underscore the need to improve transport and service reach to enhance equity.

Implementation of Health Promotion Strategies

Implementation at the health center reflects WHO-aligned approaches—advocacy, social support, and community empowerment. Cross-sector advocacy via coordination meetings strengthened stakeholder commitment, consistent with Yuningsih (2019) on creating conducive social, political, economic, cultural, environmental, and behavioral conditions for health. Social support materialized through a community healthy-kitchen model funded by multiple partners, indicating active local participation (8).

Community empowerment was pursued through cadre training and family accompaniment, aligning with the Ministry of Health’s *Health Promotion*

Guidelines for Community Health Centers (RI, 2010), which define empowerment as developing the knowledge, willingness, and ability of individuals, families, and communities to prevent disease and improve health (9). Effective partnerships with the District Health Office, Bank BRI, PT Pelindo, and Rumah Zakat further bolstered program inputs. Health promotion relied primarily on face-to-face counseling, complemented by leaflets/flyers and selective social media use. Limited digital uptake reflects local preferences and access patterns. This accords with Carlos et al. (2021), who stress tailoring communication to message design, recipients' sociocultural context, and constraints of time, place, and medium. In this setting, in-person education is perceived as most effective because it enables two-way communication, clarification, and immediate problem-solving (10).

Program Outcomes and Effectiveness

Outcome evaluation indicates a substantial reduction in stunting, from 23 children (June 2024) to 18 (December 2024), declining further to 2 children (July 2025). These results reflect the effectiveness of a comprehensive health promotion strategy that integrates health education, nutrition services, and environmental improvements, with coordinated contributions from multiple actors. The findings are consistent with Valerieet al. (2021), who demonstrated that the PRECEDE–PROCEED model is effective for planning community health empowerment programs grounded in systematic needs assessments (11), which recommend multi-sector, integrated, and sustained interventions for stunting prevention (12).

Crucially, cross-sector collaboration among the community health center, local government, cadres, families, and private organizations fostered operational synergy—facilitating resource mobilization, continuous beneficiary follow-up, and consistent delivery of counseling, PMT/PKMK support, and routine growth monitoring. This collective action strengthened program reach, adherence, and fidelity, translating upstream behavior change into measurable improvements in child growth outcomes (13) (14).

Overall, the observed decline is plausible and program-congruent, underscoring the value of theory-driven design (PRECEDE–PROCEED), family-centered engagement, and sustained multi-sector partnerships to accelerate and maintain progress in stunting reduction (15).

CONCLUSION

Using the PRECEDE–PROCEED model, this evaluation shows that the stunting-prevention program at Terjun Community Health Center (UPT Puskesmas Terjun) achieved positive results. In the PRECEDE phase, the main challenges were predisposing factors—limited caregiver knowledge and suboptimal nutrition practices—while reinforcing factors (support from *posyandu* cadres and families) and enabling factors (government backing and primary-care services) facilitated behavior change. In the

PROCEED phase, the program implemented cross-sector advocacy, community social support (e.g., healthy kitchen, PMT/PKMK), cadre empowerment, and face-to-face counseling, which proved context-appropriate and effective.

Program outcomes indicate a significant decline in stunting. Routine records cited here show a reduction from 23 children (June 2024) to 17 children (June 2025), evidencing the effectiveness of a comprehensive, multisector approach. (*Note: Earlier sections reported 23 → 18 → 2 by July 2025; please reconcile to one official series before submission.*)

Overall, the findings support the effectiveness of an integrated, theory-driven strategy that combines family-centered counseling, nutrition support, and intersectoral collaboration. To sustain and scale impact, we recommend: (1) maintaining cross-sector partnerships, (2) strengthening routine monitoring (growth, service use, KAP indicators), and (3) addressing access barriers (e.g., transport, outreach) to ensure equitable coverage and prevent relapse.

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