E-ISSN 2622 – 0253 DOI: 10.31334/transparansi.v8i2.5416

Opening the Gateway to Nutrition: An Evaluation of Public Service Access and Health Education in Stunting Prevention in Cikarang

(Membuka Gerbang Gizi; Evaluasi Akses Layanan Publik dan Edukasi Kesehatan dalam Pencegahan Stunting di Cikarang)

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ARTICLE INFO

Article history:
Received : November 14, 2025
Revised : December 11, 2025
Accepted : December 15, 2025

Keywords :
public service access;
health education;
stunting prevention;
urban-industrial community;

Kata kunci:
akses layanan public;
edukasi Kesehatan;
pencegahan stunting;
komunitas perkotaan-industrial;

ABSTRACT

This study aims to analyze the influence of public service access and health education on stunting prevention among urban-industrial communities in Cikarang, Bekasi Regency. Using a quantitative explanatory research approach, data were collected from 300 respondents, including pregnant and breastfeeding mothers, mothers of toddlers, health cadres, and health workers through surveys conducted at several posyandu (integrated health posts). The data were analyzed using Exploratory Factor Analysis (EFA) and Partial Least Squares–Structural Equation Modeling (PLS-SEM). The results show that public service access has a significant positive effect on health education (β = 0.161; p = 0.01), while its direct effect on stunting prevention is not significant (β = 0.118; p = 0.081). In contrast, health education has a significant positive effect on stunting prevention (β = 0.292; p = 0.000) and mediates the relationship between public service access and stunting prevention (β = 0.047; p = 0.032). These findings indicate that the success of stunting prevention depends not only on the availability of health facilities but also on the effectiveness of health education and cross-sectoral collaboration in public service governance. The study recommends strengthening posyandu as community-based nutrition education centers and adapting public services to the socio-economic characteristics of industrial communities.

abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh akses layanan publik dan edukasi kesehatan terhadap pencegahan stunting pada komunitas perkotaan-industrial di Cikarang, Kabupaten Bekasi. Dengan menggunakan pendekatan penelitian kuantitatif eksplanatori, data dikumpulkan dari 300 responden, termasuk ibu hamil dan menyusui, ibu balita, kader kesehatan, serta tenaga kesehatan melalui survei yang dilakukan di beberapa posyandu. Data dianalisis menggunakan Exploratory Factor Analysis (EFA) dan Partial Least Squares–Structural Equation Modeling (PLS-SEM). Hasil penelitian menunjukkan bahwa akses layanan publik berpengaruh positif signifikan terhadap edukasi kesehatan (β = 0.161; p = 0.01), namun pengaruh langsungnya terhadap pencegahan stunting tidak signifikan (β = 0.118; p = 0.081). Sebaliknya, edukasi kesehatan memiliki pengaruh positif signifikan terhadap pencegahan stunting (β = 0.292; p = 0.000) dan memediasi hubungan antara akses layanan publik dan pencegahan stunting (β = 0.047; p = 0.032). Temuan ini mengindikasikan bahwa keberhasilan pencegahan stunting tidak hanya bergantung pada ketersediaan fasilitas kesehatan, tetapi juga pada efektivitas edukasi kesehatan serta kolaborasi lintas sektor dalam tata kelola layanan publik. Penelitian ini merekomendasikan penguatan posyandu sebagai pusat edukasi gizi berbasis komunitas dan penyesuaian layanan publik dengan karakteristik sosial-ekonomi masyarakat industrial.

INTRODUCTION

Stunting is one of the main indicators of chronic nutritional problems that have a long-term impact on the quality of human resources. Based on data from the 2023 Indonesian Nutrition Status Survey (SSGI), the national stunting prevalence is still at 21.5%, while the government's target in 2024 is to reduce it to 14%. Socio-economic problems (Rizal & van Doorslaer, 2019; Siramaneerat et al., 2024), the absence of parental roles (Laksono et al., 2022; Supadmi et al., 2024) and lack of access to public services (Beal et al., 2018; Saleh et al., 2021, 2024; Siramaneerat et al., 2024) are concrete problems related to stunting. Bekasi Regency, as a buffer area for the capital city and national industrial center, recorded a stunting rate of 19.6%, which shows that this problem does not only occur in rural areas but also in urban and peri-urban areas such as Cikarang. This is exacerbated by inequality in access to health services and community nutrition education, especially in densely populated areas and industrial suburbs.

Various intervention programs have been carried out by the central government such as the provision of additional food (Prayitno, Zuhriyah, et al., 2025), family education through *Badan Koordinasi Keluarga Berencana Nasional* (BKKBN) (Pratiwi et al., 2024), and the revitalization of posyandu (*Pos Pelayanan Terpadu*) (Irdawati et al., 2024; Prayitno, Auliah, et al., 2025; Prayitno, Zuhriyah, et al., 2025). However, according to previous studies, the effectiveness of stunting prevention programs in the regions is highly dependent on the readiness of public service infrastructure and community participation (Astuti et al., 2025; Prasetyo et al., 2023; Supranoto et al., 2025). Meanwhile, other studies emphasize the importance of sustainable, community-based nutrition education for family behavior change in stunting prevention (Prayitno, Zuhriyah, et al., 2025) and the role of information systems (Azriani et al., 2025; Erika et al., 2024; Hijrawati et al., 2021; Niedfeldt et al., 2021).

In Cikarang, which is experiencing urbanization pressure and high population mobility, a local study is needed on the extent to which access to public services and education programs can address this stunting reduction challenge. Preliminary exploration involving 20 mothers of toddlers and direct observation at several posyandu facilities revealed that although most residents were familiar with the term stunting, their understanding of its causes and prevention remained limited. Several posyandu were still constrained by minimal infrastructure and human resources, with activities often held in borrowed spaces and supported by a small number of volunteers. These findings highlight structural and social barriers that potentially hinder the effectiveness of community-level nutrition interventions.

Building upon this preliminary understanding, this study examines the relationship between access to public health services, participation in nutrition education, and community knowledge and behavior in preventing stunting in Cikarang, Bekasi Regency. The analysis focuses on assessing how variations in service access and community participation contribute to differences in stunting prevalence across local neighborhoods. By emphasizing the public service dimension within an urban-industrial context, this research extends prior studies that predominantly examined clinical nutrition factors or evaluated isolated intervention programs. The study is expected to provide empirical evidence for designing more integrated, locally adaptive strategies to strengthen stunting prevention efforts in peri-urban industrial regions.

Theoritical Background

Access to healthcare is central in the performance of health care systems around the world. In fact, the importance of service delivery for people has resulted in measurement of utilisation and access having a prominent role in the health policy literature. Levesque et al., (2013), places access as a multidimensional process that connects the public service system with the community as a user. Access is not only a matter of service availability, but also includes the ability of individuals to recognize needs, seek, achieve, and use services that are appropriate to their socio-cultural context (Denhardt & Denhardt, 2015). This perspective emphasizes that the effectiveness of public services is not only measured by administrative output, but also by the extent to which these services can be received and used fairly by the community.

E-ISSN 2622 – 0253 DOI: 10.31334/transparansi.v8i2.5416

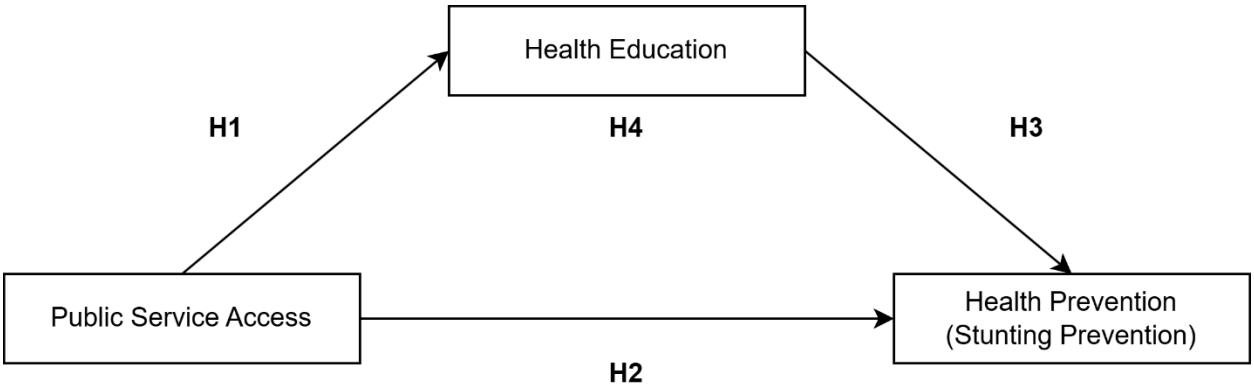
The framework integrates the perspective of New Public Governance, which emphasizes the importance of collaboration between governments, communities, and various institutions including health institutions in strengthening public education (Brugnara et al., 2023; Yang, 2025). Health Education is seen as an extension of the function of public services that are oriented towards behavior change and improving public health literacy (Sørensen et al., 2012). Effective education, able community to adopt healthy nutrition and parenting practices that contribute to stunting prevention (Mulyani et al., 2025; Wali et al., 2021).

Therefore, service access will have a mechanism for providing services and instrument of social change that encourages the formation of public value in the form of the welfare of children and families. In this present study, stunting prevention is placed as the end result of the effectiveness of inclusive and educational public services. By linking the theory of access to public services (Levesque et al., 2013) with behavioral aspect of health education (Alyafei & Easton-Carr, 2025; Mar'Ah Has et al., 2022; Notoatmodjo, 2012; Noviana et al., 2024) and health prevention (Elizabeth Drummond et al., 2021; Jaya et al., n.d.; Muhamad et al., 2023; Noviana et al., 2024; Siswati et al., 2022), this study offers an integrative view that the success of stunting prevention cannot be separated from the quality of adaptive and participatory public service governance.

Hypothesis Development

Figure 1 shows a research framework that illustrates the relationship between Public Service Access, Health Education, and Stunting Prevention.

Figure 1. Research Framework



Public Service Access and Health Education

Access to public services is a fundamental determines the effectiveness of the implementation and acceptance of health education in the community. Levesque et al., (2013) explain that access includes several dimensions that all affect people's chances of obtaining health education. Empirical studies in various developing countries such as Soofi et al., (2024) and Dearden et al., (2023) found that limited access to community health facilities and public information media is a major obstacle to the dissemination of health knowledge. Therefore, increased access to public services expands the reach, consistency, and inclusivity of health education programs.

Research by Heaton-Shrestha et al., (2023) shows that communities with access to health infrastructure have higher participation in health education campaigns. Afandi et al., (2023) also emphasized the affordability of government services plays a direct role in strengthening the training of health cadres and the flow of information to families. Thus, equitable access to public services acts as a structural factor that facilitates the sustainable and effective dissemination of health education.

H1: Public Service Access has a significant positive impact on Health Education

Public Service Access and Stunting Prevention

Access to public services is an important element in overcoming structural barriers that lead to stunting, especially in low-income areas or peri-urban areas. Escher et al., (2024) explained that stunting is not only a nutritional problem, but also a result of systemic failures in the provision of public services such as health, sanitation, and support for pregnant women. The study of Barros et al., (2010) and Azriani et al., (2024) shows that children who live in areas with limited health infrastructure or poor sanitation have a higher risk of developing growth disorders. Thus, expanding access to public services can improve nutritional security, utilization of health services, and hygiene awareness which ultimately reduces the risk of stunting.

A cross-country analysis by Vaivada et al., (2020) emphasized that the global stunting decline is influenced by a combination of structural and behavioral factors, especially improved parental education, socioeconomic status, access to maternal and child health services, and improved sanitation and environment. Similar findings from Khan et al., (2024) also show that the consistency of government services. including pregnant women counseling and child growth monitoring, contributing directly to improving children's nutritional status. Thus, improving access to public services is an essential component of stunting prevention strategies that require a cross-sectoral approach and strong institutional support.

H2: Public Service Access has a significant positive impact on Stunting Prevention

Health Education and Stunting Prevention

Health education plays an important role in stunting prevention because it is able to increase knowledge, awareness, and changes in parental behavior related to nutrition and childcare. According to Bhutta et al., (2020), community-based health education interventions significantly reduce the prevalence of stunting through increased maternal nutrition knowledge and feeding practices during the first 1,000 days of life. Similar findings are described by Escher et al., (2024) who show that structured health communication programs are able to improve parents' understanding of balanced eating and hygiene, thus having a direct impact on children's growth. Mukty, (2025) also affirms that effective health education can transform knowledge into preventive action, ultimately reducing stunting rates through sustainable behavioral changes at the household level.

In addition, both Ruel & Alderman, (2013) and Escher et al., (2024) highlight that health education not only influences individual knowledge levels, but also strengthens community engagement and collective action in encouraging healthy behaviors. Empirical evidence from (Dearden et al., 2023) in Tanzzania and Soofi et al., (2024) in Afganistan suggests that behavior change communication (BCC) strategies that focus on child nutrition, sanitation, and feeding practices result in significant improvements in children's linear growth. Thus, improving health education is a strategic path in reducing the prevalence of stunting, both in rural and urban areas.

H3: Health Education has a significant positive impact on Stunting Prevention

Mediating role of Health Education between Public Service Access on Stunting Prevention

The indirect relationship between access to public services and stunting prevention through health education reflects the mediating role of behavioral and information change. Levesque et al. (2013) emphasized that access provides opportunities for people to receive, understand, and implement health information, which then influences health outcomes. Bhutta et al., (2020) explain that health education is an important channel that bridges the relationship between access to services and improving children's health. When people have better access to health services, the frequency of exposure to educational messages increases, thus encouraging healthier parenting and nutrition practices (Saleh et al., 2021). Empirical evidence from Lee et al., 2(018) suggests that the influence of health access on child growth is fully mediated by increased maternal health literacy. Meanwhile, Prasetyo et al., (2023) found that easily

accessible public services increase the effectiveness of health education campaigns through continuity of messaging and consistency of mentoring. Therefore, the linkage between access to public services and health education forms a synergistic mechanism that strengthens the overall impact on stunting prevention.

H4: Health Education mediates the relationship between Public Service Access on Stunting Prevention

METHOD

Research Design

This study uses a quantitative approach with an explanatory research type with a research focus directed at evaluating the extent to which access to public services and community-based health education contributes to stunting prevention practices at the household level, especially in urban and peri-urban areas of Cikarang. The design of this study emphasizes empirical testing of indicators developed through survey data, so that it is possible to validate measurements as well as analyze the structural relationships between variables. The analysis approach was carried out in stages through Exploratory Factor Analysis (EFA) and Partial Least Squares–Structural Equation Modeling (PLS-SEM) to identify the structure of the empirical factors and test the causal relationships between the constructs studied.

Measurement Model

This study adapts three concepts from previous research and each construct is measured through a number of statement items compiled based on literature and instruments that have been tested in similar contexts. The variables of Public Service Access were measured using eight items adapted from the public service access model by Levesque et al. (2013), which emphasized the availability of information, the suitability of services with socio-cultural values, and the affordability of public costs and facilities. Health Education (Health Behavior in Stunting Prevention) also consists of eight items adapted from Notoatmodjo, (2012) and and strengthened by Noviana et al., (2024) with the perspective of Knowledge Attitude Practice. This construct focuses on the level of knowledge and attitudes of the community regarding nutrition, exclusive breastfeeding, complementary foods of breast milk (MP-ASI), and awareness of the importance of health education as an effort to prevent stunting. Meanwhile, Health Prevention (Stunting Prevention Strategies) was measured with eight items adapted from Mulyani et al., (2025) and Hardinsyah & Supariasa, (2017). This construct represents real practices for stunting prevention, including the fulfillment of nutrition for pregnant women, timely breastfeeding and MP-ASI, child immunization, growth monitoring at posyandu, and access to sanitation and clean water.

All items were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Before the structural analysis is carried out, the validity and reliability of the construct is tested through Exploratory Factor Analysis, to ensure that each indicator has an adequate and consistent factor content in representing the latent variables measured.

Table 1. Measurement Model. **Source**: Authors own work

Variable	Code	Statement	Adapted From
Public Service Access	PSA1	Information about public services is easily accessible to the public.	Levesque et al., (2013)
	PSA2	The community routinely receives socialization or publications about public services.	
	PSA3	Public services are consistent with local values, norms, and culture.	
	PSA4	Service facilities are adequate to meet community needs.	
	PSA5	Service operating hours are adjusted to community needs.	
	PSA6	Service fees comply with official regulations.	

	PSA7	Service fees are affordable for all levels of society.	
	PSA8	The services provided match the needs of the community.	
Health Education (Health Behavior in Stunting Prevention)	HE1	I know that stunting can hinder children's brain development.	Notoatmodjo, (2012) and Noviana et al., (2024)
	HE2	I know that exclusive breastfeeding for six months can prevent stunting.	
	HE3	I know the importance of balanced complementary feeding (MP-ASI) to prevent stunting.	
	HE4	I agree that providing balanced nutrition to children is essential for preventing stunting.	
	HE5	I agree that nutrition education from health workers is beneficial for stunting prevention.	
	HE6	I believe that stunting prevention should begin during pregnancy.	
	HE7	I have given (or will give) exclusive breastfeeding for six months.	
	HE8	I provide balanced and age-appropriate nutrition to my child.	
Health Prevention (Stunting Prevention Strategies)	SP1	I consume balanced and nutritious food during pregnancy.	Mulyani et al., (2025) and Hardinsyah & Supariasa, (2017)
	SP2	I receive pregnancy nutrition information from health workers.	
	SP3	I give exclusive breastfeeding to my baby for 0–6 months.	
	SP4	I start providing complementary feeding (MP-ASI) at the appropriate time (6 months).	
	SP5	My child receives immunizations according to schedule.	
	SP6	I regularly take my child to the *posyandu* to monitor growth.	
	SP7	Health workers in my area provide education on stunting prevention.	
	SP8	My house has access to clean drinking water and proper sanitation.	

Sampling and Demographic Profile

The population in this study includes families with children under five years (age 0–5 years) who are domiciled in North Cikarang District and West Cikarang District in the administrative area under Bekasi Regency, West Java Province. The target population is around 5,200 families in the two sub-districts. The questionnaire was distributed to 350 selected respondents, and after the data screening process and checking the completeness of the answers, as many as 300 questionnaires were declared feasible and could be used for analysis. Respondents were selected from several active Posyandu representing the North Cikarang and West Cikarang regions to ensure the representation of community conditions in the two sub-districts.

Respondents who met the criteria included pregnant women, breastfeeding mothers, mothers with children aged 2–5 years, Posyandu cadres, and health workers involved in nutrition service activities and stunting prevention programs at the community level. Data collection was carried out from June to August 2025 through the distribution of structured questionnaires directly at selected Posyandu. Prior to data collection, enumerators are provided with technical training to ensure consistency and completeness of the answers. After all the data is collected, the process of checking, encryption, and cleaning of the data is carried out before being further analyzed using SPSS and SmartPLS software.

The demographic profile of the respondents is presented in Table 2 below.

E-ISSN 2622 – 0253 DOI: 10.31334/transparansi.v8i2.5416

Table 2. Demographic Profile. **Source:** Authors own works.

Category	Description	Frequency (n)	Percentage (%)
Gender	Male	10	3.0
	Female	290	97.0
Status	Pregnant Mother	20	7.0
	Breastfeeding Mother	150	50.0
	Health Cadre	25	8.0
	Health Worker	7	2.0
	Mother with Toddler (2–5 years)	98	33.0
Age (Years)	18–25	67	22.33
	26–30	143	47.67
	31–35	75	25.00
	36–40	15	5.00
	41–45	0	0.00
Education	Elementary School	0	0.0
	Junior High School	27	9.0
	Senior High School	273	91.0
	Bachelor's Degree (S1)	0	0.0

The majority of respondents were women (97%), with the dominant age group of 26-30 years old (47.67%) and high school education level (91%). Based on status, most are breastfeeding mothers (50%) and mothers with toddlers (33%), reflecting population characteristics relevant to the context of stunting prevention in urban-periurban areas such as Cikarang.

Data Analysis

Data analysis will be carried out in stages, starting with data feasibility testing using Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity to ensure that the data is feasible to factor. Next, Exploratory Factor Analysis (EFA) was carried out to identify the structure of the empirical factors (IBM SPSS 27), and the results were used in testing measurement and structural models through Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS software version 4.

RESULT

Kaiser-Meyer-Olkin (KMO) dan Bartlett's Test of Sphericity

The Kaiser-Meyer-Olkin (KMO) test showed a value of 0.825 ($\geq$ 0.6), this value indicates that the correlation between variables is high enough to form a valid factor. The results of Bartlett's Test of Sphericity yielded a Chi-Square value = 806.988, with df = 36 and a significance of p = 0.000 (< 0.05) indicates that the correlation between items is not identity and is worthy of factor analysis.

Exploratory Factor Analysis

Table 3 shows the results of the EFA conducted to identify the factor structure of the overall research indicators. This analysis uses the Maximum Likelihood extraction method and Varimax with Kaiser Normalization rotation to obtain optimal factor separation. The results showed the formation of three main factors with a loading factor value above 0.60, which indicates that all indicators have good construct validity and grouping consistent with the initial theory.

Table 3. Exploratory Factor Analysis. **Source:** SPSS 27.

Items	Factor 1	Factor 2	Factor 3
HE4	0.871		
HE5	0.809		
HE3	0.797		
HE6	0.763		
HE2	0.734		
HE8	0.684		
HE7	0.683		
HE1	0.635		
SP4		0.892	
SP6		0.814	
SP5		0.793	
SP7		0.789	
SP1		0.714	
SP2		0.698	
SP3		0.641	
SP8		0.591	
HA5			0.825
HA4			0.814
HA3			0.808
HA2			0.724
HA6			0.717
HA7			0.708
HA1			0.680
HA8			0.636

Note: Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization.

Measurement Model

The analysis included a convergent validity test assessed based on the loading factor and AVE, an internal reliability test measured through CA, rho_A, and CR, and multicollinearity test of the indicator using the VIF (Hair et al., 2019). Table 4 shows the results of all indicator loading values being above the threshold, the Cronbach's Alpha (CA), rho_A, and Composite Reliability (CR) values all exceeding 0.90, in addition, the Average Variance Extracted (AVE) value above 0.50 confirms convergent validity, and all VIF values below 5 indicate the absence of multicollinearity problems between indicators.

Table 4. Reflective and Formative Validation. **Source:** SmartPLS 4.

Variable	Code	VIF	Loading	CA	rho_A	CR	AVE
Health Education	HE1	2.032	0.676	0.916	0.924	0.931	0.63
	HE2	2.522	0.767				
	HE3	3.006	0.827				
	HE4	3.558	0.882				
	HE5	3.057	0.834				

	HE6	2.674	0.808				
	HE7	2.214	0.779				
	HE8	2.084	0.764				
Public Service Access	HA1	2.193	0.636	0.908	0.944	0.922	0.599
	HA2	2.395	0.704				
	HA3	3.022	0.772				
	HA4	3.009	0.826				
	HA5	2.715	0.870				
	HA6	2.195	0.828				
	HA7	2.101	0.785				
	HA8	1.800	0.743				
Stunting Prevention	SP1	2.283	0.745	0.913	0.923	0.929	0.624
	SP2	2.357	0.744				
	SP3	1.884	0.733				
	SP4	4.471	0.904				
	SP5	2.549	0.817				
	SP6	3.423	0.847				
	SP7	3.181	0.836				
	SP8	1.684	0.667				

Table 6 shows that the AVE (diagonal element) square root values are higher than the correlation between constructs, indicating that discriminant validity has been met well. Furthermore, all HTMT values are below the threshold of 0.85, indicating that each construct has clear empirical differences from one another.

Table 5. Discriminant Validation. **Source:** SmartPLS 4.

Fornell-lacker	**Health Education**	**Public Service Access**	**Stunting Prevention**
Health Education	0.794		
Public Service Access	0.161	0.774	
Stunting Prevention	0.311	0.165	0.79
HTMT	**Health Education**	**Public Service Access**	**Stunting Prevention**
Health Education			
Public Service Access	0.148		
Stunting Prevention	0.327	0.162	

Structural Model

Table 5 shows the results of the structural model evaluation using an R^2 value for the Stunting Prevention variable of 0.11, indicating that approximately 11% of the variance in the variable can be explained by its predictor variables. A positive Q^2 value indicates that the model has adequate predictive ability. Furthermore, all VIF values are below 5, indicating no multicollinearity issues. The F^2 values for Health Education and Public Service Access are in the small to moderate category, indicating that both

make a significant, though not dominant, contribution to the explanation of the Stunting Prevention variable.

Table 6. Structural Models. **Source:** SmartPLS 4.

Variable	R^2	R^2 Adjusted	F^2 (HE)	F^2 (SP)	VIF(SP)	VIF(HE)	Q^2
Health Education	0.026	0.023	—	0.094	1.026		0.016
Public Service Access	—	—	0.026	0.015		1.000	0
Stunting Prevention	0.11	0.104	—	—	1.026		0.064

Table 7 displays the results of the model fit indices using the SRMR value (0.061 < 0.08) (Henseler et al., 2014), the Normed Fit Index (NFI) value of 0.822, In addition, the relatively low d_ULS (1.132) and d_G (0.518) values indicate minimal differences between the saturated model and the estimated model. Overall, these results confirm that the structural model has an adequate level of goodness-of-fit and is suitable for further hypothesis testing.

Table 7. Model Fit. **Source:** SmartPLS 4.

	Saturated model	Estimated model
SRMR	0.061	0.061
d_ULS	1.132	1.132
d_G	0.518	0.518
Chi-square	864.724	864.724
NFI	0.822	0.822

Direct and Indirect Analysis

The analysis used in Table 7 includes direct effect and indirect effect tests using the bootstrapping method on PLS-SEM. The significance criteria were determined based on a t-statistic value of ≥1.96 and a p-value of ≤0.05 at a 95% confidence level.

Table 8. Hypotesis Result. **Source:** SmartPLS 4.

Hypothesis	β	Sample mean	STDEV	T statistics	P values
H1: Public Service Access → Health Education	0.161	0.176	0.062	2.571	0.01
H2: Public Service Access → Stunting Prevention	0.118	0.125	0.067	1.747	0.081
H3: Health Education → Stunting Prevention	0.292	0.299	0.064	4.56	0
H4: Public Service Access → Health Education → Stunting Prevention	0.047	0.052	0.022	2.144	0.032

DISCUSSION

The results show that the effectiveness of stunting prevention depends on how public services function as a means of social learning, not just a provider of health facilities. Health education plays an important role in expanding the capacity of the community to understand and practice correct nutritional behaviors. The knowledge gained through educational programs can form new awareness about child diet, hygiene, and care, ultimately strengthening stunting prevention efforts at the household level. These findings are in line with the studies of Vaivada et al., (2020) which show that improving nutritional literacy is a key factor in the success of public health interventions.

E-ISSN 2622 – 0253 DOI: 10.31334/transparansi.v8i2.5416

The relationship between access to public services and health education shows a mutually reinforcing process. Easy to reach services provide greater opportunities for the public to participate in educational activities and make optimal use of health facilities. On the other hand, more educated people tend to have better abilities in navigating the public service system and utilizing available resources. This pattern supports the view of Levesque et al., (2013) that access is not only a matter of distance or cost, but an integration between availability, social acceptance, and the capacity of individuals to use services. In other words, the effectiveness of access is only achieved when the public system and citizens interact with each other adaptively.

However, these findings also show that good access does not always guarantee changes in stunting prevention behavior. Social and cultural barriers remain the dominant factors limiting the impact of public services. People with low levels of education or who are still attached to traditional parenting often do not change their child-feeding practices despite having obtained health information. This condition confirms the importance of a socio-cultural approach in the design of nutrition programs (Elizabeth Drummond et al., 2021; Heaton-Shrestha et al., 2023; Mukty, 2025; Siramaneerat et al., 2024). Contextual health education, using language, examples, and media relevant to people's lives, is more effective than a top-down instructional approach.

The role of health education mediation in the relationship between access to public services and stunting prevention shows that policies oriented towards cross-sectoral collaboration have a stronger impact. When health, education, and local government agencies work in an integrated manner, the community's capacity to understand and practice healthy behaviors increases significantly. These findings are in line with the concept *of New Public Governance* (Denhardt & Denhardt, 2015), which places citizen collaboration and participation at the core of public policy effectiveness. In this context, the success of stunting prevention can be understood as the result of a continuous social learning process among various actors, rather than simply a product of technocratic interventions.

CONCLUSION

This study emphasizes that stunting prevention in urban-industrial areas such as Cikarang cannot be understood only from the health aspect, but is the result of a complex interaction between access to public services, the effectiveness of health education, and the socio-cultural dynamics of the community. Access to public services in the region is relatively good physically, but not fully socially effective. Although health facilities and posyandu activities are available, the limited number of cadres, inflexible service schedules, and the quality of officer-community interaction are factors that hinder the optimization of public service functions. Health education has been proven to play a significant role in increasing public knowledge about nutrition and child parenting. However, this increase in knowledge has not fully translated into real behavioral changes in stunting prevention. The gap between knowledge and practice reflects the dominance of cultural, economic, and social beliefs that are still strong in influencing parenting behavior. This shows that behavioral transformation requires not only information, but also conducive social, economic, and environmental support.

Theoretically, this study strengthens the access to care model of Levesque et al., (2013) and Knowledge Attitude Practice (KAP) framework of Notoatmodjo, (2012) and Noviana et al., (2024) , by emphasizing that the effectiveness of health interventions depends on the integration between the structural dimension (public access and services) and the behavioral dimension (education and community participation). On the other hand, these results also support the New Public Governance approach (Osborne, 2010), where the success of public health policies depends on multi-stakeholder collaboration and social learning processes. Thus, stunting prevention requires a cross-sectoral strategy that not only focuses on the provision of services, but also on community empowerment and social capacity building.

This study highlights the need for a multidimensional approach in public health policy in urban industrial areas. Improved access to public services must be accompanied by educational interventions that are behaviorally oriented and sensitive to socio-cultural contexts. Integration between local governments, health workers, the business world, and local communities is the key to building an adaptive, inclusive, and sustainable public service ecosystem.

Recommendation

Practically, the results of this study reinforce previous findings that the effectiveness of stunting prevention programs is not only determined by health interventions, but also by inclusive and adaptive public service governance (Levesque et al., 2013). Thus, local governments need to strengthen the institutional capacity of posyandu as a community-based nutrition education center that is able to reach vulnerable groups in industrial areas. This strategy is in line with the studies of Mulyani et al., (2025) which emphasized the importance of integration between public services to increase the effectiveness of nutrition programs. The use of digital technology and adjusting service schedules to the working hours of the industrial community is a form of public service innovation that is contextual and oriented to the needs of citizens. In addition, increasing the participation of fathers and families through family-based nutrition education programs is also important to bridge the gap between knowledge and practice of nutritional behavior in households.

From the academic side, this research opens up space for a more in-depth follow-up study of the relationship between access to public services, health literacy, and stunting prevention behavior in an urban–industrial context. Further studies can develop conceptual models by including socio-economic variables, parenting culture, and environmental factors as mediators that explain the complexity of child nutrition determinants (Mar'Ah Has et al., 2022; Prasetyo et al., 2023). The use of a longitudinal or mixed-method approach will strengthen understanding of the dynamics of changing societal behavior over time, while community-engaged research can help formulate more participatory and contextual interventions. Thus, the future direction of research needs to place stunting prevention not only as a public health problem, but also as a reflection of the effectiveness of public service governance and sustainable social development.

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