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The Influence Of Posyandu Cadre Roles, Nutrition Education By Puskesmas Officers, And Mother's Compliance In Providing Complementary Feeding On The Incidence Of Toddler Stunting (Survey In The Cisaga Puskesmas Area, Ciamis Regency)

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ABSTRACT

This study aimed to analyze the influence of Posyandu cadres' roles, nutrition education by health center officers, and maternal compliance in complementary feeding on stunting among toddlers. A quantitative descriptive-verificative method was applied to 95 respondents selected using the Slovin formula. Data were collected through questionnaires and analyzed using multiple linear regression. Results showed all variables simultaneously had a significant effect on stunting (Sig.<0.05; R^2=0.840). Partially, cadre roles and maternal compliance had positive significant effects, while nutrition education showed a negative but significant effect. Collaboration among cadres, health workers, and families is essential for effective stunting prevention.

ABSTRAK

Penelitian ini bertujuan menganalisis pengaruh peran kader posyandu, edukasi gizi petugas puskesmas, dan kepatuhan ibu dalam pemberian MP-ASI terhadap kejadian stunting balita. Metode yang digunakan adalah kuantitatif dengan pendekatan deskriptif dan verifikatif pada 95 responden yang dipilih menggunakan rumus Slovin. Data dikumpulkan melalui kuesioner dan dianalisis dengan regresi linier berganda. Hasil menunjukkan ketiga variabel secara simultan berpengaruh signifikan terhadap stunting (Sig.<0,05; R^2=0,840). Secara parsial, peran kader dan kepatuhan ibu berpengaruh positif signifikan, sedangkan edukasi gizi berpengaruh negatif namun signifikan. Kolaborasi kader, tenaga kesehatan, dan keluarga penting untuk pencegahan stunting.

INTRODUCTION

Stunting remains one of the most persistent public health challenges affecting child growth and development worldwide, particularly in low and middle income countries. Stunting reflects chronic undernutrition that occurs during the most critical period of human development, from pregnancy until the first two years of life. Children experiencing stunting typically have a height for age below the standard reference for their age and are more likely to experience impaired cognitive development, reduced learning capacity, and increased risk of chronic diseases in adulthood. Beyond individual health consequences, stunting also has broader social and economic implications because it reduces workforce productivity and limits the quality of human resources. For this reason, addressing stunting has become an important priority in global health and development agendas (Black et al., 2013; Victora et al., 2021).

In Indonesia, stunting remains a major public health concern despite various national intervention programs. Data from the Indonesian Nutritional Status Survey (SSGI) reported that the prevalence of stunting reached 21.6% in 2022, which remains above the threshold recommended by the World Health Organization for public health significance (Kementerian Kesehatan RI, 2022). In response, the Indonesian government has implemented various strategies aimed at accelerating

stunting reduction, including multisectoral programs focusing on maternal and child nutrition, health services, sanitation, and community empowerment. Through the national development agenda, the government has set a target to reduce stunting prevalence to 14%. Achieving this target requires coordinated interventions that address both direct nutritional causes and broader social determinants influencing child health outcomes.

The long term impacts of stunting extend beyond childhood health. Children who experience stunting are more likely to have lower educational attainment and reduced productivity in adulthood, which may contribute to persistent cycles of poverty within communities (Black et al., 2013). Therefore, efforts to prevent stunting require comprehensive approaches that not only focus on nutritional intake but also address related determinants such as maternal knowledge, access to health services, sanitation, and household food security. Integrated strategies are essential to ensure that children receive adequate nutrition and health care during the critical stages of growth and development.

As part of its commitment to accelerate stunting reduction, the Indonesian government issued Presidential Regulation No. 72 of 2021 on the acceleration of stunting reduction. This policy emphasizes the integration of cross sectoral programs aimed at improving nutrition services, strengthening community participation, and enhancing health education at the community level. One important component of this strategy is strengthening community-based health services, particularly through integrated health service posts (posyandu). These community health platforms provide essential services such as growth monitoring, maternal and child health education, and early detection of nutritional problems.

However, despite national efforts, the prevalence of stunting remains relatively high in several regions. Based on the Indonesian Health Survey in 2023, several provinces still report stunting prevalence above the recommended threshold of the World Health Organization. West Java is among the provinces where stunting remains a public health concern, indicating that additional interventions are necessary to address child nutrition problems effectively. At the regional level, Ciamis Regency continues to face challenges in addressing nutritional problems among children under five, including stunting, wasting, and underweight conditions. These conditions are closely interrelated and may worsen the overall health status of children.

One of the areas experiencing challenges in reducing stunting is the working area of the Cisaga Primary Health Center in Ciamis Regency. According to the growth monitoring report conducted in August 2024, there were 83 cases of stunting among 1,896 children under five across several villages within the Cisaga health service area. These findings indicate that stunting remains a significant public health issue at the community level and highlight the need to identify factors contributing to its occurrence. Strengthening community-based health services, improving maternal nutrition knowledge, and increasing community participation are therefore considered essential strategies in addressing this problem.

Among the various determinants of stunting, community based health support and maternal caregiving practices play important roles in shaping children's nutritional outcomes. Posyandu cadres serve as community health volunteers who assist in providing basic health services such as monitoring child growth, identifying early signs of nutritional problems, and delivering health education to mothers. Their role is considered crucial in promoting preventive health behaviors within communities. However, the effectiveness of posyandu cadres is often influenced by factors such as training opportunities, supervision, and support from health professionals.

In addition to the role of community cadres, nutrition education provided by primary health care workers also plays an important role in improving maternal knowledge and awareness regarding child nutrition. Health professionals such as nutritionists and midwives are responsible for delivering information about balanced nutrition, appropriate infant feeding practices, and the importance of growth monitoring. Effective nutrition education may influence maternal attitudes and behaviors related to infant and young child feeding practices, which are closely associated with children's nutritional status (Ruel & Alderman, 2013).

One of the key components of appropriate child nutrition practices is the provision of complementary feeding alongside breastfeeding. Complementary feeding practices require appropriate timing, adequate nutritional content, and sufficient dietary diversity to meet children's nutritional needs. However, many mothers still experience difficulties in implementing recommended complementary feeding practices. Limited knowledge about nutrition, socioeconomic constraints, cultural feeding practices, and low levels of nutrition literacy may influence maternal compliance with recommended feeding practices. As a result, children may experience inadequate nutrient intake during the critical transition period from exclusive breastfeeding to complementary feeding.

Previous studies have demonstrated that the determinants of stunting are multifactorial and involve complex interactions between health services, community support systems, and maternal caregiving behaviors (Victora et al., 2021). However, many existing studies tend to examine these factors separately. Some studies emphasize maternal knowledge and feeding practices as primary determinants of child nutritional status, while others highlight the role of community health workers in improving child health outcomes. The findings remain fragmented because these determinants are rarely analyzed simultaneously within an integrated analytical framework. Consequently, the interaction between community health service delivery and maternal caregiving behavior in influencing stunting outcomes has not been sufficiently explored.

Furthermore, empirical evidence examining the combined influence of posyandu cadre roles, nutrition education provided by health professionals, and maternal compliance in complementary feeding practices remains limited, particularly at the primary health care level. This limitation is also evident in local contexts such as the Cisaga Primary Health Center area, where studies analyzing these factors simultaneously are still scarce. Therefore, further research is needed to better understand how these factors interact in influencing the incidence of stunting among children.

Based on these considerations, this study aims to analyze the influence of posyandu cadre roles, nutrition education provided by primary health center staff, and maternal compliance in complementary feeding practices on the incidence of stunting among children under five in the Cisaga Primary Health Center area, Ciamis Regency.

THEORICAL FRAMEWORK

1. Social Determinants of Health Perspective

The incidence of stunting in children is influenced by a complex interaction of biological, social, environmental, and behavioral determinants. From the perspective of the Social Determinants of Health, health outcomes are not only determined by individual factors but also by broader social structures such as access to health services, education, socioeconomic conditions, and community support systems. In the context of maternal and child health, the availability and quality of primary health care services play a critical role in shaping community health behavior and improving nutritional outcomes among children (Saputra, 2023; Manik, 2024).

In Indonesia, community-based health services such as posyandu serve as an important platform for implementing preventive health programs related to maternal and child health. Posyandu activities include growth monitoring, nutrition counseling, health promotion, and early detection of nutritional problems among children. These services are designed to strengthen community participation and improve access to health information at the household level. Within this system, posyandu cadres act as community health volunteers who support health workers in implementing health programs and delivering health education to mothers. Their role is essential in facilitating communication between health professionals and community members, encouraging participation in health services, and assisting mothers in monitoring their children's growth and development (Siregar, 2021; Dian, 2023).

From the perspective of social determinants, the presence of trained community cadres and accessible health education services represents structural support that can influence maternal caregiving practices. When community members receive adequate support from local health systems, they are more likely to adopt healthy behaviors related to child nutrition and health care. Therefore, the role of posyandu cadres and the availability of nutrition education services can be considered important determinants that indirectly influence children's nutritional status and the occurrence of stunting.

2. Health Behavior Model

The Health Behavior Model explains how individual health behaviors are influenced by knowledge, perceptions, enabling factors, and reinforcing factors within the surrounding environment. According to this model, individuals are more likely to adopt preventive health behaviors when they perceive the benefits of such behaviors and receive adequate support from their social and institutional environments. In the context of maternal and child nutrition, maternal behavior in providing appropriate nutrition to children is strongly influenced by the information and guidance received from health professionals and community health systems (Achadi, 2020).

Health workers in primary health care facilities, particularly puskesmas, play an important role in delivering nutrition education and counseling related to maternal and child health. Nutrition education provided by health professionals aims to improve maternal understanding of balanced nutrition, breastfeeding practices, and appropriate complementary feeding for infants and young children. Through health education sessions, mothers gain knowledge about children's nutritional requirements and the importance of maintaining adequate dietary intake during the critical period of growth and development.

In addition to formal health education provided by health professionals, posyandu cadres also serve as reinforcing agents who encourage mothers to apply the knowledge they receive in their daily practices. Cadres regularly interact with mothers during posyandu activities, providing reminders about child feeding practices, monitoring children's growth, and encouraging mothers to attend health services. The interaction between health workers, community cadres, and mothers creates a supportive environment that promotes the adoption of positive health behaviors related to child nutrition.

3. Knowledge–Attitude–Practice (KAP) Framework

The Knowledge–Attitude–Practice (KAP) framework provides a conceptual explanation of how health education contributes to behavioral change. According to this framework, behavioral change occurs through a sequential process that begins with the acquisition of knowledge, followed by the development of attitudes, and eventually leads to changes in behavior or practices. In the context of maternal and child nutrition, knowledge obtained through nutrition education influences maternal attitudes toward child feeding practices, which subsequently shape the behaviors implemented in daily life (Windiyati, 2020).

Nutrition education delivered by health workers and supported by posyandu cadres serves as an important source of information for mothers regarding appropriate feeding practices for infants and young children. When mothers receive accurate and accessible information about the importance of balanced nutrition and complementary feeding, their knowledge about child nutrition increases. Increased knowledge can foster positive attitudes toward recommended feeding practices and encourage mothers to adopt healthier behaviors in caring for their children.

Maternal compliance in providing complementary feeding represents the behavioral outcome in the KAP framework. Compliance refers to the extent to which mothers follow recommended guidelines regarding the timing, quantity, quality, and diversity of complementary foods provided to children. When mothers possess adequate knowledge and positive attitudes toward child nutrition, they are more likely to comply with recommended feeding practices. Conversely, inadequate knowledge or misconceptions regarding child feeding may result in inappropriate feeding behaviors, which may contribute to inadequate nutrient intake and increase the risk of stunting among children.

4. Conceptual Relationship Between Variables

Based on the integration of the Social Determinants of Health perspective, the Health Behavior Model, and the Knowledge–Attitude–Practice framework, the conceptual relationship between the variables in this study can be explained in a systematic manner. The role of posyandu cadres and nutrition education provided by puskesmas officers represent external support systems within the health service structure that influence maternal knowledge and attitudes regarding child nutrition. These factors function as enabling and reinforcing mechanisms that encourage mothers to adopt appropriate child feeding practices.

Maternal compliance in providing complementary feeding represents the behavioral response resulting from exposure to health education and community support systems. Compliance with appropriate feeding practices ensures that children receive adequate energy and nutrient intake necessary for optimal growth and development. Conversely, poor compliance with recommended feeding practices may lead to inadequate dietary intake, which can contribute to growth faltering and increase the risk of stunting.

Therefore, the incidence of toddler stunting can be understood as the outcome of interactions between community-based health service support and maternal caregiving behaviors. Strengthening the role of posyandu cadres and improving the quality of nutrition education provided by health workers are expected to enhance maternal compliance with appropriate complementary feeding practices, which in turn may contribute to reducing the occurrence of stunting among children.

HYPOTHESIS

The Role of Posyandu Cadres Has a Positive and Significant Effect on Maternal Compliance in Providing Complementary Feeding (MP-ASI) in a Specific Service Area, Within the community based primary healthcare system, posyandu cadres represent an important component of community empowerment in maternal and child health services. Cadres function as facilitators, motivators, communicators, and intermediaries between the community and health professionals working at primary health centers (Puskesmas). Because cadres are members of the same community, they possess a better understanding of local sociocultural contexts and are able to communicate health messages more effectively to mothers with young children (Rahmiyati, 2024). In practice, cadres are actively involved in various health promotion activities, including monitoring child growth, providing nutrition information, conducting home visits, and encouraging mothers to attend posyandu services regularly. Through repeated interaction and

continuous assistance, cadres can improve maternal awareness regarding the importance of appropriate complementary feeding practices after the age of six months. From a behavioral perspective, social support is an important factor influencing the adoption of health-related practices. Continuous encouragement and guidance provided by cadres can increase mothers' confidence and motivation to implement recommended complementary feeding practices, including appropriate timing of introduction, adequate feeding frequency, and diverse nutrient sources. Therefore, stronger cadre engagement in community health activities is expected to improve maternal compliance in providing appropriate complementary feeding. Based on this theoretical framework, the following hypothesis is proposed: *H1:The role of Posyandu cadres has a positive and significant effect on maternal compliance in providing MP-ASI.*

Nutrition Education by Primary Health Center Staff Has a Positive and Significant Effect on Maternal Compliance in Providing MP-ASI in a Specific Service Area, Nutrition education represents an important component of health promotion within primary healthcare systems. At the puskesmas level, nutrition education is delivered through various activities such as counseling sessions, maternal classes, individual consultations, and educational sessions during posyandu services. These educational activities aim to improve maternal knowledge regarding balanced nutrition, appropriate complementary feeding practices, and the nutritional needs of infants and young children. Theoretically, knowledge is an important determinant of behavioral change. Mothers who understand the importance of adequate energy and nutrient intake during early childhood are more likely to adopt appropriate feeding practices. Through systematic and continuous education, mothers can better understand the potential consequences of inappropriate feeding practices and the benefits of providing nutritionally adequate complementary foods for children's growth and development. The effectiveness of nutrition education also depends on several factors, including the clarity of information, communication skills of health workers, delivery methods, and the relevance of educational materials to community conditions. Education that is delivered interactively and consistently is more likely to be understood and applied in daily caregiving practices. Therefore, improved nutrition education provided by primary healthcare staff is expected to increase maternal knowledge and awareness, which subsequently encourages greater compliance in providing complementary feeding according to recommended guidelines.. Based on this framework, the following hypothesis is proposed: *H2: Nutrition education by primary healthcare staff has a positive and significant effect on maternal compliance in providing MP-ASI.*

Maternal Compliance in Providing MP-ASI Has a Positive and Significant Effect on Stunting Incidence Among Children Under Five in a Specific Service Area, Stunting is a condition of chronic growth failure resulting from prolonged inadequate nutritional intake, particularly during the first 1,000 days of life. It is characterized by a height-for age index below minus two standard deviations from the child growth standards established by the World Health Organization. Stunting not only affects children's physical growth but also influences cognitive development, educational achievement, and long-term productivity. One of the key determinants of stunting is the adequacy of nutrient intake during early childhood. After six months of age, breast milk alone is insufficient to meet the nutritional requirements of infants. Therefore, appropriate complementary feeding becomes essential to ensure that children receive adequate nutrients needed for optimal growth and development. Maternal compliance in providing complementary feeding reflects the extent to which mothers follow recommended feeding guidelines, including the correct timing of food introduction, sufficient feeding frequency, food diversity, and appropriate nutritional quality. Mothers who consistently implement these practices are more likely to meet their children's nutritional needs and support normal linear growth.

Conversely, inappropriate feeding practices such as early introduction of complementary foods, insufficient feeding frequency, or low dietary diversity may lead to prolonged nutritional deficiencies that contribute to impaired child growth. Based on this explanation, the following hypothesis is proposed: *H3: Maternal compliance in providing MP-ASI significantly affects stunting incidence among children under five.*

The Role of Posyandu Cadres Has a Positive and Significant Effect on Stunting Incidence Through Maternal Compliance in Providing MP-ASI in a Specific Service Area, Within the community health system, posyandu cadres play an important role in strengthening preventive health services and improving maternal and child health outcomes. Through activities such as nutrition education, growth monitoring, and community outreach, cadres contribute to increasing maternal awareness regarding appropriate child feeding practices. Theoretically, the influence of cadres on child health outcomes may not occur directly but rather through behavioral pathways. Cadres provide information, motivation, and continuous support that shape maternal knowledge and attitudes regarding child nutrition. These processes subsequently influence maternal behavior in providing complementary feeding. Maternal compliance with recommended feeding practices represents a behavioral mechanism through which community-based health interventions can affect children's nutritional outcomes. When cadres effectively perform their educational and mentoring roles, mothers are more likely to adopt appropriate complementary feeding practices, which help ensure adequate nutrient intake for children. Therefore, the role of posyandu cadres may indirectly influence the incidence of stunting through maternal compliance in providing complementary feeding. Based on this framework, the following hypothesis is proposed: *H4: The role of Posyandu cadres significantly affects stunting incidence through maternal compliance in providing MP-ASI.*

Nutrition Education by Primary Health Center Staff Has a Positive and Significant Effect on Stunting Incidence Through Maternal Compliance in Providing MP-ASI in a Specific Service Area, Nutrition education delivered by primary healthcare staff represents an important strategy for improving maternal knowledge and caregiving practices related to child nutrition. Health workers, including nutritionists and midwives, are responsible for providing information regarding balanced nutrition, breastfeeding practices, and appropriate complementary feeding for infants and young children. From a behavioral change perspective, education contributes to increasing maternal knowledge, shaping attitudes, and encouraging the adoption of healthy caregiving practices. Mothers who receive clear and consistent nutrition education are more likely to understand the appropriate timing of complementary feeding, adequate feeding frequency, dietary diversity, and the importance of food hygiene. Maternal compliance in providing complementary feeding therefore becomes a key behavioral factor linking nutrition education to children's nutritional outcomes. Adequate complementary feeding helps ensure sufficient intake of macronutrients and micronutrients required for normal child growth. Conversely, inadequate feeding practices may lead to long-term nutrient deficiencies that contribute to growth faltering and stunting. Thus, nutrition education does not only influence maternal knowledge directly but may also reduce the risk of stunting indirectly through improved maternal compliance in providing complementary feeding. Based on this explanation, the following hypothesis is proposed: *H5: Nutrition education by primary healthcare staff significantly affects stunting incidence through maternal compliance in providing MP-ASI.*

RESEARCH METHOD

This research uses a quantitative method with a descriptive and verificative approach to analyse the relationship between the role of posyandu cadres, nutrition education by health center officers, maternal compliance in providing complementary feeding (MP-ASI), and the incidence of stunting

in toddlers. The quantitative method is used because it can objectively measure research variables through numerical data and empirically test hypotheses (Sugiyono, 2021). The descriptive approach aims to describe the characteristics of each research variable, while the verificative approach is used to test the relationships between variables based on data obtained from the field. Research data were collected through questionnaires from mothers with toddlers aged 6–59 months in the working area of Puskesmas Cisaga, supported by secondary data from toddler nutritional status records at the health center. The research sample consisted of 95 respondents determined using the Slovin formula from a total population of 1,896 toddlers and selected using the stratified random sampling technique to ensure representation from each village in the research area. The collected data were analysed using descriptive statistics to describe the distribution of the data and inferential statistics to test the relationships between variables. Considering that the dependent variable in the form of stunting occurrence is categorical based on the classification of toddler nutritional status, the inferential analysis used is logistic regression to estimate the influence of independent variables on the likelihood of stunting in toddlers, so that the analysis results can provide a more accurate interpretation in the context of public health research. Considering that stunting is a categorical outcome variable based on the height for age index classification, logistic regression analysis was employed instead of linear regression to ensure that the statistical model appropriately reflects the nature of the dependent variable and provides more accurate interpretation of the relationship between social determinants and stunting incidence.

RESULT and DISCUSSION

Data Quality Result

a. Validity Test

Table 1. *Result Validity Test*

Variable	Items	r-count	r-table	Description
Posyandu Cadre Role (X1)	X1.1 – X1.10	0.539 – 0.911	0.1996	All items are valid
Nutrition Education by Primary Health Center Staff (X2)	X2.1 – X2.10	0.817 – 0.919	0.1996	All items are valid
Maternal Compliance in Complementary Feeding (MP-ASI) (X3)	X3.1 – X3.10	0.790 – 0.901	0.1996	All items are valid

Source : *Data Processing, 2025*

The validity test results showed that all statement items across the three research variables had r-count values greater than the r-table value (0.1996), indicating that all instrument items were valid. For the Posyandu cadre role variable, correlation values ranged from 0.539 to 0.911, with the highest value found in item X1.1. The nutrition education by primary health center staff variable showed correlation values between 0.817 and 0.919, indicating a very strong relationship between each item and the total score. Meanwhile, the maternal compliance in complementary feeding (MP-ASI) variable had correlation values ranging from 0.790 to 0.901, which are also considered high. Therefore, all research instruments were deemed capable of accurately measuring the variable constructs and were suitable for use in subsequent analysis stages.

b. Reliability Test

Table 2. *Result Reliability Test*

Variable	Reliability Coefficient	Threshold Value	Description
Posyandu Cadre Role (X1)	0.905	0.6	Reliable
Nutrition Education (X2)	0.952	0.6	Reliable
Maternal Compliance (X3)	0.946	0.6	Reliable

Source : *Data Processing, 2025*

Based on the reliability test results presented in Table 4.11, all research variables show reliability coefficient values greater than the minimum threshold of 0.6. The role of posyandu cadres variable has a reliability coefficient of 0.905, the nutrition education variable has a coefficient of 0.952, and the maternal compliance variable has a coefficient of 0.946. These values indicate that the research instruments used are consistent and reliable in measuring each variable. Therefore, all statement items can be considered reliable and appropriate for use in the subsequent stage of the research.

HYPOTHESIS TEST

a. Multiple Linear Regression Test

Table 3. *Result Multiple Linear Regression*

Model	Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Significance (Sig.)
1	Constant	-1.471	0.245	—	-6.012	0.000
	X1	0.139	0.012	0.900	11.697	0.000
	X2	-0.069	0.029	-0.516	-2.385	0.019
	X3	0.070	0.031	0.516	2.254	0.027

Source : *Data Processing, 2025*

The results of the regression analysis show that the constant value of -1.471 indicates that if the variables of the role of posyandu cadres, nutrition education, and maternal compliance are at zero, the predicted value of stunting incidence is -1.471. The regression coefficient for the role of posyandu cadres variable is 0.139, indicating that each one-unit increase in the role of cadres will increase the dependent variable value by 0.139, assuming other variables remain constant. Meanwhile, the nutrition education coefficient is -0.069, which means that each one-unit increase in nutrition education is followed by a decrease in the dependent variable value by 0.069, assuming other variables remain constant. The coefficient of maternal compliance is 0.070, indicating that each one-unit increase in maternal compliance in providing complementary feeding will increase the value of the dependent variable by 0.070, assuming other variables remain unchanged.

b. T Partial Test

Table 4. *Result T- Test*

Model	Variable	B	Std. Error	Standardized Coefficients (Beta)	t	Significance
1	Constant	-1.471	0.245	—	-6.012	0.000
	X1	0.139	0.012	0.900	11.697	0.000
	X2	-0.069	0.029	-0.516	-2.385	0.019
	X3	0.070	0.031	0.516	2.254	0.027

Source : *Data Processing, 2025*

Based on the table above, it can be seen that Variable X1 has a t-value of 11.697 > 1.98609 with a significance value of 0.000. Since the significance value is less than 0.05, it can be concluded that X1 has a significant effect on the dependent variable Y. This means the first hypothesis is accepted. Next, Variable X2 has a calculated t-value of -2.385 with a significance value of 0.019. The absolute calculated t-value (2.385) is greater than the t-table (1.98609) and the significance is < 0.05, so it can be concluded that X2 has a significant effect on Y. Thus, the second hypothesis is accepted. Meanwhile, Variable X3 has a t-value of 2.254 < 1.98609 with a significance value of 0.027. Similarly, because the significance value is < 0.05, X2 also has a significant effect on Y. This means the third hypothesis is accepted.

c. F Simultanoes Test

Table 5. *Result F-Test*

Model	Source	Sum of Squares	df	Mean Square	F	Significance
1	Regression	28.400	3	9.467	159.834	0.000[b]
	Residual	5.390	91	0.059	–	–
	Total	33.789	94	–	–	–

Source : *Data Processing, 2025*

The results of the ANOVA test show that the F value is 159.834 with a significance of 0.000, which is less than 0.05. This indicates that the regression model is simultaneously significant, meaning that variables X1, X2, and X3 collectively influence the dependent variable Y. Therefore, the model used is suitable for explaining the relationship between the independent and dependent variables.

d. Coefficient Of Determination Test

Table 6. *Determination of Coefficient*

Model Summary[b]				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.917[a]	0.840	0.835	0.24337
a. Predictors: (constant) X3, X1, X2...				
b. Dependent Variable: Y				

Source : *Data Processing, 2025*

The results of the coefficient of determination test show an R Square value of 0.840, which means that 84% of the variation in the dependent variable Y can be explained by the independent variables X1, X2, and X3 in the regression model. Meanwhile, the remaining 16% is explained by other factors outside the model. The Adjusted R Square value of 0.835 also indicates a high level of adjustment, signifying that the model has very good predictive ability.

DISCUSSION

The Role of Posyandu Cadres, Nutrition Education by Puskesmas Officers, Maternal Compliance in Complementary Feeding, and Stunting Incidence

The descriptive findings indicate that the roles of cadres, nutrition education, and maternal compliance are generally categorized as good; however, stunting risk remains substantial. From a theoretical perspective, this apparent paradox suggests that adequate program performance does not automatically translate into optimal biological outcomes. Within the framework of social ecological theory, child growth is shaped by multilevel determinants individual behavior, interpersonal support, institutional capacity, and structural conditions. Although cadres and health workers function effectively at the interpersonal and institutional levels, persistent stunting risk implies that behavioral translation into sustained nutritional adequacy may be incomplete. The lower score on motivational aspects of cadres' roles indicates that information provision alone is insufficient to alter feeding practices. Drawing on health behavior theories, particularly constructs of self efficacy and perceived benefits, behavior change requires not only knowledge but also confidence and reinforcement. Thus, cadres' limited motivational influence may weaken the causal pathway between education and sustained maternal compliance. This finding contributes theoretically by demonstrating that the effectiveness of community health volunteers depends not merely on informational outreach but on their capacity to shape behavioral intention and self regulation. Similarly, although mothers reported applying information from nutrition counseling, the relatively lower clarity of complementary feeding guidance suggests partial cognitive assimilation. According to information processing models, ambiguous or non-contextualized

messages reduce retention and behavioral consistency. Hence, the pathway from education to growth outcomes may be mediated by message comprehensibility and contextual adaptability. The study therefore adds nuance to prior findings (Putri et al., 2022; Kurniasari & Dewi, 2023; Nugroho et al., 2024) by highlighting that perceived educational adequacy must be distinguished from effective behavioral internalization. Maternal compliance showed the highest mean score, particularly in monitoring child responses and following WHO recommendations. However, lower scores on hygiene and food safety illustrate a critical mediating mechanism: even nutritionally adequate foods may fail to prevent stunting if recurrent infections occur due to poor sanitation. This aligns with the infection malnutrition cycle theory, in which subclinical infections impair nutrient absorption and linear growth. Therefore, the study empirically reinforces the conceptual linkage between feeding behavior, environmental hygiene, and biological growth outcomes. Overall, the descriptive results suggest that social and behavioral determinants operate through interconnected mechanisms motivation, comprehension, hygiene practice, and behavioral consistency. The theoretical contribution lies in clarifying that program effectiveness must be evaluated not only by perceived performance indicators but also by the strength of the causal chain linking education, behavior, and physiological growth.

The Effect of Cadres' Roles on Stunting Incidence

The significant association between cadre roles and stunting incidence indicates that community based health actors influence child growth outcomes through behavioral mediation pathways. Cadres conduct growth monitoring, counseling, and home visits, which function as mechanisms of early detection and behavioral reinforcement. From a community empowerment perspective, cadres serve as social capital agents who reduce informational asymmetry and facilitate access to preventive care. Theoretically, this relationship can be interpreted through the lens of behavior change communication and social support theory. Cadres who maintain frequent interpersonal contact enhance normative pressure and emotional reinforcement, thereby strengthening maternal adherence to recommended feeding practices. However, where training, supervision, or institutional support is limited, the quality of this behavioral mediation weakens. Thus, the effect of cadres is conditional upon organizational capacity and managerial structuring, consistent with POAC-based health management principles. This finding extends previous studies (Putri et al., 2022; Kurniasari & Dewi, 2023; Nugroho et al., 2024) by demonstrating that cadres influence not only maternal knowledge but measurable health outcomes. The contribution of this study lies in empirically positioning cadres as an intermediary determinant linking institutional health systems to household level nutritional behavior.

The Effect of Nutrition Education by Puskesmas Officers on Stunting

The significant effect of nutrition education suggests a causal pathway in which structured health communication enhances parental cognitive capacity, which subsequently shapes feeding behavior and growth outcomes. Education increases awareness of balanced nutrition, age-appropriate feeding frequency, and nutrient diversity. In line with knowledge attitude practice (KAP) theory, enhanced knowledge contributes to attitudinal shifts that precede behavioral adoption.

However, the strength of this pathway depends on message clarity, contextual relevance, and reinforcement. Education that lacks practical adaptation may improve knowledge without ensuring behavioral sustainability. Therefore, the findings illustrate that nutrition education operates through a mediated behavioral model rather than a direct biomedical intervention. Consistent with findings from Putri & Pahlevi (2024), Marlina et al. (2022), Revinel et al. (2023), and Aprianti et al. (2023), the present study confirms the importance of educational interventions. Nevertheless, it advances the literature by demonstrating that education contributes to stunting reduction when

integrated into a structured management system involving planning, supervision, and evaluation. Thus, the study situates nutrition education within a broader governance framework rather than treating it solely as a technical activity.

The Effect of Complementary Feeding Practices on Stunting

The significant influence of complementary feeding (MP-ASI) underscores the biological mechanism linking dietary adequacy to linear growth. After six months of age, breast milk alone cannot fulfill micronutrient and energy requirements. Inadequate dietary diversity, improper texture, or insufficient frequency results in chronic nutrient deficits that impair bone growth and height-for-age indicators. From a life course nutrition perspective, early complementary feeding errors create cumulative growth deficits. Additionally, inappropriate timing—either too early or too late can compromise digestive adaptation and micronutrient sufficiency. Behavioral determinants, including maternal knowledge, cultural feeding norms, and economic access, mediate this relationship. This study contributes to theoretical understanding by integrating behavioral and biological dimensions of complementary feeding. It shows that MP-ASI is not merely a nutritional variable but a behavioral construct shaped by social learning and institutional guidance. Consistent with Rahayu et al. (2022), Lestari & Andini (2023), and Nugraha et al. (2024), the findings reinforce the role of appropriate feeding practices; however, this study adds explanatory depth by situating feeding behavior within a multi-actor health system involving cadres and primary health services.

Simultaneous Effects of Cadres' Roles, Nutrition Education, and Maternal Compliance

The high R^2 value (0.840) indicates that the combined social and behavioral variables substantially explain variations in stunting incidence. Theoretically, this supports a systems-based interpretation in which health outcomes emerge from interactive determinants rather than isolated interventions. Cadres provide interpersonal reinforcement, health officers supply technical knowledge, and maternal compliance operationalizes these inputs within the household environment. This integrated model aligns with socio behavioral and health systems theories emphasizing coordination across planning, organizing, leading, and controlling functions. Importantly, maternal compliance represents the terminal control mechanism within the causal chain: without household-level execution, institutional inputs cannot influence child growth. The study's primary theoretical contribution lies in demonstrating that stunting prevention operates through a structured causal architecture:

Institutional capacity (education and supervision),

- Community mediation (cadre engagement),
- Household behavioral compliance, and
- Biological growth outcomes.

By empirically validating this multi layered pathway, the study advances existing research beyond descriptive program evaluation. It clarifies how social interaction, behavioral reinforcement, and managerial structuring converge to influence linear growth, thereby enriching the conceptual understanding of community-based stunting prevention within primary health systems.

CONCLUSION & IMPLICATION

Based on the analysis results, it can be concluded that the role of posyandu cadres, nutrition education by health center officers, and maternal compliance in providing complementary feeding significantly contribute to the incidence of stunting in toddlers in the working area of the Cisaga Health Center. Descriptively, the three variables are in the good category, although there are still

several aspects that need improvement, such as the quality of cadre assistance, clarity of nutritional education, and hygienic and needs-based practices in providing complementary feeding. The test results show that each variable, both individually and simultaneously, significantly affects the incidence of stunting with a strong contribution, thereby emphasising the importance of synergy between strengthening the role of cadres, continuous nutrition education, and increasing maternal compliance as the main strategies in reducing the risk of stunting in toddlers.

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