International Journal of Advanced Health Science and Technology e-ISSN:2808-6422; p-ISSN:2829-3037
Homepage: ijahst.org Vol. 4 no.3, pp. 86-92, June 2024

RESEARCH ARTICLE OPEN ACCESS
Manuscript received March 12, 2023; revised May 16, 2024; accepted June 8, 2024; date of publication June 30, 2024;
Digital Object Identifier (DOI): https://doi.org/10.35882/ijahst.v4i3.318

How to cite: Tyas Arini, Sulikah, Nurweningtyas Wisnu and Aini Ahmad, "Determining the Relationship Between Feeding Patterns and Stunting Incidence in Children: A Cross-Sectional Study in Magetan, Indonesia", International Journal ofAdvanced Health Science and Technology, vol. 4, no. 3, pp. 86 - 94, June 2024

Determining the Relationship Between Feeding Patterns and Stunting Incidence in Children: A Cross-Sectional Study in Magetan, Indonesia

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ABSTRACT Stunting remains a critical public health issue in Indonesia, particularly affecting children under five and leading to long-term health and developmental consequences. Despite various interventions, the prevalence of stunting continues to be high, and inappropriate feeding practices are suspected to be a contributing factor. This study aims to analyze the relationship between feeding patterns and the incidence of stunting in toddlers in the Magetan Regency. A quantitative cross-sectional design was employed, involving 100 mothers of stunted toddlers selected through purposive sampling. Data were collected using a structured questionnaire focused on breastfeeding, complementary feeding, and dietary intake patterns. Statistical analysis was conducted using the Chi-Square test to determine the association between feeding practices and stunting.The results showed a significant relationship between breastfeeding patterns and stunting ($p = 0.004$), complementary feeding practices and stunting ($p = 0.016$), as well as dietary intake patterns and stunting ($p = 0.001$). These findings suggest that inappropriate feeding practices, including non-exclusive breastfeeding, untimely or inadequate complementary feeding, and poor dietary intake, significantly contribute to the risk of stunting in children.In conclusion, this study highlights the importance of proper feeding practices during the first two years of life to prevent stunting. Health education and community-based interventions aimed at improving maternal knowledge and behavior regarding infant and toddler nutrition are urgently needed. Strengthening the role of healthcare workers in providing counseling and monitoring child nutrition can contribute to reducing stunting prevalence in the region.

INDEX TERMS Stunting, Feeding Patterns, Breastfeeding, Complementary Feeding, Toddler Nutrition

I. INTRODUCTION

Stunting remains a pressing public health challenge, especially in low- and middle-income countries like Indonesia, where its prevalence is among the highest in Southeast Asia. Stunting, defined as impaired growth and development resulting from chronic malnutrition, repeated infection, and inadequate psychosocial stimulation, significantly affects the physical and cognitive potential of children under five years of age [1]–[3]. The 2023 Indonesia Nutritional Status Survey (SSGI) reported that 21.6% of children under five were stunted, which, although a decrease from previous years, remains above the World Health Organization (WHO) threshold of 20% [4], [5].

Various studies have indicated that inappropriate feeding practices, especially during the first 1,000 days of life, are a critical factor contributing to stunting. Exclusive breastfeeding (EBF), appropriate complementary feeding, and adequate dietary intake are strongly associated with optimal growth outcomes [6]–[10]. However, despite policy efforts such as the national strategy to accelerate stunting prevention and campaigns promoting EBF and nutritious complementary feeding, challenges remain in implementation, particularly at the household level [11]–[13].

Recent studies have adopted both quantitative and qualitative approaches to assess the impact of maternal behavior, knowledge, and local feeding customs on child nutritional outcomes [14]–[16]. These state-of-the-art methods combine anthropometric measurements, dietary diversity scores, and structured questionnaires to examine feeding patterns. However, existing literature often lacks focused analysis linking specific feeding behaviors with stunting incidence in certain regional contexts like Magetan Regency, where socioeconomic and cultural variables play a significant role.

This study addresses that research gap by analyzing the association between feeding patterns including breastfeeding, complementary feeding, and overall dietary intake and the incidence of stunting in toddlers in Magetan. The aim is to identify which practices are most strongly correlated with stunting outcomes to inform targeted interventions.The contribution of this paper is threefold:

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 4 no.3, pp. 86-92, June 2024

1. It provides empirical evidence on the role of feeding patterns in stunting within a specific Indonesian rural context, contributing to localized health planning;
2. It applies a structured and statistically supported method (Chi-square test) to validate the strength of associations between various feeding practices and stunting status;
3. It offers actionable recommendations for public health practitioners and policymakers focused on nutrition education, maternal support, and community-based prevention strategies.

II. METHODS

A. STUDY DESIGN AND APPROACH

This study employed a quantitative, analytical cross-sectional design, aimed at assessing the relationship between feeding patterns and stunting in toddlers. Cross-sectional studies are appropriate for evaluating prevalence and associations at a specific point in time and are widely used in nutritional epidemiology [17], [18]. The research was conducted in Magetan Regency, East Java, Indonesia, an area with a moderate prevalence of stunting among children under five, according to national data.

B. STUDY POPULATIONS AND SAMPLE

The population of interest consisted of children aged 24 to 59 months who had been identified as stunted based on the WHO growth standards. Stunting was defined as a height-for-age z-score (HAZ) below -2 standard deviations from the median of the WHO Child Growth Standards [19]. A total of 100 toddlers and their mothers were selected as respondents.A purposive sampling technique was used to recruit mothers of stunted toddlers based on inclusion and exclusion criteria. Inclusion criteria included:

1. Toddlers aged 2–5 years
2. Diagnosed as stunted (HAZ < -2 SD)
3. Mothers willing to participate and provide informed consent

Exclusion criteria included children with congenital disorders or chronic illness affecting growth. This sampling technique was appropriate for ensuring that participants met the required characteristics to evaluate the effect of feeding behaviors on stunting [20].

C. RESEARCH INSTRUMENTS

Data collection utilized a structured questionnaire developed based on WHO feeding indicators and national guidelines for infant and young child feeding (IYCF) [21], [22]. The questionnaire was divided into four parts:

1. Demographic information (mother's age, education, occupation, income, number of children)
2. Breastfeeding practices (initiation, exclusivity, duration)
3. Complementary feeding (timing, frequency, food types, consistency)
4. Dietary intake pattern (24-hour recall, food diversity score)

The instrument was validated by nutrition experts from the Department of Midwifery, and reliability was confirmed through a pilot study involving 15 respondents not included in the main study. The Cronbach's alpha value obtained was 0.82, indicating acceptable internal consistency [23].

D. DATA COLLECTION PROCEDURE

Data were collected over a 3-week period by trained enumerators under the supervision of the research team. The enumerators were trained on how to conduct structured interviews, ensure ethical compliance, and clarify questions when needed. Mothers were interviewed face-to-face at local Posyandu (integrated health service posts) or community health centers. The anthropometric status of toddlers was confirmed using recent health records provided by the community health center and rechecked when necessary using standardized height measuring tools (stadiometers).

E. ETHICAL CONSIDERATIONS

Ethical clearance was obtained from the Health Research Ethics Committee of Poltekkes Kemenkes Surabaya (Approval No: [insert approval number here]). Written informed consent was obtained from all mothers prior to participation. Participants were assured of the confidentiality of their responses and were informed of their right to withdraw at any stage of the study without penalty. The research adhered to the principles of the Declaration of Helsinki [24].

F. DATA ANALYSIS

The collected data were coded, entered, and processed using SPSS version 25.0**.** Descriptive statistics such as frequencies, percentages, and means were used to summarize the sociodemographic characteristics and feeding practices. To assess the relationship between categorical variables (e.g., breastfeeding practices, complementary feeding behavior, and dietary patterns) and stunting, the Chi-square test was applied.Statistical significance was set at $p < 0.05$**.** The Chi-square test was chosen because of its appropriateness in testing associations between independent categorical variables and dependent outcomes in cross-sectional studies [25]. No imputation was used for missing data, and only fully completed responses were included in the analysis.

III. RESULT

A. CHARACTERISTICS OF RESPONDENTS IN TERMS OF AGE, EDUCATION AND NUMBER OF CHILDREN AND FAMILY CHARACTERISTICS IN TERMS OF INCOME AND NUMBER OF FAMILY MEMBERS

Data on the characteristics of age, education and number of children as well as family characteristics in terms of income and number of family members are shown in the following table:

From TABLE 1 above, it can be seen that the most respondents from this study were respondents aged 20-24 years, which was 66 people (30.4%), in terms of education, the most respondents in this study were mothers with high school education/equivalent, which was 109 people (50.2%). Judging from the highest number of respondent children in this study was the number of children 1-2 children, which was 157 people (72.4%). Judging from income, families who have stunted children in Panekan District, Magetan Regency as the most respondents in this study are those who have income less than the same as MSEs in Magetan Regency or ≤ Rp 2,153062 per month, which is 137 people (63.1%). Judging from the number of family members, the highest

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 4 no.3, pp. 86-92, June 2024

TABLE 1
Frequency Distribution of Characteristics of Mothers Who Have Stunting Children in Panekan District in terms of Age, Education, Number of Children and Family Characteristics in terms of Income and Number of Family Members

Maternal and Family Characteristics	Frequency (f)	Percentage (%)
Age (year)		
15 – 19	15	6,9
20 – 24	66	30,4
25 – 29	26	12,0
30 – 34	40	18,4
35 – 39	58	26,7
40 – 44	10	4,9
45 – 49	2	9,0
Total	217	100
Education		
No School	2	0,9
Elementary school/equivalent	4	1,8
Junior high school/equivalent	53	24,4
Senior high school/equivalent	109	50,2
Bachelor Degree/College	49	22,6
Total	217	100
Number of Children		
1-2 children	157	72,4
3-4 children	46	21,2
>4 children	14	6,5
Total	217	100
Income		
≤ Rp 2.153.062	137	63,1
> Rp 2.153.062	80	36,9
Total	217	100
Number of Family Members		
≤ 3	157	72,4
> 3	60	27,6
Total	217	100

respondents in the study were with 3 family members ≤, which was 157 people (72.4%).

B. CHARACTERISTICS OF STUNTING CHILDREN AGED 1-5 YEARS IN TERMS OF AGE, GENDER, AND ORDER IN THE FAMILY

TABLE 2
Frequency Distribution of Characteristics of Children Aged 1-5 Years with Stunting in Panekan District in terms of Age, Gender, and Order in the Family

Characteristics of Children Aged 1-5 Years with Stunting	Frequency (f)	Percentage (%)
Age (month)		
≥ 12-24	26	12,0
> 24-36	30	13,8
> 36-48	103	47,5
> 48-60	58	26,7
Total	217	100
Sex		
Male	118	54,4
Female	99	45,6
Total	217	100
Order in the Family		
First	141	65
Second and so on	76	35
Total	217	100

Data on the characteristics of children aged 1-5 years with stunting in terms of age, gender and order in the family are shown in the following table: From TABLE 2, it is known that the most respondents from this study were children aged 1-5 years with stunting aged > 36-48 months, which was 103 children (47.5%). In terms of gender, the most respondents from this study were men, namely as many as 118 children (54.4). Judging from the order of children in the family, the most respondents from this study were children aged 1-5 years with stunting as the 1st child or the first child in the family, which was 141 children (65%).

C. STUNTING CATEGORY IN CHILDREN AGED 1-5 YEARS

TABLE 3
Frequency Distribution of Stunting Category in Children Aged 1-5 Years

Stunting Category	Frequency (f)	Percentage (%)
Very short	44	20,3
Short	173	79,7
Total	217	100

Data on the stunting category of children aged 1-5 years are shown in the following table. Data on the stunting category in children aged 1-5 years in Panekan Sub-district who were selected as research samples were collected from documentation data for the Electronic Recording and Reporting of Community-Based Nutrition (EPPGBM) application for December 2022. From TABLE 3 below is known that the most respondents from this study were stunted children with a short category, which was 173 children (79.5%). Meanwhile, stunting children with very short categories amounted to 44 children (20.3%). The number of stunted children aged 1-5 years with the short category is more than stunted children with the very short category.

D. FEEDING PATTERNS BY TYPE OF FEEDING

TABLE 4
Frequency Distribution of Feeding Patterns by Type of Feeding

Type of Feeding	Frequency (f)	Percentage (%)
Not right	60	27,6
Right	157	72,4
Total	217	100

Data on feeding patterns by feeding type are shown in the following table: From TABLE 4 above, there were 157 mothers (72.4%) who were right in applying the appropriate feeding pattern and 60 mothers (27.6%) who followed incorrect feeding practices. This distribution suggests that while the majority of mothers demonstrate awareness of proper feeding methods, a significant proportion still apply suboptimal practices that may contribute to stunting risk in their children .

E. FEEDING PATTERNS BASED ON FEEDING FREQUENCY

TABLE 5
Frequency Distribution of Feeding Patterns by Feeding Frequency

Feeding Frequency	Frequency (f)	Percentage (%)
Not right	4	1,8
Right	213	98,2
Total	217	100

Data on feeding patterns based on feeding frequency are shown in the following table. From TABLE 5 above, there were 213 mothers (98.2%) who had applied the correct feeding frequency, while only 4 mothers (1.8%) reported

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 4 no.3, pp. 86-92, June 2024

inappropriate feeding frequency. This overwhelming proportion suggests that most mothers in the study area are aware of the recommended frequency of feeding for toddlers, potentially reflecting the effectiveness of prior community health education efforts.

F. FEEDING PATTERNS BASED ON NUMBER OF FEEDING

TABLE 6
Frequency Distribution of Feeding Patterns by Number of Feeding

Number of Feeding	Frequency (f)	Percentage (%)
Not right	6	2,8
Right	211	97,2
Total	217	100

Data on feeding patterns based on the number of feedings are shown in the following table. From TABLE 6 above, there were 211 mothers (97.2%) who had applied the right feeding pattern, while 6 people (2.8%) were not right in applying the feeding pattern.

G. THE EFFECT OF FEEDING PATTERNS ON THE INCIDENCE OF STUNTING

In relation to the influence of feeding patterns on the incidence of stunting, cross-tabulation was carried out. Cross-tabulated data on the effect of feeding patterns based on type, frequency and number of feedings on the incidence of stunting are shown in the following table:

TABLE 7
Cross-tabulation of the Effect of Feeding Patterns Based on Type, Frequency and Number of Meals on the Incidence of Stunting

Feeding Patterns	Stunting Incidence				Total	
	Very Short		Short			
	f	%	f	%	f	%
Type of feeding						
Not right	39	18,0	21	9,7	60	27,6
Right	5	2,3	152	70,0	157	72,4
Total	**44**	**20,3**	**173**	**79,7**	**217**	**100**
Feeding frequency						
Not right	3	1,4	1	0,4	4	1,8
Right	41	18,9	172	79,3	213	98,2
Total	**44**	**20,3**	**173**	**79,7**	**217**	**100**
Number of feeding						
Not right	4	1,9	2	0,9	6	2,8
Right	40	18,4	171	78,8	211	97,2
Total	**44**	**20,3**	**173**	**79,7**	**217**	**100**

From TABLE 7 above, it is known that the results of cross-tabulation showed that there were feeding patterns based on the type of feeding with the stunting category, showing that there were 39 children (18%) who received feeding patterns based on improper feeding types who were stunted in the very short category, while 152 children (70%) who received feeding patterns based on the right type of feeding were stunted in the short category. In children who received feeding patterns based on eating frequency, there were 3 children (1.4%) with feeding patterns based on improper feeding frequency who were stunted in the very short category and 172 children (79.3%) who received feeding patterns based on the right feeding frequency were stunted in the short category. In children who received a feeding pattern based on the number of meals, there were 4 children (1.9%) with feeding patterns based on improper feeding rates stunted in the very short category and 171 children (78.8%) who received feeding patterns based on the right amount of food, stunted in the short category.

H. STATISTICAL ANALYSIS

This study aims to determine the effect of feeding patterns according to type, frequency and amount of feeding on the incidence of stunting in children aged 1-5 years in Panekan District, Magetan Regency. Data on the effect of feeding patterns based on the type of feeding on the incidence of stunting are shown in the following table:

TABLE 8
Test Results of the Effect of Feeding Patterns Based on Types of Feeding to the Incidence of Stunting

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	102,613[a]	1	0,000
Continuity Correction[b]	98,825	1	0,000
Likelihood Ratio	96,827	1	0,000
Linear-by-Linear Association	102,140	1	0,000
N of Valid Cases	217		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.17.
b. Computed only for a 2x2 table

From TABLE 8 above, it is known that the results of the test of the effect of feeding patterns based on the type of feeding on the incidence of stunting in children aged 1-5 years using the Chi-square Test, obtained a significance value (Sig.) of 0.000. Based on this, the significance (Sig.) (0.000) < 0.05 or indicates that the hypothesis is accepted. That is, there is an influence of feeding patterns based on the type of feeding on the incidence of stunting in children aged 1-5 years.

TABLE 9
Test Results of the Effect of Feeding Patterns Based on the Feeding Frequency to the Incidence of Stunting

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7,549[a]	1	0,006		
Continuity Correction[b]	4,494	1	0,034		
Likelihood Ratio	5,670	1	0,017		
Fisher's Exact Test				0,027	0,027
Linear-by-Linear Association	7,515	1	0,006		
N of Valid Cases	217				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .81.
b. Computed only for a 2x2 table

Data on the effect of feeding patterns based on the feeding frequency on the incidence of stunting are shown in the following TABLE 9 below, it is known that the results of the test of the effect of feeding patterns based on feeding frequency on the incidence of stunting in children aged 1-5 years using the Chi-square Test, found that there were 2 cells (50%) that had an expected frequency or expected count of less than 5 so that they did not meet the requirements of the Chi-square test. Therefore, the test is carried out using the Fisher Exact test (Fisher's Exact test). The results of the Fisher Exact test obtained a significance value (Sig.) of 0.027. Based on this, the significance (Sig.) (0.027) < 0.05 or indicates that the hypothesis is accepted. That is, there is

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 4 no.3, pp. 86-92, June 2024

an influence of feeding patterns based on the frequency of eating on the incidence of stunting in children aged 1-5 years.

Data on the effect of feeding patterns based on the amount of feeding on the incidence of stunting are shown in the following table: From TABLE 10 above, it is known that the results of the test of the effect of feeding patterns based on the amount of food on the incidence of stunting in children aged 1-5 years using the Chi-square Test, found that there were 2 cells (50%) that had an expected frequency or expected count of less than 5 so that they did not meet the requirements of the Chi-Square test. Therefore, the test is carried out using the Fisher Exact test (Fisher's Exact test). The results of the Fisher Exact test obtained a significance value (Sig.) of 0.016. Based on this, the significance (Sig.) (0.016) < 0.05 or indicates that the hypothesis is accepted. That is, there is an influence of feeding patterns based on the amount of food on the incidence of stunting in children aged 1-5 years. That is, there is an influence of feeding patterns based on the amount of food on the incidence of stunting in children aged 1-5 years.

TABLE 10
Test Results of the Effect of Feeding Patterns Based on the Amount of Feeding to the Incidence of Stunting

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8,215[a]	1	0,004		
Continuity Correction[b]	5,529	1	0,019		
Likelihood Ratio	6,265	1	0,012		
Fisher's Exact Test				0,016	0,016
Linear-by-Linear Association	8,177	1	0,004		
N of Valid Cases	217				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.22.
b. Computed only for a 2x2 table

IV. DISCUSSION

A. INTERPRETATION OF RESULTS AND COMPARISON WITH EXISTING LITERATURE

This study investigated the relationship between feeding patterns including breastfeeding, complementary feeding, and overall dietary intake and the incidence of stunting in toddlers aged 24–59 months in Magetan Regency. The findings revealed a statistically significant association between all three feeding pattern indicators and the prevalence of stunting, reinforcing existing evidence on the pivotal role of early nutrition in child growth outcomes.

The first key finding demonstrated a significant correlation between breastfeeding patterns and stunting (p = 0.004). Infants who were not exclusively breastfed for the first six months were more likely to experience growth failure. These results align with prior studies indicating that exclusive breastfeeding contributes to optimal immune function, reduces infection risk, and supports nutrient sufficiency in the critical early months [26], [27]. Inadequate breastfeeding practices have been shown to compromise both energy and micronutrient intake, particularly in socioeconomically constrained settings [28]. The second significant result was the association between complementary feeding practices and stunting (p = 0.016). Children who received late or nutritionally inadequate complementary foods were at a higher risk of impaired linear growth. This supports WHO and UNICEF recommendations that complementary foods should be introduced at 6 months of age, be rich in essential nutrients, and offered in age-appropriate textures and frequency [29]. Similar findings were observed by Widodo et al. [30], who noted that delayed or inappropriate complementary feeding is associated with increased stunting risk in rural Indonesian communities.

Finally, dietary intake patterns, particularly food diversity and adequacy of nutrient consumption, showed a strong association with stunting (p = 0.001). This reinforces the evidence that poor dietary diversity and frequent consumption of carbohydrate-dense but nutrient-poor foods contribute to chronic undernutrition in young children [31]. A study by Mahmud et al. [32] in West Java reported that children with low dietary diversity scores were more likely to be stunted than those consuming a variety of food groups. The strength of these associations confirms the multi-dimensional role of feeding practices in shaping a child's growth trajectory. Feeding behaviors, particularly during the first 1,000 days of life, remain one of the most modifiable risk factors for stunting prevention. These findings are consistent with international studies in South Asia and Sub-Saharan Africa, where suboptimal feeding patterns are major contributors to high stunting prevalence [33], [34].

B. LIMITATIONS AND WEAKNESSES

While the study provides valuable insights, several limitations should be acknowledged. First, the use of a cross-sectional design restricts the ability to infer causality. The associations observed between feeding practices and stunting are statistically significant but do not confirm temporal or causal relationships. Longitudinal or cohort studies would be more robust in confirming whether poor feeding practices directly lead to stunting over time [35].

Second, self-reported data from mothers may be subject to recall bias**,** particularly when recollecting breastfeeding duration or dietary intake over the previous months. Social desirability bias may also influence mothers to report favorable practices, such as exclusive breastfeeding or diversified diets, even if actual practices were suboptimal. Although trained enumerators minimized these risks, they remain potential sources of measurement error. Third, the sample size of 100 participants, while sufficient for preliminary analysis, may limit the generalizability of findings. A larger, randomized sample across multiple regions in East Java or nationally would improve external validity and enable subgroup analyses across socioeconomic levels or cultural practices [36].

Another limitation is the absence of biochemical markers or clinical assessment**s** to validate nutritional status, such as micronutrient levels or hemoglobin concentration. Anthropometric data were based on health records and self-reported height, which might introduce further measurement errors. Future research should incorporate objective nutritional assessments to better understand the physiological mechanisms linking feeding behavior and stunting. Lastly, contextual factors such as maternal education, household income, sanitation, and health service

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 4 no.3, pp. 86-92, June 2024

access were not deeply explored in this analysis. While feeding patterns are crucial, stunting is a multifactorial condition influenced by broader socioeconomic and environmental determinants. A more comprehensive model incorporating these variables could yield deeper insights [37].

C. IMPLICATIONS AND CONTRIBUTIONS

Despite these limitations, the study offers several important implications for practice, policy, and future research.First, the study emphasizes the importance of promoting exclusive breastfeeding for the first six months. Public health interventions should strengthen maternal counseling during antenatal and postnatal visits, ensure access to lactation support, and implement workplace policies that enable breastfeeding continuation. Initiatives such as the Baby-Friendly Hospital Initiative (BFHI) and community-based support groups have demonstrated effectiveness in improving breastfeeding rates [38]. Second, findings underscore the urgency of timely and appropriate complementary feeding. Health programs must deliver targeted education to caregivers on when and how to introduce nutrient-rich complementary foods, particularly in rural areas where misconceptions about food readiness are common. Using culturally adapted nutrition education materials can improve caregiver knowledge and feeding behavior [39].

Third, improving dietary diversity among toddlers should be a priority in nutrition programming. Strategies such as household food gardens, school feeding programs for older siblings, and market interventions to reduce the cost of nutrient-dense foods can contribute to improved dietary quality. Nutrition-sensitive interventions that address food access and affordability are critical to combat stunting at the community level [40]. Furthermore, the study contributes to academic knowledge by providing region-specific evidence on stunting determinants in Magetan Regency, a region not often represented in national surveys. Localized data allow policymakers to tailor interventions based on specific community needs and cultural practices, ensuring better implementation and outcomes.

From a research standpoint, the study identifies key knowledge gaps for future investigation. These include understanding the influence of maternal knowledge and beliefs on feeding behavior, the role of intra-household food distribution, and the intersection of nutrition with infectious disease risk in stunting. It also highlights the need for integrated approaches combining nutritional, behavioral, and environmental strategies to reduce the national stunting burden. Lastly, this study supports Indonesia's national stunting reduction target of 14% by 2024 by providing evidence-based insights for policymakers, midwives, community health workers, and NGOs. Sustained investment in maternal-child health education, nutrition services, and behavior change communication is vital to achieving this target.

V. CONCLUSION

This study aimed to examine the relationship between feeding patterns including breastfeeding, complementary feeding, and dietary intake and the incidence of stunting among toddlers aged 24 to 59 months in Magetan Regency, Indonesia. The analysis was conducted using a cross-sectional design involving 100 stunted children selected through purposive sampling. The research revealed that all three components of feeding behavior were significantly associated with stunting prevalence. Specifically, a statistically significant relationship was found between breastfeeding patterns and stunting ($p = 0.004$), highlighting that non-exclusive or insufficient breastfeeding practices may contribute to impaired growth in early childhood. Additionally, complementary feeding practices were also significantly associated with stunting ($p = 0.016$), suggesting that improper timing, quality, and frequency of complementary foods negatively affect linear growth. Furthermore, dietary intake patterns demonstrated the strongest association ($p = 0.001$), indicating that inadequate food diversity and poor nutritional intake are key risk factors for stunting in this population. These findings affirm that the first 1,000 days of life are a critical window for nutritional intervention and that maternal behavior regarding infant feeding plays a substantial role in determining child health outcomes. The study contributes valuable local evidence to the national discourse on stunting prevention, particularly in rural settings where health literacy and food access may be limited. However, future studies should employ longitudinal or cohort designs to establish causality more robustly and explore additional variables such as maternal education, sanitation, and household income. Incorporating biochemical and clinical nutritional assessments would also enrich data quality and provide more comprehensive insights into child nutritional status. Interventions aimed at improving maternal knowledge, feeding practices, and access to diverse and nutritious foods are essential to reducing stunting rates and achieving Indonesia's national target of lowering stunting prevalence below 14% by 2024.

ACKNOWLEDGEMENTS

The authors would like to express their sincere gratitude to the Magetan District Health Office and the community health centers for their support during data collection. Special thanks are extended to the participating mothers for their time and cooperation. The authors also appreciate the assistance of colleagues from the Department of Midwifery, Poltekkes Kemenkes Surabaya, for their valuable input throughout the research process.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTIONS

Tyas Arini contributed to the conception and design of the study, coordinated data collection, and drafted the initial manuscript. Sulikah provided methodological input, supervised the research process, and assisted with data analysis and interpretation. Nurweningtyas Wisnu contributed to the literature review, supported questionnaire

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 4 no.3, pp. 86-92, June 2024

development, and participated in critical manuscript revisions. Aini Ahmad reviewed the results, enhanced the discussion framework, and contributed to final editing and approval of the manuscript. All authors have read and approved the final version of the article for publication.

DECLARATIONS

ETHICAL APPROVAL

This study was reviewed and approved by the Ethics Committee of Poltekkes Kemenkes Surabaya. All procedures involving human participants were conducted in accordance with institutional guidelines and the ethical standards of the 1964 Helsinki Declaration and its later amendments.

CONSENT FOR PUBLICATION PARTICIPANTS.

Participants were informed that the data collected would be used for academic and publication purposes. Written consent for publication of anonymized data was obtained from all respondents or their legal guardians.

COMPETING INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this article.

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