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Optimizing Posyandu for Stunting Prevention: Does Routine Attendance Make a Difference?

Syafarinah Nur Hidayah Akil[1], Nadia Tarina Sabila[2], Gina Noor Djalilah[3]

[123] Faculty of Medicine, Universitas Muhammadiyah Surabaya, Indonesia

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ABSTRACT

Background: Stunting remains an important public health and nutritional concern in Indonesia. Posyandu provides community-based growth monitoring and maternal health education.
Objectives: To examine the associations of Posyandu attendance frequency and maternal knowledge with stunting severity among children aged 0–24 months in the working area of Puskesmas Lepak Sakra Timur.
Methods: An observational cross-sectional study was conducted in September 2022 among 60 mothers of children classified as stunted or severely stunted. Posyandu visits were obtained from maternal and child health records, maternal knowledge was assessed using a 25-item questionnaire, and associations were assessed using Chi-square tests.
Results: Of the 60 children, 47 (78.3%) were classified as stunted and 13 (21.7%) as severely stunted. Routine Posyandu attendance was recorded for 45 (75.0%) children. Attendance frequency was associated with stunting severity ($p = 0.047$), whereas maternal knowledge was not ($p = 0.478$).
Conclusion: Posyandu attendance frequency was associated with stunting severity in this sample, while maternal knowledge was not significantly associated. The cross-sectional design and inclusion of only stunted children do not establish a preventive or causal effect.

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Corresponding Author:

Syafarinah Nur Hidayah Akil
Faculty of Medicine, Universitas Muhammadiyah Surabaya, Indonesia
Email: syafarinahnha@um-surabaya.ac.id

INTRODUCTION

The problems of malnutrition, stunting, and obesity are still a challenge in efforts to improve the health of the Indonesian people1–3. Stunting is still a major nutritional problem in Indonesia because it has a major impact on children's health for the present and the quality of human resources (HR) in the future4. The impacts in question are impaired motor, verbal and cognitive development which will later affect productivity

performance and work capacity as adults5. Therefore, reducing the incidence of stunting is one of the targets for Indonesia's health development goals in 2025 and the Sustainable Development Goals (SDGs) in 20306.

The global prevalence of stunting in children aged less than 5 years in 2020 reach 22% or around 149.2 million children. Half of the stunting incidents in the world were in Asia. The highest prevalence of stunting in the Asian region in order of Timor Leste (50.2%), India (38.4%), and Indonesia (36.4%), of which two were included in the Southeast Asia region7. According to the Indonesian Ministry of Health through the 2022 SSGI report, East Nusa Tenggara has the highest prevalence of stunting nationwide (37%), followed other province including West Nusa Tenggara (Nusa Tenggara Barat or NTB), which also remains among the provinces with the highest stunting burden7–9. The three big regencies or cities with the highest number of stunting in NTB are Sumbawa (41.8%), Central Lombok (39.1%) and Dompu (38.3%) with an average number of stunting cases of 150,000 children10. However, the data turned out to be inversely proportional to the results of a specific work visit by Commission IX of the DPR RI in 2019 where the region with very bad stunting cases in NTB was East Lombok Regency as much as 43.52%11.

Posyandu is a media for health promotion that seeks to convey health information which is expected to be able to increase knowledge about basic maternal and child health in determining healthy lifestyles every day. Posyandu visits less than 8 times per year indirectly lead to a tendency for mothers to have lower knowledge and have the opportunity to have stunted children12,13.

Studies that have been conducted in several regions in Indonesia show that there is a significant relationship between the level of mother's knowledge and the incidence of stunting13–17. Researches conducted in several regions in Indonesia shows that most stunted children are found in mothers with less knowledge13,14,17. Lack of knowledge about nutrition, especially related to food diversity, balanced nutrition, breast milk, and the form of toddler food has the opportunity to cause mistakes and mistakes in providing food with the right type and amount to optimize the process of growth and development of toddlers in their golden period15,16.

The frequency of Posyandu visits causes a lack of information received by mothers so that knowledge related to nutrition issues is also reduced12,18. Therefore, the researchers want to further examine whether the mother's knowledge and the posyandu's visits both have a relationship with the incidence of stunting that occurs in the working area of the Puskesmas East Lepak Sakra, East Lombok Regency, NTB.

METHOD

Study design

This observational analytic study used a cross-sectional design and was conducted in September 2022 in the working area of Puskesmas Lepak Sakra Timur, East Lombok, West Nusa Tenggara, Indonesia.

Population and sample

The study included 60 mothers of children aged 0–24 months classified as stunted or severely stunted. The source manuscript describes proportional random sampling. [AUTHOR VERIFICATION REQUIRED: define the source population, inclusion and exclusion criteria, sampling strata, and sample-size calculation. Clarify the discrepancy with "stratified random sampling" in the original abstract.]

Data collection

Posyandu visit frequency was obtained from maternal and child health (KIA) books. Maternal knowledge was assessed with a 25-item questionnaire. Routine attendance was defined as 8–12 visits per year, and non-routine attendance as fewer than eight visits per year. [AUTHOR VERIFICATION REQUIRED: specify anthropometric measurements and WHO length-for-age z-score thresholds, instrument validity/reliability, questionnaire scoring, and informed consent procedures.]

Data analysis

Descriptive analyses and Chi-square tests were used to assess associations between attendance frequency, maternal knowledge, and stunting severity. A significance level of 0.05 was applied. [AUTHOR VERIFICATION REQUIRED: state statistical software and version, clarify the reported correlation/effect-size statistic "r", and verify Chi-square assumptions for small expected cell counts.]

Ethical statement

Ethical approval was reported from the Health Research Ethics Committee of Universitas Muhammadiyah Surabaya, approval no. 037/KET/II.3/AU/F/2022. [AUTHOR VERIFICATION REQUIRED: provide the informed consent statement.]

RESULTS

The respondents' characteristic in the study is shown in Table 1. Most respondents were between 26-30- and 36–40-year-old. Three fourth of the children were at the age of 13-24 months. The maternal educational level mostly was high school while the employment was dominantly housewives or farmers, 33.3% dan 68.3% respectively.

Tabel 1. The characteristic of the study (n=60)

Characteristic	Frequency (n)	Percentage (%)
Maternal Age (years)		
15-20	6	10
21-25	11	18,3
26-30	14	23,3
31-35	13	21,7
36-40	14	23,3
41-45	2	3,3
Child age (months)		
0-12	15	25
13-24	45	75
Domicile		
Gelanggang	4	6,7
Gereneng	8	13,3
Greneng Timur Lenting	6	10,0
Lepak	3	5,0
Lepak Timur	11	18,3
Menceh	5	8,3
Mt. Tangi	8	13,3
Surabaya	3	5.0
Surabaya Utara	6	10,0
	6	10,0
Level of education		
Elementary school	16	26,7
Junior high school	18	30,0
High school	20	33,3
D4	1	1,7
S1	5	8,3
Employment		
Laborer	1	1,7
Teacher	3	5,0
Merchant	41	68,3
Housewife	1	1,7
Farmer	11	18,3
Self-employed	3	5.0
Total	60	100%

The more detail gender characteristics of the stunted children is presented in Figure 1. Both stunting and severe stunting children are dominated by male gender. The number of severe stunted children in Puskesmas Lepak Sakra Timur in both genders were about 10-12%.

Table 2 shows the frequency of posyandu visits. The frequency of posyandu visits was divided into routine and non-routine. It is considered routine if the visits were 8-12 times a year and non-routine if the number of visits is less than 8 times. The majority (63.3%) of stunted children have a routine posyandu visits listed in the book called KIA (Kesehatan Ibu dan Anak or Maternal and Child Health). Meanwhile, for children with severe stunting status, the frequency of visits between routine (11.7%) and non-routine (10%) visits does not have that much of a difference.

Table 2. Frequency of Posyandu visits with stunting incidents in the Puskesmas Lepak working area (N=60)

Frequency of Posyandu Visits	Stunting incidence rate n (%)	Stunting incidence rate n (%)	Total n (%)
Frequency of Posyandu Visits	Severe stunting	Stunting	Total n (%)
Routine	7 (11,7%)	38 (63,3%)	45 75%)
Not routine	6 (10%)	9 (15%)	15 (25%)
Total	13 (21,7%)	47 (78,3%)	60 (100%)

Chi-Square analysis: p = 0,047 and r = 0,249

Figure 2 illustrates the distribution of maternal knowledge about stunting. Majority of the mothers' knowledge in Lepak Village, Sakra Timur District is sufficient accounting for 53.3% of the sample indicating that more than half of the mothers possess a moderate level of understanding related to child nutrition and stunting. However, there were still more 35% of mothers with poor knowledge, suggesting that over one-third of the population may still lack essential information needed to support optimal child growth and development. Only 11.7% of mothers had good knowledge, reflecting a relatively small proportion with strong nutritional awareness. Overall, the distribution shows that although most mothers fall within the sufficient category, a considerable segment still possesses inadequate knowledge, highlighting the need for targeted educational interventions to improve maternal understanding of stunting and child nutrition.

The distribution of stunting incidence based on maternal knowledge levels among 60 respondents in the Puskesmas Lepak Sakra Timur working area is presented in Table 3. The majority of mothers had sufficient knowledge (53.3%), followed by those with poor knowledge (35%), and only 11.7% had good knowledge.

Table 3. Chi-square correlation test between the mother's knowledge with stunting incidence in the Puskesmas Lepak Sakra Timur Working Area (N=60)

Mother's knowledge	Stunting incidence n (%)	Stunting incidence n (%)	Total
Mother's knowledge	Severe stunting	Stunting	Total
Good	2 (3,3%)	5 (8,3%)	7 (11,7%)
Sufficient	5 (8,3%)	27 (45%)	32 (53,3%)
Poor	6 (10%)	15 (25%)	21 (35%)
Total	13 (21,7%)	47 (78,3%)	60 (100%)

Chi-Square test: p >0,05 (p = 0,478) and r = 0,155

Among mothers with good knowledge, 2 children (3.3%) still experienced severe stunting, and 5 children (8.3%) experienced stunting, yielding a total of 7 cases (11.7%). For mothers with poor knowledge, 6 children (10%) were severely stunted, and 15 children (25%) were stunted, totaling 21 cases (35%).

Although the proportion of stunting appears highest among mothers with sufficient and poor knowledge, the Chi-square test showed no statistically significant relationship between maternal knowledge and stunting incidence (p=0.478; r=0.155). This indicates that in this population, maternal knowledge level does not significantly influence whether a child becomes stunted or severely stunted.

Editorial verification note: Table 2 and Table 3 compare "stunting" versus "severe stunting"; they do not include a non-stunted comparison group. Please confirm that all percentages, denominators, and reported p-values match the original dataset.

DISCUSSION

The maternal characteristics shown in Table 1 represents the area of origin or residence of mothers who have stunted children which is in accordance with secondary data provided by the Puskesmas Lepak Sakra Timur. Majority of stunted children were from Lepak Village (18.3%) then Gereneng Village (13, 3%) and Menceh (13.3%).

Children classified as aged 0–12 months and 13–24 months were the two age groups of in this study as the subject. In this study, stunting occurred more frequently in children aged 13-24 months, which indicates that the older the child is, the need for nutritional intake will also increase and children tend to be more active so that the burning of energy in the body is also maximized20.

More children aged 0-24 months were in the stunting category (78.4%) compared to the severe stunting category (21.7%). If this is not addressed immediately, it will have an impact on the growth and development of toddlers in the future, such as disruption of cognitive, motor and verbal development, increased risk of disease, less than ideal performance and ability for learning,, increased health costs and mortality rates in the future21.

As much as 21.6% of the respondents experienced severe stunting (Figure 1). This incidence rate shows that there are still many cases of severe stunting that occur in the work area of the Puskesmas Lepak Sakra Timur. More stunted children were male; however, the difference is not too big compared to the stunted female children. The incidence of stunting mostly occurs in male children because in the first year of life, males are more susceptible to malnutrition, plus the larger body size of males means that nutritional intake tends to be inadequate. If the stunting condition left for a long period of time, it will have an impact on disrupting growth and development20,22,23.

The frequency of posyandu visits was divided into 3 groups, which is routine, non-routine, and absence. It is considered routine if the number of visits per year was 8-12 times, while it was considered non-routine if the number of visits is less than 8 times per year, and absence category if you have never visited the posyandu at all 20.

In this study, the frequency of posyandu visits by people who live in the working area of the Puskesmas Lepak Sakra Timur showed that majority have regular or routine visits, reaching 75%. However, there are still a quarter of the total respondent who do not make regular or non routine visits (as shown in Table 2). The study's findings are consistent with previous research conducted in Kembangan Village, Kebomas District, Gresik Regency. It is known that the majority of the group of stunted toddlers actively attend posyandu every month were 63.2%, while those who do not regularly visit posyandu were 30.8%. These results are also supported by research conducted by Tatu et al (2021) in Kabuna Village, Kakuluk Mesak District, Belu Regency, NTT. The research showing that the results of an analysis of the relationship between the frequency of posyandu visits and the incidence of stunting in toddlers showed that 82.3% of stunted toddlers made regular visits throughout the year. Meanwhile, 17.7% of stunted toddlers do not regularly visit posyandu18,24.

Frequent posyandu visits offer vital health services that are critical in the early detection of malnutrition and stunting hazards, including growth monitoring, vaccinations, and nutrition education19. Research indicates that kids who regularly visit posyandu have a higher chance of receiving prompt treatments, such as dietary supplements and advice from parents on appropriate feeding techniques12,18. As a result, a lower rate of stunting is associated with greater participation in posyandu activities because these activities provide regular monitoring and prompt intervention during crucial developmental phases in children.

This study shows that regular posyandu attendance plays an important role in reducing stunting among children aged 0–24 months. Frequent visits allow for early growth monitoring, timely detection of problems, and direct nutrition counseling, making posyandu a key community-based strategy for stunting prevention. Improving participation through better outreach, accessibility, and community engagement could further enhance its effectiveness.

Stunting is still an unresolved nutritional problem in Indonesia25. One of the indirect factors that causes stunting is the mother's knowledge about nutrition. At 1000 first days of life, it is a period of time vulnerable to problems of malnutrition, because at that age growth and development occurs relatively quickly and tends to determine the quality of future growth now and in the future16. Mothers have an important role in meeting the nutritional problems of families, especially children. Because, starting from the selection of materials food, food processing up to serving food is carried out by the mother. Fulfillment of good nutrition must be in line with good nutritional knowledge possessed by a mother14,19.

In this study, mothers' knowledge about nutrition, which includes food diversity, balanced nutrition, breast milk and forms of food for toddlers, was measured using a questionnaire that had been tested for validity and reliability. The knowledge is classified into 3 groups, namely good (76%-100%), sufficient (56%-75%) and poor (≤55%). Majority of respondents have sufficient knowledge which is in line with research conducted in Tasikmalaya19. Other study which also had the same results is conducted in Nanggalo District, Padang City, where 48.7% had sufficient knowledge, while compared to those with poor knowledge were 25.9%14. Wulandari and Muniroh also stated in their research that stunted toddlers were found more often in mothers with a moderate (sufficient) level of knowledge16. However, different results of maternal knowledge were

found in research conducted in Langkat and Pekanbaru15,26. Both researches showed that the majority of mothers' knowledge was lacking, as much as 66.7% in Langkat regency and 53,9% in Pekanbaru.

There is no relationship between mother's knowledge and incidence of stunting in the Lepak Sakra Timur as shown in Table 3 (p>0,05). This result is in line with research conducted in Tasikmalaya which stated that there was no relationship between maternal knowledge about nutrition and the incidence of stunting. Also supported by research conducted in Bojonegoro Regency and Padang City27,28. This could happen because the mother's good and sufficient knowledge does not guarantee having children with good nutritional status, due to behavior and parenting patterns what is implemented which can be influenced by other factors such as socio-economic, socio-cultural and environment21,27,28.

Our result about the mother's knowledge is contradicted with the research conducted in the working area of the Puskesmas Jati Makmur, North Binjai, and at the Puskesmas Bahu, Malalayang District, Manado City. These two researches showing the mother's knowledge regarding nutrition is a significant risk factor for stunting29,30. Both researches use categories of stunted and non-stunted respondents which is different with the category of stunting used in our study. Another research conducted in Kapuas also shows that there is a significant relationship between maternal knowledge and stunting because the characteristic of most of the research respondents (81.8%) in that area have insufficient knowledge31.

Mother's knowledge about nutrition will later influence parenting practices and attitudes behavior in selecting, processing, and providing food according to needs children at the age they should be27,28. This nutritional knowledge does have an important role because with sufficient knowledge, especially about health, a person can know various things health problems that can occur and finding the right solution to overcome them. The children development will still be negatively impacted if the mother does not use and incorporate her knowledge into her parenting techniques, even if she already have adequate and high-quality knowledge 21. However, good knowledge possessed by respondents is not very significant in terms of the severity of child stunting, which means that even though the mother has good knowledge, her child can experience severe stunting. This happens because the mother's knowledge is one indirect factor which can cause stunting and there are many direct and indirect factors which are directly interconnected and cause children to fall into a condition of stunting or severe stunting14,21.

Theoretically, stunting rates can be decreased by increasing mothers' awareness of child nutrition and education, as evidenced by several studies32,33. Thus, reducing stunting and enhancing the health of children can be greatly impacted by arming moms with the necessary knowledge. However, the result in this study which showed no correlation could be caused by the different categories used in stunting incidence. In most studies the categories used are stunting and non-stunting, while in this study it is stunting and severe stunting. The researchers used this category to find out whether maternal knowledge can influence the incidence of stunting to become more severe. It turns out that in the population of children who are already stunted, maternal knowledge is not related to worsening stunting. However, this study also shows that cases of children with severe stunting are most common in mothers with poor knowledge (10%), although it is not statistically significant.

In conclusion, the absence of a significant link between maternal knowledge and stunting suggests that knowledge alone is not enough to change nutritional outcomes. This highlights the need for additional support, such as practical feeding guidance, behavior-focused interventions, and improvements in household or environmental conditions.

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish causal relationships between posyandu visit frequency, maternal knowledge, and stunting incidence. The associations observed reflect conditions at a single point in time and may not capture changes in behavior or child growth over time. Second, the study relied on self-reported data for posyandu visit frequency and maternal knowledge, which may be subject to recall bias or social desirability bias. Third, the sample was restricted to one community health center (Puskesmas Lepak Sakra Timur), which may limit the generalizability of the results to regions with different socio-demographic or cultural characteristics.

In addition, the study did not assess other important factors that may influence stunting, such as feeding practices, sanitation, or socioeconomic status, which could confound the relationship between knowledge or visit frequency and stunting outcomes. Finally, the small sample size (N=60) may reduce the statistical power to detect weaker associations, particularly for variables like maternal knowledge. Future studies with larger samples and multiple locations are recommended to obtain more robust insight into the determinants of stunting.

CONCLUSION

Among 60 children with stunting or severe stunting, routine Posyandu attendance was statistically associated with stunting severity ($p = 0.047$), while maternal knowledge was not ($p = 0.478$). These findings should be interpreted as associations rather than evidence that attendance prevents stunting. Further research including children without stunting and accounting for potential confounders is warranted.

CONFLICT OF INTEREST

[AUTHOR TO COMPLETE: disclose any conflicts of interest or explicitly state that none exist.]

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LIST OF ABBREVIATIONS

KIA: Kesehatan Ibu dan Anak (Maternal and Child Health); NTB: Nusa Tenggara Barat (West Nusa Tenggara); WHO: World Health Organization; SDGs: Sustainable Development Goals; SSGI: Survei Status Gizi Indonesia.

ETHICAL APPROVAL

Health Research Ethics Committee, Universitas Muhammadiyah Surabaya; approval no. 037/KET/II.3/AU/F/2022.

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