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CAN FAMILY MEALTIME REDUCE STUNTING? INVESTIGATING THE ROLE OF FREQUENCY AND MEALTIME ENVIRONMENT

Widia Maharani[1], Wahiduddin[1], A. Arsunan Arsin[1], Andi Zulkifli[1], Abdul Salam[2], Masyitha Muis[3]

[1]Department of Epidemiology, Faculty of Public Health, Hasanuddin University – Indonesia

[2]Department of Nutrition Science, Faculty of Public Health, Hasanuddin University – Indonesia

[3]Department of Occupational Health and Safety, Faculty of Public Health, Hasanuddin University – Indonesia

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ABSTRACT:

Context/Background:

The occurrence of stunting in East Luwu Regency has risen in 2022.

Aims/Objectives:

This study aimed to identify whether family meals are associated with stunting in children aged 24-59 months in Burau District, East Luwu Regency.

Methodology:

This case-control study involved 136 children (68 cases and 68 controls) selected through systematic random and purposive sampling. Data were analyzed using Stata version 17.

Results:

Children who ate breakfast with their family less than once a week had a higher risk of stunting (adjusted OR 6.76, 95% CI 1.66-27.44, p=0.008), as did those who ate dinner with their family less than once a week (adjusted OR 4.69, 95% CI 1.35-16.27, p=0.015). Children whose parents never modeled eating fruits (adjusted OR 3.49, 95% CI 1.15-10.55, p=0.027) or vegetables (adjusted OR 5.81, 95% CI 1.44-23.35, p=0.013) had a higher risk of stunting. The use of TV/phones during meals was associated with an increased risk of stunting (adjusted OR 5.22, 95% CI 1.18-22.94, p=0.029).

Conclusions:

Family mealtimes were protective against stunting in East Luwu Regency. Promoting the benefits of a family mealtime routine can be an effective strategy for preventing stunting.

Key-words:

Communication, fruits intake, phone using, parental modeling, vegetable intake.

INTRODUCTION:

One of the goals set out in the Sustainable Development Goals (SDGs) formulated by the United Nations in 2015 is to end all forms of malnutrition by 2030. However, the fact is that several children under the age of five are still undernourished, especially in developing countries. One example of malnutrition that, to this day, still catches most children is stunting.

Global data for 2022 showed that the prevalence of stunting among children under the age of five reached 22.3%, with more than half (52%) living in Asia and two out of five (43%) in Africa.[1].Southeast Asia ranks second with the highest prevalence of stunts in the Asian Region, reaching 26.4%. Indonesia ranks first with the most prevalence among the Southeast Asian countries, at 31.8%. According to the Indonesian Nutrition Status Survey (SSGI), the prevalence has declined in 2022 to 21.6%.[2] Specifically, South Sulawesi ranks tenth nationally, with a prevalence of stunting reaching 27.2%.[2]

East Luwu, as one of the regions in South Sulawesi, needs to be the focus of research because of the trend of a significant increase in stunting prevalence. Based on SSGI data for 2022, the prevalence of stunting in East Luwu has increased by 2022 to 22.6%, or up by 2.7% compared to 2021.[2] The stunting rate in Burau district reached 6.15%, ranking second highest in the list of incidents presented. Furthermore, when looking at families at risk of stunting, Burau district reappeared as one of the main stunting locus with the percentage reaching 40.7%.

Currently, research on stunting has mostly focused on a few key factors such as maternal, child, household, and environmental factors. The risk factors associated with stunting in children are diverse and complex, including maternal health and nutrition, breastfeeding practices, dietary diversity, hygiene, sanitation, and access to healthcare services. Environmental factors such as food insecurity, poverty, and lack of education also contribute significantly to the prevalence of stunting. [3–7] Lifestyle behaviors and dietary patterns play crucial roles in the prevention of stunting, given that they are largely modifiable factors.[8] Ensuring adequate nutrition through a balanced diet is vital for proper growth and development in children.[9] Cross-sectional and prospective studies have documented an association between poor dietary quality and increased levels of stunting.[10–12] A study in rural Malawi indicated that improvements in diet quality were associated with reductions in stunting prevalence among children.[13] Diet quality is essential for healthy growth and development early in life.

Eating meals with one's family or family meals may be a significant factor in the development of healthful eating habits in children. Family meals have garnered attention as a method to enhance the content of meals among eating behaviors.[14,15] Evidence shows that a higher frequency of family meals positively correlates with healthier dietary outcomes in children and adolescents.[16,17] Additionally, there has been evidence of a correlation between family meals and an increase in nutritional status. A greater frequency of family meals is associated with a healthier diet, less unhealthy diet, and lower body mass index.[17] One study reported that family meals were typically inversely associated with obesity.[18]

However, relatively few studies have examined the impact of family meals on stunting. This study aimed to identify the association between family mealtime and stunting among children. The novelty of this study is that family meals were examined regarding both frequency and mealtime environment (parental modeling in eating fruits and vegetables, parent-child communication, and the use of phones or TV during mealtime) to see their relationship with stunting.

OBJECTIVES:

Our research objective was to identify whether family mealtime is associated with stunting; the hypothesis was that the frequency of family meals and a positive environment during meals are inversely associated with stunting.

METHODOLOGY:

Study Design

This type of research is a quantitative research using a case-control study design.

Population and Sample

This study included all children aged 24-59 months in Burau District, East Luwu Regency, whose height measurements were recorded in the East Luwu District Health Service's electronic community-based nutrition report in 2024. The samples in this study were some children aged 24-59 months in Burau District, East Luwu Regency. The respondents of this study were the mothers of the children in the sample. This study excluded children without a mother and father, children with apparent physical disabilities, and children whose exact age was unknown. According to the sample calculations, the sample size was 68 people. The case and control samples are compared in a 1:1 ratio, resulting in a total sample of 136 people.

The sampling technique for the case group in this study was probability sampling using systematic random sampling. The sample for the control group was selected using a purposive sampling technique. This was done to make matching easier and because the control group was selected from neighbours close to the location of the case.

Research Variables

a. Stunting

Children are considered stunting if their height-for-age exceeds two standard deviations (SD) on the WHO growth curve**.**

b. Family mealtime frequency

In this study, family mealtime is defined as eating together with at least two people, that is, the child and the father/mother. To evaluate how often family meals occurred during breakfast and dinner, mothers were asked to indicate the number of days per week their child ate breakfast (or dinner) with the family by responding to the question, "How many days per week does your child eat breakfast (or dinner) with the family?" The responses were then categorized into four groups: less than once a week, 1-3 times a week, 4-6 times a week, and every day of the week.

c. Mealtime Environment

The mealtime environment was measured with four items (Cronbach's $\alpha = 0.62$), asking: "When eating with your child, how often do you eat fruit?", "When eating with your child, how often do you eat vegetables?", "When eating with your child, how often do you engage in conversation or storytelling?", and "How often do you or your child use a mobile phone or watch TV during meals?". The responses were categorized into five groups: never, rarely, sometimes, often, and always. However, for analysis purposes, the often and always categories were combined.

d. Other Variables

We collected information on the following variables through a study-specific questionnaire: the child's age, gender, immunization status, history of infectious diseases, maternal educational status, maternal employment status, and monthly household income.

Regarding the history of infectious diseases, the mother was asked if the child had ever been diagnosed with any disease by a physician, including acute respiratory infection and diarrhea. For maternal educational status, respondents chose from six categories: “not in school/did not complete elementary school”, “completed elementary school”, “completed middle school”, “completed high school”, “completed diploma”, and “completed bachelor’s degree”. For analysis, these were consolidated into two categories: “high school or higher” and “middle school or less”. As for monthly household income, it was based on the minimum wage in Luwu Timur, which is IDR3,400,000.

Processing and Analysis

The Pearson's chi-square test or Fisher's exact test was employed to analyze the associations between stunting and the characteristics of children, family meal frequency, and mealtime environment. The latter was employed when the expected frequency in more than 20% of all cells was less than 5. A logistic regression analysis was performed to estimate the odds ratios (ORs) and 95% confidence intervals (CIs) for stunting in relation to the frequency of family meals and the mealtime environment. The reference was the highest frequency or "often/always" (excluding TV/phone use during family meals, which was classified as "never"). The following potential confounders were taken into account when calculating multivariate odds ratios: the child's age, gender, immunization status, history of infectious diseases, maternal educational status, maternal employment status, and monthly household income. Stata version 14 for Mac was employed to conduct all statistical analyses. Statistical significance was determined by two-sided p-values that were less than 0.05.

Research Ethics Approval

The Health Research Ethics Committee of Hasanuddin University granted ethical permission for this study, with the recommendation number 407/UN4.14.1/TP.01.02/2024. All research respondents provided informed consent, data confidentiality was upheld, and privacy was ensured.

Results:

Table 1 illustrates the demographic characteristics of participants enrolled in the study. The mean age of children who participated in this study was 31.3 ± 6.5 (mean ± SD) months. The majority of children are evenly distributed between males (52.94%) and females (47.06%) across both groups (p=0.303). Most children are aged 24-35 months (39.71%) with no significant difference between the groups (p=0.307). Most children had a birth weight of ≥2500 grams (83.82%) and completed immunizations (87.50%), with similar distributions in both groups (p=1.000 and p=0.195). Stunted children had a higher incidence of infectious diseases (41.18%) compared to normal children (27.94%), but this was not statistically significant (p=0.105). A significant factor is maternal education; more mothers with lower education levels were found in the stunting group (57.35%) compared to the normal group (38.24%) (p=0.026). Maternal employment status and household income showed no significant differences between the groups (p=0.060 and p=0.229).

The family mealtime frequency and mealtime environment of all subjects are presented in Table 2. The percentage of “7 times/week” for breakfast with their family is higher among normal children (20.59%) compared to stunted children (7.35%), with a significant difference (p=0.007). Similarly, the percentage of “7 times/week” for dinner with their family is more common among normal children (32.35%) than stunted children (14.71%), also significant (p=0.026). The percentage of “often/always” for parental modeling to eat fruits is similar between groups, with 64.71% for normal children and 50.00% for stunted children (p=0.078). However, the percentage of “often/always” for parental modeling to eat vegetables is higher among normal children (67.65%) compared to stunted children (60.29%), statistically significant (p=0.007). The percentage of “often/always” for engaging in conversation or storytelling is 29.41% for normal children and 20.59% for stunted children, with no significant difference (p=0.109). The percentage of “often/always” for using TV/phones during family meals is more frequent among stunted children (47.06%) compared to normal children (17.65%), with a significant difference (p=0.003).

As presented in Table 3, compared with children who ate breakfast with their family seven times a week, those who ate breakfast with their family less than once a week had a significantly higher risk of stunting (OR 6.29 (95% CI, 1.68-23.52), p = 0.006). The risk remained higher after adjusting for potential confounders (adjusted OR 6.76 (95% CI, 1.66-27.44), p = 0.008). Similarly, compared with children who ate dinner with their family seven times a week, those who ate dinner with their family less than once a week had a significantly higher risk of stunting (OR 5.03 (95% CI, 1.57-16.05), p = 0.006). This higher risk persisted after adjusting for potential confounders (adjusted OR 4.69 (95% CI, 1.35-16.27), p = 0.015).

According to Table 4, children whose parents never modeled eating fruits had a significantly higher risk of stunting compared to those whose parents often or always modeled eating fruits (OR 3.67 (95% CI, 1.31-10.29), p = 0.014). This increased risk persisted even after adjusting for potential confounders (adjusted OR 3.49 (95% CI, 1.15-10.55), p = 0.027). Regarding parental modeling of eating vegetables, children whose

parents never modeled this behavior had a significantly higher risk of stunting than those whose parents often or always modeled eating vegetables (OR 5.98 (95% CI, 1.62-22.02), p = 0.007). This association remained significant after adjusting for confounders (adjusted OR 5.81 (95% CI, 1.44-23.35), p = 0.013). For parent-child engagement in conversation or storytelling during meals, children who never engaged in such activities had a higher risk of stunting compared to those who often or always did (OR 3.33 (95% CI, 1.02-10.79), p = 0.045). However, this association was not statistically significant after adjusting for potential confounders (adjusted OR 3.27 (95% CI, 0.91-11.81), p = 0.069). Lastly, for the use of TV/HP during family meals, children who often or always used TV/HP during meals had a higher risk of stunting compared to those who never did (OR 3.73 (95% CI, 0.99-14.05), p = 0.051). This risk remained significant after adjusting for potential confounders (adjusted OR 5.22 (95% CI, 1.18-22.94), p = 0.029).

Tables:

Table 1 Characteristics of Respondents Based on Children's Nutritional Status (Normal or Stunting)

Characteristic	Total (N=136) (%)	Normal (n=68) (%)	Stunting (n=68) (%)	*p*
Child Gender				
Male	72 (52.94)	39 (57.35)	33 (48.53)	0.303 †
Female	64 (47.06)	29 (42.65)	35 (51.47)	
Child age group				
24-35 months	54 (39.71)	30 (44.12)	24 (35.29)	0.307 †
36-47 months	40 (29.41)	16 (23.53)	24 (35.29)	
48-59 months	42 (30.88)	22 (32.35)	20 (29.41)	
Birth weight				
≥2500 grams	114 (83.82)	57 (83.82)	57 (83.82)	1.000 †
<2500 grams	22 (16.18)	11 (16.18)	11 (16.18)	
Immunization status				
Complete	119 (87.50)	62 (91.18)	57 (83.82)	0.195 †
Not complete	17 (12.50)	6 (8.82)	11 (16.18)	
History of infectious disease				
No	89 (65.44)	49 (72.06)	40 (58.82)	0.105 †
Yes	47 (34.56)	19 (27.94)	28 (41.18)	
Maternal educational status				
High school/higher	71 (52.21)	42 (61.76)	29 (42.65)	0.026 *†
Middle school/less	65(47.79)	26 (38.24)	39 (57.35)	
Maternal employment status				
Employed	16 (11.76)	12 (17.65)	4 (5.88)	0.060 ‡

Unemployed	120 (88.24)	56 (82.35)	64 (94.12)	
Monthly household income				
≥ IDR3,400,000	63 (46.32)	35 (51.47)	28 (41.18)	0.229 †
<IDR3,400,000	73 (53.68)	33 (48.53)	40 (58.82)	

* Statistically significant (<0.05), † Pearson's chi-square test, ‡ Fisher's exact test.

Table 2 Family mealtime frequency and mealtime environment Based on Children's Nutritional Status (Normal or Stunting)

Characteristic	**Total**	**Normal**	**Stunting**	***p***
	(N=136) (%)	**(n=68) (%)**	**(n=68) (%)**	
Frequency of eating breakfast with their family				
7 times/week	19 (13.97)	14 (20.59)	5 (7.35)	0.007 *†
4-6 times/week	54 (39.71)	32 (47.06)	22 (32.35)	
1-3 times/week	37 (27.21)	14 (20.59)	23 (33.82)	
<1 times/week	26 (19.12)	8 (11.76)	18 (26.47)	
Frequency of eating dinner with their family				
7 times/week	32 (23.53)	22 (32.35)	10 (14.71)	0.026 *†
4-6 times/week	60 (44.12)	31 (45.59)	29 (42.65)	
1-3 times/week	21 (15.44)	8 (11.76)	13 (19.12)	
<1 times/week	23 (16.91)	7 (10.29)	16 (23.53)	
Parental modelling to eat fruits				
Often/ always	78 (57.35)	44 (64.71)	34 (50.00)	0.078 †
Sometimes	15 (11.03)	7 (10.29)	8 (11.76)	
Rarely	20 (14.71)	11 (16.18)	9 (13.24)	
Never	23 (16.91)	6 (8.82)	17 (25.00)	
Parental modelling to eat vegetables				
Often/ always	87 (63.97)	46 (67.65)	41 (60.29)	0.007 *‡
Sometimes	13 (9.56)	9 (13.24)	4 (5.88)	
Rarely	17 (12.50)	10 (14.71)	7 (10.29)	
Never	19 (13.97)	3 (4.41)	16 (23.53)	
Parent-child engage in conversation				

or storytelling				
Often/ always	34 (25.00)	20 (29.41)	14 (20.59)	0.109 †
Sometimes	53 (38.97)	30 (44.12)	23 (33.82)	
Rarely	29 (21.32)	12 (17.65)	17 (25.00)	
Never	20 (14.71)	6 (8.82)	14 (20.59)	
TV/phone using during family meals				
Never	12 (8.82)	7 (10.29)	5 (7.35)	0.003 *†
Rarely	39 (28.68)	25 (36.76)	14 (20.59)	
Sometimes	41 (30.15)	24 (35.29)	17 (25.00)	
Often/ always	44 (32.35)	12 (17.65)	32 (47.06)	

* Statistically significant (<0.05), † Pearson's chi-square test, ‡ Fisher's exact test.

Table 3. Association Between Family Mealtime Frequency and Risk of Stunting in Children

		Risk of Stunting				
	n	**Crude OR (95% CI)**	*p*	**Adjusted OR (95% CI)**		*p*
Frequency of eating breakfast with their family						
7 times/week	19	1.00		1.00		
4-6 times/week	54	1.92 (0.61-6.11)	0.267	2.18	(0.64-7.47)	0.213
1-3 times/week	37	4.59 (1.36-15.55)	0.014	5.65	(1.52-21.00)	0.010
<1 times/week	26	6.29 (1.68-23.52)	0.006	6.76	(1.66-27.44)	0.008
Frequency of eating dinner with their family						
7 times/week	32	1.00		1.00		
4-6 times/week	60	2.05 (0.83-5.08)	0.117	2.21	(0.84-5.79)	0.105
1-3 times/week	21	3.57 (1.13-11.35)	0.031	4.63	(1.32-16.18)	0.016
<1 times/week	23	5.03 (1.57-16.05)	0.006	4.69	(1.35-16.27)	0.015

CI, confidence interval; OR, odds ratio; Values are ORs and 95% CIs are in parentheses for stunting against normal. Adjusted ORs were adjusted for child's age, gender, immunization status, history of infectious diseases, maternal educational status, maternal employment status, and monthly household income.

Table 4. Association Between Mealtime Environment and Risk of Stunting in Children

	n	Risk of Stunting					
		Crude OR (95% CI)		*p*	Adjusted OR (95% CI)		*p*
Parental modelling to eat fruits							
Often/ always	23	1.00			1.00		
Sometimes	20	1.47	(0.49-4.48)	0.489	1.80	(0.53-6.10)	0.343
Rarely	15	1.05	(0.39-2.84)	0.910	0.89	(0.32-2.52)	0.833
Never	78	3.67	(1.31-10.29)	0.014	3.49	(1.15-10.55)	0.027
Parental modelling to eat fruits							
Often/ always	19	1.00			1.00		
Sometimes	17	0.49	(0.14-1.74)	0.276	0.58	(0.15-2.21)	0.422
Rarely	13	0.78	(0.27-2.25)	0.653	0.69	(0.23-2.11)	0.523
Never	87	5.98	(1.62-22.02)	0.007	5.81	(1.44-23.35)	0.013
Parent-child engage in conversation or storytelling							
Often/ always	20	1.00			1.00		
Sometimes	29	1.09	(0.45-2.62)	0.838	1.17	(0.45-2.98)	0.743
Rarely	53	2.02	(0.73-5.53)	0.170	2.83	(0.93-8.56)	0.065
Never	34	3.33	(1.02-10.79)	0.045	3.27	(0.91-11.81)	0.069
TV/phone using during family meals							
Never	12	1.00			1.00		
Rarely	39	0.78	(0.21-2.94)	0.718	0.84	(0.18-3.85)	0.821
Sometimes	41	0.99	(0.26-3.66)	0.990	1.06	(0.25-4.53)	0.934
Often/ always	44	3.73	(0.99-14.05)	0.051	5.22	(1.18-22.94)	0.029

CI, confidence interval; OR, odds ratio; Values are ORs and 95% CIs are in parentheses for stunting against normal. Adjusted ORs were adjusted for child's age, gender, immunization status, history of infectious diseases, maternal educational status, maternal employment status, and monthly household income.

DISCUSSION:

The objective of this study was to establish the correlation between family meals and the likelihood of stunting in children. The study unveiled possible correlations between family meals and stunting. We have established a correlation between the frequency of family meals and the mealtime environment with the growth of children. Specifically, we found that children who had fewer breakfasts and dinner with their families or had a poor mealtime environment were more likely to exhibit stunting. One unique feature of this study is the association between stunting and both the frequency and environment of family mealtime, which has rarely been investigated comprehensively before.

The findings of this study align with several other studies that consistently demonstrate the positive effects of more frequent family meals on children's nutritional health. These effects include higher consumption of fruits and vegetables, healthier overall eating patterns, reduced intake of high-sugar drinks, lower body mass index (BMI), and a lower prevalence of eating disorders.[14,15,17] Family mealtime routines are linked to positive effects such as healthier eating habits, better food choices, improved social outcomes, and lower involvement in risky behaviors.[19–22] According to numerous studies, having regular family mealtimes improves both mental and physical health. This is because these routines provide a consistent setting for conversation, serve as role models for healthy relationships and eating habits, help establish appropriate boundaries, and allow family members to connect with one another.[23–25]

Another study reported conflicting findings. A cross-sectional study conducted in Japan found no statistically significant correlation between family meals and mental health status.[26] An explanation for the lack of agreement with other studies may be attributed to the varying definitions of family meals used across different studies. Prior research has examined the "frequency of communal meals" with family members without identifying the exact meals or confining them to particular ones, such as dinner. The concept of "with family" might vary, encompassing the presence of most, all, or at least one parent.[17,27–29] Additionally, family eating status may be linked to cultural and regional factors, as well as family structure, for example, a household consisting of three or more generations, potentially contributing to a higher frequency of family meals.[26]

In this study, we did not identify a statistically significant relationship between parent-child conversations during meals and stunting after adjusting for several confounding variables. One of the primary reasons is that stunting is mainly caused by chronic undernutrition, which is more closely related to the quantity and quality of the food consumed than to social interactions during mealtimes. Conversations between parents and children during meals can enhance the social and emotional atmosphere but do not directly affect the food's nutritional content. Previous research also stated that using child-centered communication provided promising outcomes for positive child-eating behaviors, while parental “weight talk” communication was found to be associated with poorer dietary outcomes in children.[30]

This study also found a negative relationship between TV/phone use during family meals and stunting. Distractions from screens can lead to mindless eating and reduced attention to the food's nutritional quality.[31] In addition, the use of television and mobile phones during meals can also reduce the quality and quantity of parent-child interactions, thereby diminishing the potential positive effects of such conversations. When the focus is on screens rather than each other, opportunities for sharing information and modeling healthy eating behaviors are reduced, which means the potential benefits of conversations during meals are not fully realized.[32–34] Previous research also revealed that parental phone use was associated with lower use of positive parental feeding practices like modeling and more use of negative parental feeding practices like emotional regulation and the use of pressure to eat.[35,36]

Our study has several limitations. First, the results of this study are restricted in their generalizability due to the fact that it was conducted in a specific region. A more extensive investigation that includes a more representative sample of children from the general population would yield substantial additional evidence. Secondly, the mothers' self-administered questionnaires may have overestimated or underestimated the family meal as a result of social desirability bias. Third, due to the case-control study design, which has a risk of recall bias due to respondents' limited memory. Respondents' honesty in answering questions strongly influenced the study's results, potentially leading to data inaccuracy.

Despite these limitations, this study's strength is that it includes a comprehensive survey of children in a specific region, minimizing sampling error. This is one of the first studies to focus on the relationship between children’s growth status assessed through stunting and family meals in this population. Therefore, our findings provide useful information for preventing stunting in children. The results suggest that promoting shared family meals may contribute not only to children’s physical health but also to their overall well-being.

CONCLUSION:

This research highlights the importance family mealtime in preventing stunting in children, showing that it is not only the frequency that matters, but also the mealtime environment, modeling fruits and vegetables intake and not use TV/phone during mealtime. These findings open opportunities for interventions based on family mealtime as an innovative and culturally appropriate strategy to prevent stunting and improve children's nutritional status. Health workers can carry out active and massive campaigns about the benefits of family mealtime. Then families can adopt the habit of family mealtime easily because it is based on local wisdom and is easier to implement.

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