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Food Frequency Focuses on Protein, Carbohydrate, and Minerals in Children Stunting Aged 24-59 Months at the Dom Aleixo Post Administrative, Dili Municipality, Timor-Leste, 2024

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Abstract

Stunting is a serious public health concern in Timor-Leste since it is the most common condition among nations in the East Asia-Pacific region. According to this study, stunting in children ages 24 to 59 months is substantially correlated with inadequacies in protein and vitamin intake, but there is no significant correlation with carbohydrate intake. These results highlight how urgently focused dietary interventions are needed. Expanding community-based nutrition initiatives and fortifying the national nutrition surveillance system should be top priorities for the Ministry of Health, especially in high-risk and rural areas. Nutritional deficits may be closed by incorporating protein and micronutrient supplements into current maternity and child health care. Furthermore, public health policies must promote awareness of balanced diets by leveraging local food resources through culturally relevant health education campaigns. Practical strategies, such as training community health workers, supporting home gardens, and partnering with local agricultural sectors, can help ensure sustainable access to protein-rich and vitamin-rich foods. Long-term, these efforts will contribute to reducing childhood stunting, improving cognitive development, and fostering a healthier future generation in Timor-Leste.

Keywords: carbohydrates, proteins, vitamin, minerals, stunting, nutrition programs, child health, Timor-Leste

INTRODUCTION

Approximately 148.1 million children under the age of five, or 22% of the total, were stunted worldwide. Furthermore, 45.4 million children are squandered. Additionally, the study discovered that, at 52% and 43%, respectively, Asia and Africa had the highest rates of stunting in children. In Southeast Asia, children under the age of five are disproportionately affected by malnutrition. With sufficient data, the prevalence of stunting in this subregion is the second highest in Asia at 27.4% (Pratiwi, 2023). Malnutrition growth abnormalities in children aged <5 years are stunting, wasting, and underweight. The level of macronutrient intake is a risk factor for stunting and wasting (Food and Nutrition Survey 2020 Timor-Leste Final Report, 2020).

Timor-Leste has the highest prevalence of stunting, 47.1%, compared to countries in the East Asia Pacific Region. Rates of moderate and severe stunting in children increase from birth to 23 months and stagnate thereafter up to five years (0-5 months 13.4%, 6-11 months 20.9%, 12-23 months 51.9%, 24-35 months 62.7%, 36-47 months 60.4%, and 48-59 months 55.3%). Stunting declined in comparison to the DHS 2016 stunting rate of 50.2% and the DHS 2010 stunting rate of 58.1%, indicating further improvements in the overall nutrition situation. However, the stunting rate is 32.0% in Dili Municipality. 3. 6. In Timor-Leste, household food consumption management is the element that has the biggest impact on stunting. The Timor-Leste frequency of food intake in the home over the last seven days, Legumes, nuts, and seeds 10.9%; vegetables 53.6%; fruits 6.7%; meat and fish 8.8%; milk and other dairy products 9.4%; sugar and products 78.0%; oils, fats, and butter 80.9%; condiments and spices 81.2%; and cereals, roots, and tubers 50.8% (Cassidy et al., 2024; Hall et al., 2020; Hashmi et al., 2021; McKeen et al., 2019).

Toddlers have less access to wholesome meals since food prices are not rising in line with family incomes. Toddlers may also consume less nutrient-dense food due to societal factors and moms' limited understanding of how to metabolize wholesome food. An alternative to combating stunting in terms of economic, social, and cultural factors is to use local food products (Foster et al., 2024; Joye, 2019; Restila et al., 2023). One factor affecting stunting is Breastfeeding practices. Breastfeeding practices are better in poor and less well-educated women than among the wealthiest and best-educated women (Sokolowski et al., 2020). Breastfeeding successes were recounted with a sense of pride and achievement, and the participants talked about how being able to breastfeed was inherently tied to identifying as a mother (Barker, 2023; Mohseni & Aryankhesal, 2020; Pardamean et al., 2024).

Previous studies have consistently shown that macronutrient deficiencies, particularly in protein, carbohydrates, and micronutrients, contribute significantly to the risk of stunting in children under five (Rah et al., 2013; Dewey & Begum, 2011). In Southeast Asia, studies by Nguyen et al. (2019) and Harding et al. (2018) emphasize the role of inadequate dietary diversity and household food insecurity in high stunting prevalence. While breastfeeding practices and maternal knowledge have been acknowledged as protective factors (Agho et al., 2019), research in Timor-Leste specifically focusing on nutrient intake among stunted children remains scarce. This study contributes a novel perspective by quantitatively assessing the intake of protein, carbohydrates, and vitamins among stunted children aged 24–59 months in Dom Aleixo, Dili Municipality (Alfonso Mayén et al., 2022; Song et al., 2021). Its local focus on Timor-Leste, where stunting rates are among the highest in the Asia-Pacific region, and its goal of examining the effects of dietary patterns on child growth make this study distinctive. The results can help create community-based nutrition education and policy by using readily available, reasonably priced local food sources.

This study examines the protein, carbohydrate, and vitamin intake of stunted children in the Dom Aleixo Post Administrative, Dili Municipality, Timor-Leste, between the ages of 24 and 59 months in 2024. The aim of this study is to examine the connection between the prevalence of stunting in children under five and the consumption of macronutrients, particularly protein, carbs, and vitamins. The study intends to guide focused nutrition treatments by determining which nutritional determinants are most closely linked to stunting.

In order to prevent child malnutrition and enhance long-term child development outcomes, the research will help the Timor-Leste Ministry of Health and local public health officials create nutrition programs at the community level, support locally sourced food solutions, and improve maternal education.

METHOD

In this study, a cross-sectional, quantitative research strategy was utilized. Mothers in the Dom Aleixo Post Administrative, Dili Municipality, with children between the ages of 24 and 59 months, make up the target population. To ensure representativeness, a sample of 97 respondents was chosen using basic random sampling procedures. The data gathering process was undertaken from September to October 2024 and was conducted utilizing the mWater Application, which enabled effective digital data capturing immediately in the field. The structured questionnaire used in this study comprised three main components: (1) Respondent characteristics, including maternal age, employment status, family income, and household size; (2) Food frequency intake with a focus on protein, carbohydrates, and minerals consumed in the previous seven days; and (3) Nutritional status data of the children assessed using anthropometric measurements in accordance with WHO growth standards (2006), to determine stunting. Enumerators were trained prior to field deployment to ensure consistency in administering the questionnaire and measuring child height and age accurately. The data collected were analyzed using SPSS software, employing descriptive statistics to summarize the findings, chi-square tests to identify associations between variables, and Pearson correlation coefficients to assess the strength and direction of relationships between macronutrient intake and stunting.

RESULTS AND DISCUSSION

Table 1. Descriptive Analysis of Characteristics of Respondents

Age	**F**	**%**
21-24	13	13.4%
25-29	33	34.0%
30-34	22	22.7%
35-39	20	20.6%
40-44	6	6.2%
>45	3	3.1%
Religion		
Catholic	93	95.9%
Protestant	4	4.1%
Employed Status		
Employed	10	10.3%
Unemployed	87	89.7%
Families Income		
= $135	6	6.2%
> $ 135	45	46.4%
< $ 135	46	47.4%
Families Size		

1-4	28	28.9%
5-8	56	57.7%
9-12	10	10.3%
>12	3	3.1%
Total	97	100.0%

The descriptive analysis of respondent characteristics reveals that 34% of mothers are between the ages of 25 and 29, 95.9% are Catholic, 87.6% are unemployed, 47.4% have a family income of less than $135, and 57% have 5-8 members in their household.

Table 2. Bivariate analysis of the Protein, Carbohydrates, and Minerals in Stunting Children Aged 24-59 Months

Carbohydrates	Stunting		Total	Pearson's R	*P=value*
	Stunted	Normal			
Good	23 (23.7%)	35 (36.1%)	58 (59.8%)	0.190	0.062
Lower	23 (23.7%)	16 (16.5%)	39 (40.2%)		
Protein					
Good	11 (11.3%)	29 (29.9%)	40 (41.2%)	0.334	0.001
Lower	35 (36.1%)	22 (22.7%)	57 (48.8%)		
Vitamin/ Minerals					
Good	5 (5.2%)	18 (18.6%)	23 (23.7%)	0.287	0.005
Lower	41 (42.3%)	33 (34%)	74 (76.3%)		
Total	46 (47.4%)	51 (52.6%)	97 (100%)		

The results show a bivariate analysis of protein, carbohydrates, and minerals in stunting children aged 24-59 months. Good and lower carbohydrates with stunted are 23.7%, and Pearson's r=0.192 and P value= 0.062. The results found a significant relationship between carbohydrates and stunting. Good Protein with stunted is 11.3% and lower protein with stunted is 36.1%, and the value of Pearson's R=0.334 and P value= 0.001. The results show a significant relationship between the protein and stunting. Good Vitamin/Minerals with stunted is 5.2% and Lower Vitamin/Minerals with stunted is 42.3%, and the value of Pearson's R=0.287 and P value= 0.00. The results show a significant relationship between vitamins/ minerals and stunting aged 24-59 months.

Discussion

The results show that bivariate analysis of the Protein, Carbohydrates, and Minerals in Children Stunting Aged 24-59 Months.

Management of Carbohydrates for Children Stunting Aged 24-59 Months

Stunting and underweight status in children under the age of five are significantly influenced by the variety of foods consumed and the quantity of food consumed. The ability of people or communities to obtain wholesome, secure, and nourishing food is referred to as food security. According to the study, the lower percentage of carbs in stunted individuals is 23.7%, with a P value of 0.062 and a Pearson's R of 0.192. There is no discernible link between stunting and carbs, according to the findings.

While boosting the concentration of advantageous short-chain fatty acids and vitamins that support gut barrier maturation and immunity during the complementary

feeding period, incorporating complex, bifidogenic, and indigestible carbohydrates during the transition to solid foods may offer a chance to feed commensal bacteria.

According to the earlier study, limited acceptance is one of the barriers to eating locally, but the advantages can boost the family income. Look into goods like purple sweet potato cake, TORI meatballs, corn milk, and shredded catfish that can help prevent and cure stunting. Studies have shown that a variety of local food ingredients are being used as a substitute for preventing and curing stunting through a variety of strategies, including mentoring, counseling, processing demonstrations, and even packaging design (Agho et al., 2019; O et al., 2024).

The previous study shows that 20 of 1200 studies were reviewed. The prevalence of stunting ranged from 20% to 48.3%. The other outcomes besides stunting were wasting and underweight status. There were 83 risk factors studied, and the most studied variables were age, gender, diarrhea, water source, parent's education, immunization, and inappropriate complementary feeding practices (6 to 13 studies)12.

Management of Protein for Children Stunting Aged 24-59 Months

The study found that lower protein intake is associated with stunting is 36.1% with a value of r=0.334 and a P value of 0.001. The results show a significant relationship between protein and stunting.

This study discovered that cereal protein scores are frequently low due to insufficient amino acid composition, affecting protein digestibility. The effect of protein digestion on internal and external variables. External factors include the existence of anti-nutrients and the inability to be physically accessible because they are retained in intact cell structures. The amino acid sequence of the protein is the primary internal component. The variety of food processing frequently aims to increase overall digestibility. The protein processing may result in less digestibility.

The study found that at 12 months, the most consumed animal source food was poultry (83%) followed by egg (81%), beef (67%), fish (35%), and pork (22%). In adjusted models, animal source introduction by 7 months was associated with 0.10 units higher IDQI at 12 months (95% CI 0.01, 0.18, p=0.03). Eating poultry, eggs, or fish before 12 months was also associated with higher IDQI at 12 months: 0.16 (0.06,0.25, p=0.003), 0.10 (0.1, 0.19, p=0.04), and 0.08 (0.01, 0.15, p=0.01), respectively, while beef and pork were not associated with IDQI14.

Proteins fill different roles in animal bodies and plant tissues, and protein molecular structures and microstructures are different. The nutritional and physicochemical functionalities of a protein-rich food or ingredient are determined by the protein source (animal tissue and plant), and the purification processes used to produce it, which fractionate proteins, modify structures, and co-extract different non-protein materials. The examine the relationship between animal and plant protein intake and overall diet quality in young adult females and males (Rah et al., 2013).

Economic empowerment will ultimately lead to better nutrition for kids and increased family well-being. The equitable distribution of resources16 is the plan for enhancing the financial health of the community. We provide evidence that the program can effectively lower the prevalence of stunting in children under the age of five, especially

in those who get locally produced fish-based supplements, as part of our monitoring and evaluation activities. This strategy of using local protein might also work in other developing nations with similar stunting and malnutrition issues (Nguyen et al., 2019).

Management of Vitamin/Minerals for Children Stunting Aged 24-59 Months

Vitamins are essential nutrients needed in small amounts by humans for the normal functioning of the visual system. These dietary needs for vitamin A are normally provided by retinol (mainly as retinyl ester) and provitamin A carotenoids. The study found that lower vitamin/mineral stunting rates are 42.3%, with Pearson's R=0.287 and P value=0.00. The results show a significant relationship between vitamins and minerals with stunting.

The actions of the microbiota on immunity also produce another type of secondary metabolite, which are vitamins. Essential vitamins, especially those from the B and K families, which have different expression in newborns than in adults, can be synthesized by commensal bacteria. Genes related in the synthesis of vitamin K2, retinol, folate, pyramidal (B6), and biotin (B7)—all of which are important for bone, eyesight, dental development, and glucose conversion—are more abundant in the microbiota of newborns (Harding et al., 2018).

The Vitamins are a group of organic compounds essential to physiological functions in the body. Vitamins are involved in cellular processes and are associated with the development and prevention of malignant diseases18. The state researched our knowledge to explore the relationship between vitamin D levels and the risk of wasting, stunting, and underweight in children(Dewey & Begum, 2011) .

In these situations, socio-demographic disparities continue to drive the structural and underlying causes of malnutrition, poverty, family food insecurity, and limited access to healthcare services (Aisyah et al., 2024). The study found that long-term preventive supplementation with micronutrients added to a culturally approved drink had little impact on growth or micronutrient status in newborns and young children in rural Guatemala. Based on the reports of children >5 years, the global stunting prevalence declined from 26 (Timor-Leste Demographic and Health Survey 2016, 2016; Timor-Leste Demographic and Health Survey, 2010). from 2012 to 22.3 percent in 2022. It is projected that 19 (Food and Nutrition Survey Final Report, 2013; Timor-Leste Demographic and Health Survey 2003, 2003). percent of all children under five will be stunted in 203021.

Finding

The study found that carbohydrates, proteins, and vitamins/minerals with stunting are new findings in Timor-Leste. We are considering this new finding because of a comparison with the Timor-Leste Food Nutrition Survey 2020.

CONCLUSION

Food security, which includes having access to enough safe and nourishing food, is essential to a child's growth and development. According to this study, low consumption of carbohydrates was seen in 23.7% of stunted children at Dom Aleixo Post Administrative, low intake of protein in 36.1% of cases, and low intake of vitamins and minerals in 42.3% of instances. These results demonstrate the strong correlation between

stunting and severe nutritional deficits. Thus, it is advised that the Ministry of Health and the Government of Timor-Leste step up targeted nutrition initiatives in underserved urban and rural areas. The creation of community-based nutrition education programs, particularly those that encourage the use of locally accessible foods high in protein and micronutrients, should be one of the specific interventions. Enhancing maternal knowledge through integrated health promotion and school-based programs can improve feeding practices. To ensure long-term impact, it is essential to incorporate food security strategies into larger health and social protection policies, such as food subsidy schemes, home gardening initiatives, and regular growth monitoring. These multisectoral efforts will not only improve child nutrition but also help to lower the national stunting burden and promote sustainable development in Timor-Leste.

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