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The Association Between the Family's Income, number of family, and Knowledge with Stunting

Marcos Carvalho, Levi Anatolia S.M. Exposto, Santiago Jorge Pereira, Tomas Elvis Fátima, Aniceto da Conceição Pacheco
Faculty of Public Health and Medical Science, Universidade da Paz, Timor-Leste
marcosd4carvalho@gmail.com, leviexposto89@gmail.com, boruanan729@gmail.com, tomaselvisfatima@gmail.com, anis.pacheco123@gmail.com

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Abstract
Introduction: *Timor-Leste has the highest prevalence of stunting compared to countries in the Asia Region and the sixth highest rate globally. RAEOA is the highest stunting number three in Timor-Leste.* ***Objective:*** *The objective is to find out the Association between the mothers' Education level, Occupation, family income, Total number of families, and mothers' knowledge of stunting.* ***Method:*** *The research design used quantitative research with a survey design using a selective cross-sectional approach. The sample is mothers who have children under five years. Data were analyzed using SPSS. Chi-square test for the single association and linear regression for multivariate association.* ***Result and Discussion:*** *The results found that the Association between the mother's education and occupation is not significant with stunting. The Association between Family Income, the Number of Families, and Mother's Knowledge is significant with stunting. A strong association between the Mother's Education, Occupation, Family Income, number of Families, and Mother's Knowledge with stunting.* ***Conclusion:*** *Concluded that the role of mothers in the golden phase is very important to prevent stunting in children. It is recommended that the Health Center and District Health Service intervene with health promotion programs to increase knowledge, prepare healthy food practices, and work with related institutions to solve the problem of stunting in Timor-Leste.*
Keyword: Family income; Number of Family; Knowledge; Stunting;

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Introduction

Malnutrition among under-five children is one of the most important public health problems in developing countries. UNICEF estimates that nearly 195 million children are suffering from malnutrition across the globe (Sowunmi, Ese, Adejoorin, Omotayo, & Salman, 2024). Globally, approximately 165 million children under the age of five, or 26%, experience stunted growth, while 16% are underweight, 8% suffer from wasting, and 7% are overweight. The high prevalence of stunting among children under five in Africa (36%) and Asia (27%) remains a significant public health concern, often overlooked. More than 90% of the world's stunted children reside in Africa and Asia (Bajiri et al., 2023)

Timor-Leste has one of the highest stunting rates globally, with one in every two children under the age of five experiencing stunted growth. This means that half of the country's children in this age group are affected. From 2010 to 2013, the stunting rate among Timorese children declined by 2% annually. However, according to WHO guidelines, a prevalence rate exceeding 40% is classified as a severe public health issue. While nutrition programs have shown positive results, greater efforts are required to expand their reach and effectiveness. Stunting occurs when a child's growth and development are hindered due to prolonged inadequate nutrition. This condition results from a lack of essential nutrients, leading to children being shorter than expected for their age (Toda, Picauly, & Ndun, 2022)

Stunting, also known as chronic malnutrition, refers to a condition where a child's height is lower than the standard for their age. This occurs due to prolonged or repeated undernutrition, often linked to factors such as poverty, inadequate maternal health and nutrition, frequent illnesses, and improper feeding and care during early childhood. Stunting hinders children's physical and cognitive development, limiting their overall potential (UNICEF, 2022). Children affected by stunting not only experience growth delays but are also more vulnerable to diseases, have lower intelligence levels, and tend to be less productive. In the long run, a high prevalence of stunting can negatively impact Indonesia's economic growth. Addressing this issue requires a focus on providing balanced nutrition, particularly by increasing the intake of animal protein. Disseminating this information is crucial, especially for young mothers. However, tackling stunting effectively demands a comprehensive approach from both families and the government, such as implementing community-based healthcare initiatives (Salamoon, Siaputra, & Kristianto, 2023)

The TLFNS 2020 reported that nearly half of children under five suffer from chronic malnutrition, with 47.1% classified as stunted, putting them at greater risk of illness and mortality. Timor-Leste has the highest stunting prevalence in the East Asia Pacific region and ranks sixth globally. The rate of moderate to severe stunting rises from birth to 23 months and remains stable until five years of age, with prevalence rates recorded as follows: 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%). According to

WHO, a stunting rate exceeding 30% is categorized as 'very high' in terms of public health significance. Stunting is widely recognized as an indicator of poor child development, with its occurrence before the age of two strongly linked to lower cognitive abilities and poorer educational achievements in later years. Additionally, TLFNS 2020 data highlights that stunting is more prevalent among children from low-income families (57.2%) compared to those from wealthier households (34.7%). Likewise, children born to mothers with no formal education (52.3%) have a higher likelihood of stunting than those whose mothers have received education (31.2%). Although there has been a declining trend, WHO (2018) emphasizes that stunting prevalence in Timor-Leste remains alarmingly high under its revised public health thresholds, (National Health Sector Nutrition Strategic Plan 2022-2026).

The overall nutritional situation has continued to improve, with the stunting rate declining to 47.1%, compared to 50.2% in the 2016 Demographic Health Survey and 58.1% in the 2010 survey. Among the municipalities in Timor-Leste, Ermera has the highest prevalence of stunting at 63.4%, followed by Ainaro (60.3%), Oecusse (57.1%), Aileu (53.9%), Bobonaro (50.3%), Covalima (49.0%), Baucau (48.8%), Viqueque (48.2%), Manufahi (46.8%), Manatuto (46.8%), Liquiça (45.8%), Lautem (42.3%), and Dili (32.0%). Oecusse ranks as the third-highest municipality in terms of stunting prevalence in the country (TLFNS 2020).

According to Nomura K. et al (2023), Among 4,581 children under the age of five, nearly 40% experienced stunted growth. Most mothers with stunted children were between 20 and 30 years old, with approximately 33% giving birth to their first child at or before the age of 19. Interestingly, the likelihood of stunting was found to be lower in female children compared to male children [OR: 0.75, 95% CI: (0.64–0.88), $p < 0.001$] in the adjusted model. Additionally, several other factors, including household wealth, postnatal care visits, ongoing breastfeeding, child's age, and birth weight, were also linked to stunting prevalence (Nomura, Bhandari, Matsumoto-Takahashi, & Takahashi, 2023)

Efforts to prevent stunting cannot be separated from parents' knowledge about stunting. Knowledge results from knowing one's cells through human senses such as seeing, hearing, tasting, touching, and smelling. Increasing the knowledge of mothers who have toddlers about stunting can also be affected by education, behavior, and beliefs. The research stated that the mother's level of knowledge is one of the factors that increases the risk of stunting. In addition, children who experience stunting tend to occur in mothers with less knowledge, (Titimeidara & Hadikurniawati, 2021) City by Aticeh1 et al, 2023).

Based on the problems that can be described above, this research to find out the Association between the mothers' Education level, Occupation, family income, Total number of family and mother's knowledge of stunting in Sub-Region Pante Makasar, RAEOA, Timor-Leste.

Methods

The research design used is quantitative research with a survey design using a selective cross-sectional approach. The sample for this research is mothers who have children under five years). The sample in this study obtained 78 respondents. A structured questionnaire was used for this survey targeting mothers who have children under five years in Sub-Region Pante Makasar, RAEOA, Timor-Leste, 2024. The questionnaire consisted of three parts: 1) Characteristics of Respondents (Mother's Education, Occupation, Family Income, and Number of Families, 2) Mother Knowledge, and 3) Data of Status Nutrition /Anthropometry (Analyze use Anthropometry=WHO, 2006) can check the age of child from 0-59 months. A paper-based questionnaire was distributed by the researchers' team in Sub-Region Pante Makasar, RAEOA, Timor-Leste, in February-March, 2024. Respondents anonymously replied to the questions and returned them immediately. Returned answers were double-entered in Epi-Info format by the Research team. Statistical analysis used Chi-square to measure the association between the family's income, the Number of Families, and the mother's knowledge with stunting. Data were analyzed using a statistical package for social sciences software (SPSS). Chi-square test and P-values were calculated and presented the single association and linear regression for multivariate association.

Results and Discussion

Result

Based on the results of the analysis above regarding the relationship between family income, family size, and knowledge of stunting in RAEOA, the following results can be found:

Table 1

Analysis Chi Square to single association between the Mother Education, Occupation, Family Income, Total number of Family, and Mother's Knowledge with stunting

Mother Education Level	Stunting			Total	p-value
	Severe	Moderate	Normal		
Illiterate	4 (5.1%)	10 (12.8%)	3 (3.8%)	17 (21.8%)	0.057
Primary School	13 (16.7%)	7 (9.0%)	9 (11.5%)	29 (37.2%)	
JHS	3 (3.8%)	0 (0%)	5 (6.4%)	8 (10.3%)	
SHS	8 (10.3%)	7 (9.0%)	2 (2.6%)	17 (21.8%)	
Bachelor Degree	3 (3.8%)	3 (3.8%)	1 (1.3%)	7 (9.0%)	
Mother Occupation					
Unemployed	21 (26.9%)	17 (21.8%)	10 (12.8%)	48 (61.5%)	0.438
Employ	10 (12.8%)	10 (12.8%)	10 (12.8%)	30 (38.5%)	
Family Income					
Less $135	25 32.1%	5 (6.4%)	5 (6.4%)	35 (44.9%)	0.000
$135	4 (5.1%)	15 (19.2%)	5 (6.4%)	24 (30.8%)	
More $135	2 (2.6%)	7 (9.0%)	10 (12.8%)	19 (24.4%	
Total Number of Family					
1-4	10 (12.8%)	4 (5.1%)	0 (0%)	14 (17.9%)	0.003
5-8	17 (21.8%)	12 (15.4%)	8 (10.3%)	37 (47.4%)	
More 9	4 (5.1%)	11 (14.1%)	12 (15.4%)	27 (34.6%)	
Mother's Knowledge					
Low	18 (23.1%)	4 (5.1%)	0 (0%)	22 (28.2%)	0.000
Middle	12 (15.4%)	15 (19.2%)	5 (6.4%)	32 (41.0%)	
Good	1 (1.3%)	8 (10.3%)	15 (19.2%)	24 (30.8%)	

The results of education level by illiterate 5.1% with severe stunting and 12.8% with moderate stunting, Primary school 16.7% with severe stunting and 9% with moderate stunting, Junior Hight school 3.8% with severe stunting, Senior Hight School 10.3% with severe stunting and 9% moderate stunting and bachelor degree 3.8% with severe and moderate stunting. The Association between the mother's education level with stunting for child under five years is not significant with p value=0. 057. The results of mother's occupation by the unemployed 26.9% with severe stunting and 21.8% with moderate stunting, and employ 12.8% with severe and moderate stunting.

The Association between the mother's occupation with stunting for child under five years is not significant with p value=0.438. The results of the Family Income by Income Less $135 32.1% with severe stunting and 6.4% with moderate stunting, Income equal

$135 5.1% with severe stunting and 19.2% with moderate stunting, Income more $135 2.6% with severe stunting and 9% with moderate stunting. The Association between the Family Income with stunting for child under five years is significant with p value=0.000. The results of the Total Number of Family by number of family 1-4 is 12.8% with severe stunting and 5.1% with moderate stunting, number of family 5-6 is 21.8% with severe stunting and 15.4% with moderate stunting, number of family more 9 is a 5.1% with severe stunting and 15.4% with moderate stunting.

The Association between the Family Income with stunting for child under five years is significant with p value=0.003. The results of the Mother's Knowledge by low are 23.1% with severe stunting and 5.1% with moderate stunting, middle is 15.4% with severe stunting and 19.2% with moderate stunting, good is 1.3% with severe stunting and 10.3% with moderate stunting. The Association between the Mother's Knowledge with stunting for children under five years is significant with a p-value of 0.000.

Table 2

Analysis Regression Linear is a multivariate association between the Mother's Education, Occupation, Family Income, Total number of Family, and Mother Knowledge with stunting

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.827[a]	.683	.661	.466	.683	31.055	5	72	.000

a. Predictors: (Constant), Mother Knowledge, Mother Education Level, Family Income, Total Number of Family, Mother Occupation

The strong association between the Mother's Education, Occupation, Family Income, Total number of Family, and Mother's Knowledge with stunting for children under five years with the value R=0.827. The determinant coefficients with the value of R-Square= 0.683 or 68.3% contributed from the Mother's Education, Occupation, Family Income, Total number of Family, and Mother's Knowledge with stunting for children under five years in Sub-region Pante Makasar, RAEOA, Timor-Leste 2024. The significant association between the Mother's Education, Occupation, Family Income, Total number of families, and Mother's Knowledge of stunting for children under five years in Sub-region Pante Makasar, RAEOA, Timor-Leste 2024 with Sig. F Change=0.000.

Discussion

The National prevalence of child stunting in Timor-Leste remains very high (47.1%). Our study presents selected determinants associated with stunting among children under five in Sub-region Pante Makasar, RAEOA, Timor-Leste. The study showed that a mother's education and occupation were found not significantly associated

with stunting for children under five years. Among these determinants Income family, Total number of family, and knowledge of mothers are significantly associated with stunting in children under five.

1. Mothers Education

The study revealed that 5.1% of illiterate mothers had children with severe stunting, while 12.8% experienced moderate stunting. Among mothers with primary school education, 16.7% had children with severe stunting, and 9% had children with moderate stunting. However, the association between maternal education levels and stunting in children under five was not statistically significant ($p = 0.057$). According to the research conducted by Abri (Abri, 2022), similarly indicated that maternal education levels were not significantly linked to stunting incidence ($p = 0.992$). Nevertheless, findings suggest that mothers with lower education levels were more likely to have stunted children compared to those with higher education. Interestingly, mothers with lower education levels also had a higher number of children with normal height. A mother's level of education plays a crucial role in childcare, parenting practices, and access to affordable healthcare services, all of which ultimately impact stunting and other health issues. Additionally, a mother's education influences her ability to prepare, provide, and choose nutritious food for both herself and her child (Adyas, Handayani, Djamil, Kustiani, & Dalimunthe, 2023)

2. Mothers Occupation

The study found that mothers' occupations by the unemployed were 26.9% with severe stunting 21.8% with moderate stunting, and 12.8% with severe and moderate stunting. The Association between the mother's occupation with stunting for a child under five years is not significant with p value=0.438. Mothers who work have less time to dedicate to childcare compared to those who do not, which can impact the quality of care and, in turn, affect a child's nutritional status. Those who work full-time from morning to evening may have limited opportunities to focus on their child's diet and nutritional needs (Liberty, Aziz, & AP, 2021)

3. Families Income

The study found that Family Income by Income Less than $135 was 32.1% with severe stunting and 6.4% with moderate stunting, Income equal to $135 with 5.1% with severe stunting, and 19.2% with moderate stunting, Income more than $135 was 2.6% with severe stunting and 9% with moderate stunting. The Association between Family Income with stunting for children under five years is significant with p value=0.000. Family income is dependent on the parent's work which is used to meet the nutritional needs of the family. This makes these households more vulnerable to food insecurity and poor child growth. According to (Hossain et al., 2017) Household income serves as a key indicator of a family's ability to afford essential resources that contribute to better

nutrition, including food, clean water, sanitation, and healthcare. Malnutrition has often been attributed to food shortages within communities, which are influenced by factors such as low economic development, unequal wealth distribution, poverty, and seasonal variations (Smith and Haddad 2015). However, in Timor-Leste, economic growth has not been enough to significantly lower stunting rates, which remain higher than those of other G7+ nations and ASEAN countries. This comparison, however, is influenced by the macroeconomic effects of oil wealth on economic growth.

4. The Number of Families

The study found that the Total Number of Families by number of families 1-4 is 12.8% with severe stunting and 5.1% with moderate stunting, number of families 5-6 is 21.8% with severe stunting and 15.4% with moderate stunting, number of families more 9 is a 5.1% with severe stunting and 15.4% with moderate stunting. The Association between Family Income with stunting for children under five years is significant with p value=0.003. Linked to the household having many members of the family. This research is the same as the review study by Mediani (2020) in Indonesia that there is a relationship between family size and stunting children (Mediani, 2020)

5. Mother Knowledge

The study found that Mother's Knowledge by low is 23.1% with severe stunting and 5.1% with moderate stunting, middle is 15.4% with severe stunting and 19.2% with moderate stunting, good is 1.3% with severe stunting and 10.3% with moderate stunting. The Association between the Mother's Knowledge of stunting for children under five years is significant with p value=0.000. Knowledge about stunting is very necessary for a mother because the mother's knowledge about stunting that is lacking can cause children to be at risk of stunting. Knowledge is usually obtained from formal education information and other information such as radio, television, internet, newspapers, magazines, counseling and so on.

According to research conducted by (Juliansyah, 2020), the research findings indicate a statistically significant relationship between stunting incidence and several factors, including knowledge ($p = 0.010$), attitude ($p = 0.010$), practice ($p = 0.019$), education ($p = 0.019$), employment ($p = 0.009$), and family income ($p = 0.049$). Additionally, food insecurity, energy intake, protein intake, carbohydrate intake, underweight status, and maternal nutritional knowledge were all significantly associated with stunting in toddlers. Among these factors, underweight status emerged as the most dominant contributor to stunting, with an Odds Ratio (OR) of 18.572. This suggests that toddlers who are underweight are 18.572 times more likely to experience stunted growth compared to those with normal weight (Aisyah, Khomsan, Tanziha, & Riyadi, 2024)

According to (Abri 2022). The study found that 72.0% of children experienced stunting, while 90.0% of mothers had limited knowledge, 66.0% had low education levels, and 95.0% came from large families. Statistical analysis indicated a significant

correlation between maternal knowledge and stunting incidence (p = 0.027). Enhancing maternal health and nutritional awareness through health promotion, stunting education using posters, and distributing informational leaflets can serve as an effective strategy for addressing chronic malnutrition in children, particularly in rural areas of Enrekang.

Several factors were found to be significantly associated with stunting prevention, including knowledge (p = 0.007), attitude (p = 0.034), income (p = 0.006), cultural values (p = 0.016), and parenting practices (p = 0.000). These elements play a crucial role in shaping parental strategies for preventing stunting in children. To effectively reduce stunting rates, prevention programs should prioritize enhancing parental behavior by addressing and modifying these key influencing factors (Yunitasari, Pradanie, Arifin, Fajrianti, & Lee, 2021)

6. The association between the Mother's Education, Occupation, Family Income, number of Family, and Mother's Knowledge with stunting

The study found that the analysis linear regression showed that strong association between the Mother's Education, Occupation, Family Income, Total number of Family, and Mother's Knowledge with stunting for children under five years with the value R=0.827. The determinant coefficient (R-Square) of 0.683 (68.3%) indicates that maternal education, employment status, family income, household size, and maternal knowledge contribute significantly to stunting among children under five in Pante Makasar, RAEOA, Timor-Leste (2024). A significant correlation was found between these factors and stunting prevalence, with a Sig. F Change of 0.000. Stunting is characterized by linear growth failure, serving as an indicator of various underlying health disorders. It is associated with an increased risk of illness and mortality, impaired physical growth, delayed neurodevelopment and cognitive function, and a higher likelihood of chronic diseases in adulthood (De Onis & Branca, 2016). According to research by (Toda et al., 2022). The findings revealed that parents' income level, maternal education, maternal knowledge, history of infectious diseases, and dietary patterns were significantly associated with stunting incidence (p-value < 0.05) in the Palla Community Health Center working area. Although several programs and policies have been implemented in these regions, greater investment is necessary to enhance nutritional status. This includes initiatives such as maternal and child healthcare programs, school meal programs, improving agricultural productivity, biofortification, raising awareness about dietary diversity, and providing support for underprivileged and marginalized families, (Rabut D. B., et al 2024), (Malezieux et al., 2024)

Stunting in toddlers is a chronic nutritional issue influenced by multiple factors. Socioeconomic conditions, maternal nutrition during pregnancy, infant illnesses, and inadequate nutrient intake are key determinants of stunting, which can hinder optimal physical and cognitive development. The lack of sufficient food availability to meet nutritional needs and the presence of infectious diseases are among the most common and direct causes of growth failure in children under five. The long-term consequences of

stunting in early childhood extend beyond growth delays, affecting future health outcomes, cognitive abilities, and productivity levels (Saleh, Syahrul, Hadju, Andriani, & Restika, 2021), (Dewi, Kusumasari, Andarini, & Indrawan, 2023). Research has shown that stunted children face greater risks of impaired cognition and reduced work capacity later in life. Additionally, findings indicate that working mothers in rural areas have a higher likelihood of having stunted or severely stunted children, while maternal age also plays a partial role in influencing stunting incidence in toddlers (Laksono, Sukoco, Rachmawati, & Wulandari, 2022)

A significant relationship was found between stunting and the developmental progress of toddlers aged 24-59 months ($p = 0.003$). Additionally, there was a correlation between maternal education levels and toddler development ($p = 0.003$) as well as family income and child development ($p = 0.001$). However, no significant relationship was observed between maternal employment and the development of children under five ($p = 0.001$). These findings highlight the association between stunting and toddler development in the Sentolo I Public Health Center working area, Kulon Progo Regency (Simamora, Santoso, & Setiyawati, 2019)

According to (Kusumajaya et al. 2023), The results saw that 846 respondents under five years of age were analyzed, indicating a stunting prevalence of 19.0%. Multivariate logistic regression demonstrated low maternal educational attainment (adjusted OR = 1.92; 95% Confidence Interval = 1.24–2.97), the inadequate consumption of iron tablets during pregnancy (adjusted OR = 1.56; 95% Confidence Interval = 1.08–2.24), and no extended family (adjusted OR = 1.55; 95% Confidence Interval = 1.07–2.26) as being significantly associated with stunting. According to these findings, sociodemographic and healthcare factors are associated with stunting in urban Bali (Kusumajaya et al., 2023)

According to (Sari et al., 2021), the results suggested that at the beginning of the session before providing education about early detection of stunting, mothers with stunting toddlers had lower levels of knowledge (73.3%) than those with normal toddlers (77%). After being provided with education, the knowledge level of mothers with stunted toddlers appeared to be higher (89%) than those with normal children (87.6%), with a significant increase in each group ($P < 0.05$). It could be concluded that education on stunting detection could significantly improve mothers' knowledge regarding the prevention of stunting in children aged 0-24 months. Providing regular education, both by nutrition workers at the health center and integrated service post cadres, was necessary to prevent stunting to the maximum (Sari et al., 2021)

Conclusion

Concluded that there is a strong relationship between Several factors, including maternal education, employment status, family income, household size, and maternal knowledge about stunting, play a crucial role in preventing stunting in children. The golden period of child growth is particularly vital, making a mother's role essential in

ensuring proper development. Therefore, early maternal nutrition reinforcement is necessary to prepare the body for pregnancy, support fetal growth and development, and continue through the infant, toddler, and adolescent stages. To address stunting in Timor-Leste, it is recommended that Health Centers and District Health Services implement health promotion programs aimed at enhancing knowledge, encouraging healthy food preparation practices, and collaborating with relevant institutions to develop effective solutions.

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