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Analysis of Health Policy Implementation, Availability of Health Human Resources, and Management of Nutrition Data to Improve the Problem of Malnutrition for Children aged under 5 years in Aileu Health Service, Timor-Leste, 2025Marcos Carvalho^{1*}, Levi Anatolia Soares Maia Exposto², Martinus Nahak Lino³**Master's Program of Public Health, UNPAZ, Timor-Leste**Email: marcosd4carvalho@gmail.com

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ABSTRACT

Timor-Leste has made a substantial political commitment to enhancing nutrition since gaining independence, as articulated in various national strategic policy documents. Despite these efforts, malnutrition remains a significant issue, affecting 47.1% of the population. This study aims to assess the implementation of health policies, the availability of human resources, and the management of nutritional data to address malnutrition. Utilizing a quantitative analytical method with a cross-sectional approach, the study sampled 116 health professionals from four health centers through saturated sampling, ensuring the research instrument's validity and reliability. Data analysis was conducted using chi-square tests with SPSS 22.0. Key findings reveal that the implementation of health policies, the availability of health human resources, and effective nutrition data management have all significantly influenced the improvement of malnutrition in children under five years old, with each aspect yielding a p-value of 0.000. The results underscore the necessity for the Ministry of Health to provide regular training for professionals to sustain nutrition programs and data management. Additionally, it is recommended that Municipal Health Services monitor health centers to ensure adherence to standard operating procedures (SOPs) and effectively tackle malnutrition issues.



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INTRODUCTION

Malnutrition is a condition characterized by an imbalance between the intake of nutritious food and the nutritional requirements for optimal growth and development. Malnutrition is a serious health condition characterized by a deficiency or imbalance in essential nutrient intake. Important factors that determine consumption patterns, health behaviors, and access to nutritious food and adequate health services (Mohseni & Aryankhesal, 2020). According to the SDG agenda, objective 2 states that by 2030, it aims to end hunger, achieve better food security and nutrition, and promote sustainable agriculture. But malnutrition remains a serious public health problem worldwide, especially among children under five years of age. (UNITED NATIONS, 2022). Globally, in 2022, 149 million children suffer from stunting, 45 million are wasting, and 37 million are obese. Almost half of all young child deaths are related to malnutrition. This is especially

true in low- and middle-income countries. (WHO, 2024). The joint 2025 malnutrition estimate from UNICEF, WHO, and the World Bank shows that malnutrition continues to affect 150.2 million children under the age of 5, suffering from stunting, and 42.8 million suffering from wasting. The estimate also reports that less than one-third of developed countries will reach the target by 2030. In Asia, more than half of children are stunted, while in Africa, it represents 43%. Stunting impacts physical growth, brain development, and destroys the intelligence potential of the younger generation. (UNICEF, 2025).

Based on the SDG agenda, objective 2. Timor-Leste implements nutrition programs with a strong political commitment to improve nutrition since independence, as written in various national strategic policy documents, including: National Strategic Plan for the Health Sector (2011-2030), National Nutrition Strategy (2014-2019); National

Food Security and Nutrition Policy (2017); National Strategic Plan for Health Sector Nutrition (2022-2026) (Ministério da Saúde, 2022). From these strategic plans, the government of Timor-Leste, through the Ministry of Health, in collaboration with UNICEF, WHO, WFP, and local NGOs, together implement nutrition programs in Timor-Leste, intending to ensure that children, adolescents, and women of reproductive age all have access to quality nutrition programs to solve malnutrition in Timor-Leste (UNICEF, 2022). However, the problem of malnutrition has changed little based on comparison in TLDHS 2010, stunting at 58.1%, TLFNS 2013 stunting at 50.2%, TLDHS 2016 at 47.3% and TLFNS 2020 at 47.1%. According to the municipalities in Timor-Leste, Ermera has the highest prevalence of stunting with 63.4%, followed by Ainaro (60.3%), Oecusse (57.1%), Aileu (53.9%), Bobonaro (50.3%), Covalima (49.0%), Baucau (48.8%), Viqueque (48%), and Manufahi (48%). (46.8%), Manatuto (46.8%), Liquiça (45.8%), Lautem (42.3%), and Dili (32.0%) (TLFNS, 2020). The previous study emphasized the need for systemic interventions incorporating education, policy changes, and community engagement to combat malnutrition effectively (Exposto et al., 2025).

To address the nutrition challenges in Timor-Leste, the government must seriously implement a nutrition policy aimed at combating malnutrition. A nutrition policy is a strategic framework that includes specific actions taken by governments and international organizations to improve the nutritional status of the population. These policies target various forms of malnutrition. The implementation of the National Nutrition Strategy Plan (2014-2019) has been influenced by several factors, including insufficient allocation of resources, ineffective advocacy, and a lack of coordination, particularly across multiple sectors. Additionally, the plan has acknowledged shortcomings in the previous strategy, including inadequate advocacy, poor communication and support, and inconsistent monitoring during its implementation from 2014 to 2019 (Ministério da Saúde, 2022). To improve the implementation of nutrition policy, the National Strategic Plan for Health Sector Nutrition (2022-2026) has been established. This plan includes several strategies: Prevent all forms of malnutrition by implementing specific nutrition interventions that focus on pregnant and lactating mothers, children under five years of age, and adolescents. Treat and control severe and acute malnutrition in children under five, adolescent girls, pregnant women, and breastfeeding mothers. Enhance nutritional support for individuals with specific needs in clinics, facilities, or institutions. Create an environment that promotes the effective implementation of nutrition interventions within the healthcare sector. Strengthen evidence-based programs through monitoring, evaluation, research, and surveillance of nutrition initiatives. (Ministério da Saúde, 2022).

Effective implementation of policies requires sufficient distribution of health human resources. Human health resources are critical to achieving health outcomes. This analysis, conducted by the World Health Organization and the Ministry of Health, recognizes that health system personnel are a limiting factor in achieving all objectives. Any increase or expansion of all services to achieve equity of access requires the involvement of adequate staff to achieve universal health coverage. (NHSSP II 2020-2030, 2020). According to Kikomeko et al. (2021), Effective nutrition interventions require healthcare professionals to possess specific competencies to enhance the performance of health services. Research conducted by Sotiraki indicates that concerns arise from inconsistencies between plans, interventions, and their implementation in the field. Additionally, leaders often encounter difficulties in accessing data, as few countries

have established adequate monitoring systems. (Sotiraki et al., 2022). Furthermore, the capacity of health personnel is crucial for delivering quality nutrition services at all levels. At the national level, human resource capacity for nutrition is essential; however, there are significant gaps in the ability to provide both quality and quantity of services at the municipal, administrative post, and suku levels. (Ministério da Saúde, 2022).

According to the National Strategic Plan for the Health Sector 2020-2030, on the distribution of health human resources to health services in the municipalities, with a total of 2472 health professionals composed of 3 specialist doctors, 703 general practitioners, 748 general nurses, 165 auxiliary nurses, 475 midwives, and 378 allied health personnel (NHSSP II 2020-2030, 2020). According to statistical data, the total healthcare human resources in Timor-Leste are distributed as follows: the municipality of Aileu comprises 6.7% of these resources. The health facilities in this area include the Aileu Village Health Center, which has 51 permanent employees, 7 permanent general regime, and 1 under a contracted regime. In addition, there are 27 under a special regime, 5 under a permanent general regime, and 2 under a contracted regime. The Laulara Health Center employs 15 permanent staff under a special regime, 6 under a permanent general regime, and 3 under a contracted regime. At the Lequidoe Health Center, there are 15 permanent staff under a special regime, 6 under a permanent general regime, and 3 under a contracted regime. The distribution of healthcare human resources by medical profession includes: 17 doctors, 32 nurses, 30 midwives, 8 dentists, 14 pharmacists, 12 analysts, and 1 physiotherapy personnel. Additionally, the permanent grades are categorized as follows: 1 at grade D, 4 at grade E, 5 at grade F, and 11 at grade G (Statistical Data SSM Aileu, 2025).

Healthcare human resources are essential for developing nutrition programs aimed at combating malnutrition. Human resource management is defined as a strategic approach to managing an organization's most valuable assets, as the collective efforts of individuals contribute significantly to achieving organizational objectives. (Araújo, 2025). A lack of human resources in the health system can hinder workloads and the successful implementation of programs. (Jayawickrama, 2020).

Implementing a computerized data management system can streamline processes and improve data visibility. Data is critical for informed decision-making; however, data gaps remain a significant obstacle to nutrition-related decisions. Nutrition research serves as the foundation for evidence-based policy and programming. (Ministério da Saúde, 2022). Thus, the Ministry of Health must strengthen nutrition data management to support nutrition programs in the decision-making process. Developing robust data management across all health facilities is imperative. Quality data is essential for providing leaders with sound options, particularly in the allocation of healthcare human resources and the monitoring of nutrition progress. This effort is part of a comprehensive strategy to implement programs related to health policy. Consequently, there is a need to enhance integrated nutrition information systems to improve the availability and use of routine nutrition data, which will support policy development, program design, and monitoring. (WHO, 2023).

Based on the researcher's observations, it seems that policy formulation occurs from the top down, without involving local policymakers who have a better understanding of the social context within the community. In rural areas, there are more human resources available, specifically nutrition experts capable of addressing

malnutrition issues. However, most professional health workers are concentrated in urban areas, making it challenging to tackle malnutrition effectively. This is partly due to an unequal distribution of human resources, as many technical health workers shift to administrative roles, leaving behind the responsibility for rural areas. Additionally, much of the data collected in health facilities, such as Community Health Centers, is not well integrated into the Ministry of Health. Consequently, there is no annual update of nutritional data in

In this study design, researchers used quantitative analytical methods with a cross-sectional approach. This study was conducted at the Remexio, Laulara, Lequidoe, and Aileu Villa Health Centers in Aileu Municipality, Timor-Leste. The target population in this study was health workers employed at the Aileu Villa Health Center (48 health workers), Remexio Health Center (25 health workers), Laulara Health Center (18 health workers), and Lequidoe Health Center (26 health workers). Therefore, this study only involved health workers employed at health centers. This survey will exclude drivers, cleaning staff, security guards, health workers who are on annual leave during the survey, health workers who are sick, health workers who refuse to participate in the survey, health workers who are traveling to other locations during the survey, and health workers who work at health posts. The Research Tool has conducted a Question Validity Test for Variables X1, X2, X3, and Y, showing that all question items are valid.

RESULTS AND DISCUSSION

Based on the analysis of the distribution of respondents regarding the implementation of health policies in health centers, the findings indicate that the implementation of these policies is 24.1% lower than expected. Additionally, the availability of human resources for health is quite limited, with 43.1% of resources reported as unavailable. Furthermore, the management of nutrition data at health centers is inadequate, showing a health failure rate of 19%. Despite these challenges, the analysis indicates that improvements in addressing malnutrition at health centers are promising, with a success rate of 62.9%, although there remains a concerning health failure rate of 37.1%.

Malnutrition remains a significant issue in Aileu Municipality, largely due to the ineffective implementation of health policies aimed at addressing this problem. Analysis results indicate that the implementation of health policies deemed effective for improving malnutrition at the Aileu Villa, Laulara, Lequidoe, and Remexio Health Centers achieved a rate of 79.5%. In contrast, 20.5% of the policies were classified as effective but did not contribute to improvements in malnutrition. Additionally, 10.7% of respondents reported that there were no health policies implemented, yet some improvement in malnutrition was observed. Alarming, 89.3% of cases showed no implementation of health policies and no improvement in malnutrition. Hypothesis testing in this study revealed a significant relationship between the implementation of health policies and the improvement of malnutrition among children under five years old at the Aileu Villa, Laulara, Lequidoe, and Remexio Health Centers in Aileu Municipality, Timor-Leste, with a p-value of 0.000. These findings suggest that the issue of malnutrition cannot be effectively resolved due to suboptimal implementation of health policies in Aileu Municipality. This inadequacy is further illustrated by several indicators: the "Policy Standards and Targets" indicator reveals a shortage of trained health workers in facilities to deliver quality nutrition services; the "Implementer Characteristics" indicator highlights a lack of training or

Timor-Leste, despite its importance for leaders to make informed decisions and understand the nutritional status of the population. Research Objectives: To find out the implementation of health policies, the availability of health human resources, and the management of nutritional data to improve the malnutrition problem in children under 5 years of age at the Aileu Villa Health Center, Laulara, Lequidoe, Remexio, Aileu Municipality, Timor-Leste in 2025.

RESEARCH METHODS

Reliability is the consistency of measurement, ensuring that similar results are obtained when repeated on the same individual or sample under the same or different conditions. From the reliability test results for Variables X1, X2, X3, and Y, all question items are proven to be reliable to continue the research. In this study, the Chi-square formula will be used. Hypothesis testing uses the criterion $\alpha = 0.05$, so that a p-value < 0.05 indicates a significant impact between the independent variable (X) and the dependent variable (Y), while a p-value > 0.05 indicates no significant impact between the independent variable (X) and the dependent variable (Y). This study has received authorization from the National Institute of Public Health of Timor-Leste (INSP-TL) to conduct research in the health sector, ensuring the confidentiality of the respondents' data. This study has been approved by INSP-TL under Reference Number: 2165/INSP-TL/UEPD-AL/X/2025.

updates regarding nutrition; the "Social Environment and Policy" indicator indicates the absence of local regulations aimed at improving community access to nutritious food; and there is a noticeable deficiency in community participation in nutrition program implementation.

The findings of this study align with the first study conducted by Sunaryo, which revealed that initiatives aimed at accelerating stunting prevention and treatment were ineffective in reducing stunting cases in Bandung. However, these activities have been implemented as targeted nutritional interventions. (Sunaryo et al., 2022). Addressing challenges in the government health sector requires both individual and collective efforts. Government health administrations must allocate sufficient resources for preventive health measures, while professional bodies, development partners, and non-governmental organizations should remain objective and motivated. Adhering to science-based policies and guidelines is crucial. Nutrition-sensitive interventions need to be streamlined, with clearly defined roles and responsibilities, as well as strong coordination at the national level. (Jayawickrama, 2020). According to Van Meter and Van Horn emphasized that the success of implementation varies across different models. According to them, several factors significantly influence this success, including the availability of implementation facilities, the readiness of the implementers, the effectiveness of communication between organizations, and the impact of the social and economic environment. Additionally, the surrounding community and its response also play a crucial role in the implementation process. (Hartawan & Kosasih, 2023).

To improve malnutrition in Timor-Leste, the government should work together with international organizations and adopt a multisectoral approach that encompasses the health, education, and social welfare sectors. This strategy involves specific nutritional interventions, such as

providing vitamin A and micronutrient supplementation. Additionally, it includes awareness-raising initiatives, such as community support, food diversification, and small-scale programs. Nutrition education is also crucial for local communities.

The analysis results indicate that the availability of health human resources categorized as "Yes" for addressing malnutrition problems at the Aileu Villa, Laulara, Lequidoe, and Remexio Health Centers is 93.9%. Meanwhile, 6.1% of health human resources are categorized as "Yes" but still marked "No" for effectively addressing malnutrition. Additionally, 22% of health human resources are rated "No" for addressing malnutrition issues, and a significant 78% are rated "No" and "No" in this context. Hypothesis testing reveals a significant relationship between the availability of health human resources and the ability to address malnutrition in children under 5 years of age at the aforementioned Health Centers in Aileu Municipality, Timor-Leste, with a p-value of 0.000. The results suggest that the availability of health human resources is insufficient, particularly evident from the "Distribution of health human resources" indicator, which highlights the imbalance in the number of health workers available in health centers to tackle malnutrition in the community. Newly assigned health workers often lack the necessary skills to effectively handle malnutrition issues, and the rotation of health workers does not help reduce malnutrition rates in these facilities. Furthermore, health workers do not participate in training related to nutrition management or malnutrition.

The findings of our research align with previous studies, indicating that a sufficient number of qualified healthcare professionals is essential for delivering equitable and high-quality health services to the community. However, there is an inadequacy in the availability of human resources in healthcare, including deficiencies in quantity, qualifications, distribution, quality, and competence. (Rimalivia, 2023). Additionally, research by Shows that the rotation of healthcare professionals significantly impacts staff performance. They also found that training and development have a substantial effect on performance, with a unit increase in training leading to improved outcomes.

To address the issue of malnutrition in Aileu Municipality, it is crucial to enhance the distribution of adequate human resources to provide proper care for children. Furthermore, we need to implement professional training for health personnel, particularly those responsible for nutrition programs, to ensure the sustainability of these initiatives at health centers.

The analysis results indicate that Nutrition Data Management significantly contributes to addressing malnutrition issues at the Aileu Villa Health Center, Laulara, Lequidoe, and Remexio. Specifically, 73.4% of cases reported that Nutrition Data Management had a positive impact on improving malnutrition problems, while 26.6% indicated it was somewhat effective but not fully satisfactory. Additionally, 18.2%

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study conducted in Aileu Municipality, Timor-Leste, the researcher emphasizes the critical role of health policy implementation in addressing malnutrition among children under the

showed a combination of "No" and "Yes" responses regarding the effectiveness of Nutrition Data Management in this context, and a concerning 81.8% reported "No" effectiveness in addressing malnutrition. Hypothesis testing in this research demonstrated a significant impact of Nutrition Data Management on improving malnutrition issues among children under five years old in Aileu Villa, Laulara, Lequidoe, Remexio, and Aileu Municipality, Timor-Leste, with a p-value of 0.000. The findings revealed deficiencies in Nutrition Data Management, observable through several indicators. The objectives of nutrition data management were not clearly defined in the planning phase. Additionally, essential resources, such as personnel, time, and costs, were overlooked. It was noted that health personnel lacked training and guidance on nutrition management. The Health Data Center relied on Microsoft Excel or Anthropometry Applications for analyzing the nutritional status of children, rather than utilizing more comprehensive tools.

This research aligns with the previous study by Lawanson et al. (2025), which highlights the importance of establishing a clear data framework to define roles, responsibilities, and data management to ensure data integrity and security. The results of this study indicate that consistent identification, assessment, intervention, and monitoring are crucial components of effective nutrition policy. Decision-making leaders play a vital role in developing and implementing malnutrition policies to ensure successful outcomes. It is recommended that future efforts prioritize the development and implementation of health policies targeting malnutrition-related diseases. (Ford et al., 2024). Additionally, the research conducted by Badawy et al. (2024) Explores the use of Big Data in healthcare, focusing on its characteristics, sources, and analytical approaches. The study proposes a framework for real-time predictive analytics and addresses the challenges associated with Big Data in the healthcare sector. The findings provide valuable insights into the potential for effectively utilizing Big Data in healthcare. Consequently, data management is closely tied to the quality of data used in the decision-making process within the health sector. Improving the quality of health data is critical for effective clinical decision-making and health program evaluation. However, ensuring the quality of health data remains a significant challenge in public health. The rapid development of information systems in the health sector is increasing the demand for robust data management across all health organizations. (Pereira et al., 2025).

The researcher concluded that effective data management in health information systems is essential for improving the health system's response to malnutrition in Aileu Municipality. Good data management can help design, monitor, and evaluate interventions, enhance the demand for and utilization of data in decision-making, and identify areas that need improvement. Additionally, it supports resource allocation and strategic planning. By managing healthcare data effectively, we can improve outcomes and deliver high-quality healthcare.

age of 5. The implementation of health policies categorized as "No" resulted in an 89.3% improvement in malnutrition issues, highlighting a significant impact on child health. Additionally, the availability of health human resources, also classified as "No," contributed to a 78% improvement in tackling malnutrition, underscoring the importance of sufficient personnel in health centers. The study also found that effective

nutrition data management led to an 81.8% improvement in addressing malnutrition, further affirming the importance of data management in evaluating children's nutritional status. Recommendations include the Ministry of Health providing regular training for community health professionals and developing an integrated data management system to enhance data quality across health posts. Regular monitoring of health

centers by Municipal Health Services is necessary to ensure compliance with Standard Operating Procedures (SOPs) in nutrition program implementation. Finally, consistent monitoring of malnourished children and effective management of digital data by SIS Managers and Nutrition Program Managers is crucial for integrating data into national health information systems, such as DHIS2 or HMIS.

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