

# PREVALENCE of Protein Energy Malnutrition and Its Risk Factors Among Orphaned Individuals in Selected Orphanages of General Santos City: A Basis for an Action PLAN

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## ABSTRACT

Malnutrition poses a health concern for orphaned individuals in General Santos City, Philippines. Using descriptive correlation methodology, this research examines the prevalence of protein energy malnutrition (PEM) and its associated risks among orphaned participants from city orphanages. The objective is to assess the malnutrition status, identify contributing factors, and bridge knowledge gaps on PEM in General Santos City. Data collection methods include structured questionnaires, observations, and anthropometric measurements. The analysis reveals a malnutrition prevalence, with (27.77%) at medium risk and (18.88%) at high-risk malnutrition. Notably, (13.3%) suffer from moderate PEM, emphasizing the necessity for targeted interventions. In conclusion, targeted initiatives such as nutrition education and improved healthcare services can reduce PEM prevalence. Enhance the well-being of orphaned individuals in General Santos City.

**KEYWORDS:** *Medical technology, quantitative design, healthcare, anthropometric measurements, albumin, Philippines*

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## INTRODUCTION

Malnutrition remains a significant global health challenge that critically impacts individuals across all age groups, particularly vulnerable demographics such as children. Among the various forms of malnutrition, Protein Energy Malnutrition (PEM) stands out due to its severe implications on health and development, especially in young children and infants. PEM is strongly linked to increased infection susceptibility and adverse health outcomes (Crichton M. et

al., 2019). A global survey estimated that approximately 14.7 million individuals worldwide are affected by PEM, with the highest age-standardized prevalence rates observed in East Asia, Oceania, South Asia, and Western Sub-Saharan Africa (Zhang, X. et al., 2019).

Focusing on the Philippines, the prevalence of malnutrition remains alarmingly high despite advances in healthcare and nutrition science. In 2017, 3.4% of Filipino children were reported as stunted, a figure that increased to 26.2% for chronic malnutrition among children aged 0–2 years by 2019 (FNRI, 2018). Malnutrition-related mortality is also significant, with over 29,000 child deaths attributed to malnutrition annually (UNICEF, 2023). Specific regions, such as the South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos City (SOCCSKSARGEN) area, report even more alarming rates, with stunting levels exceeding 40% of the population, demonstrating the urgent need for targeted nutritional interventions (World Bank Group, 2023).

Orphaned children who have lost one or both parents are particularly vulnerable to malnutrition. This group faces numerous challenges, including poor health, delayed development, and higher school dropout rates. In 2015, the global population of orphaned children was approximately 140 million, with significant numbers in Asia and Africa (Feleke S. et al., 2021). In the Philippines, about 2 million orphaned children face compounded challenges due to poverty, the COVID-19 pandemic, and political instability, factors that exacerbate their risk of malnutrition (Philippines Orphanage Foundation, 2020)

Despite governmental efforts, such as the "First 1000 Days" program and other initiatives to combat malnutrition, the rates have shown little improvement, positioning the Philippines among the highest in the region for malnutrition prevalence (World Bank, 2021). This study aims to address the gap in research regarding PEM among orphaned individuals in General Santos City by assessing their nutritional status and identifying associated risk factors. This research is critical for developing effective interventions and informing policymakers and healthcare providers.

## METHODS

### *Research design*

The study employed a descriptive correlational design, focusing on the population of orphaned individuals aged 0-18 years in General Santos City,

Philippines. This design was selected to systematically describe the population characteristics and explore the relationships between variables such as socio-demographic factors, anthropometric data, and the prevalence of PEM without establishing causality.

#### *Sampling procedure and sample size*

The respondents were chosen using a total population purposive sampling technique. In this method, a researcher examined the entire population with one or more shared characteristics. A total of 90 participants from four different orphanages

#### *Inclusion and exclusion criteria*

Orphaned individuals who lived in four orphanages in General Santos City aged 0-18 years old were included in the study. An orphan who was not feeling well, such as having a fever and cough during data collection, was not included in the study. Other exclusion criteria included individuals who had undergone cardiac surgery and lost a considerable amount of blood (10% of their blood volume) during the procedure, as well as individuals who received blood products or albumin before the albumin level measure was taken, were excluded.

#### *Research instrument*

The researcher developed and administered two survey questionnaires and a Blood collection procedure to gather the needed data. To maintain respondent confidentiality, the respondents were coded according to their orphanage code. For example, the codes ranged from A 01 to 28 for orphanage A, and similar codes were used for other orphanages. The questionnaire in the first section was modified and underwent validity testing by three validators. Additionally, it underwent pilot testing and Cronbach's alpha test to assess its reliability.

#### *Sample collection*

The respondents' height, weight, and recumbent length were measured using conventional anthropometric methods. A Detecto™ platform beam balance weighing scale with a capacity of 160 kg was used to measure the weight of each responder who was qualified for the study. Orphaned individuals over two years old or unable to need assistance when weighed alongside a guardian, caregiver, or any other adult companion. To determine the child's weight in this scenario, the weight of the guardian, caregiver, or any other adult companion absent during the measurement of the child's weight with the mother or caregiver was deducted from the total. Weighing was done to within 0.1 kilograms of the next

whole number. A Seca™ microtoise was used to measure the participants' standing height when they had reached the age of two (2) years. On the other hand, recumbent length was measured by employing either an infantometer or a wooden length board for participants younger than two years old. Height and length measurements were taken down to an accuracy of 0.1 centimeters. A calibrated tape measure was used to take measurements of the subject's waist and hip circumferences. All the measurements were taken twice. Additionally, procedures for blood collection were implemented to analyze biochemical markers such as albumin levels. These samples were processed using a Vchem analyzer with two replicates to ensure result accuracy, which is crucial for assessing nutritional status. Adhering to stringent health and safety protocols, especially in response to COVID-19, data collection was conducted with approval from the University of the Immaculate Conception ethics committee to maintain ethical standards.

### *Data Analysis*

Sociodemographic quantification was conducted using frequencies and percentages. Prevalence estimation for malnutrition and PEM was achieved through the application of percentages. The Chi-square test was employed to assess the correlation between the Screening Tool for the Assessment of Malnutrition in Paediatrics (STAMP) and albumin levels, as well as between PEM and identified risk factors. These statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS). Statistical significance was inferred when the P value was below 0.05. Finally, data from the survey and biochemical analyses were compared against established World Health Organization (WHO) standards to determine the prevalence of PEM and assess the nutritional status using tools like the STAMP, which is critical for drawing valid conclusions from the research.

### *Ethical consideration*

Ethical clearance and permission were obtained from the University of the Immaculate Conception research ethics committee (UIC-REC) with an ethical clearance protocol code: GS-64-01-23. Ethical considerations were rigorously followed, including obtaining informed consent from guardians and assent from minors, with all practices conforming to local and international standards of research ethics. Information about the study's autonomy, justice, and confidentiality was explained during data collection.

## RESULTS

### *Socio-demographic profile*

The socio-demographic profile of orphaned children in General Santos City reveals distinctive trends across three studied orphanages: Orphanages A and C each accommodate (31.11%) of the subjects, while Orphanage B houses only (11.11%), suggesting disparities in capacity or selection influenced by geographic or administrative factors. A majority (56.66%) of the orphaned individuals are adolescents aged 13-18, reflecting a global pattern where older children are more frequently retained in institutional care, possibly due to systemic challenges in foster care placement or adoption for this age group (Chowdhury et al., 2017). The predominance of male residents (62.22%) is consistent with findings in other regions, such as Ethiopia, where cultural or societal preferences might influence the demographics of orphan care (Sewnet et al., 2021). Notably, (58.88%) of these children have one or both parents alive, underscoring complex socio-economic reasons like poverty or abandonment as primary drivers for their institutionalization.

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### *Malnutrition Status as Assessed by STAMP*

The use of the STAMP (Table 1) revealed substantial differences in the

nutritional status of children across three orphanages. Orphanage C demonstrated a significantly lower risk, with (82.10%) of its residents categorized as low risk for malnutrition. In stark contrast, Orphanage B faced severe challenges, with (40.00%) of its residents at high risk of malnutrition, highlighting critical nutritional deficiencies. While (53.33%) of the population across all orphanages was assessed as low risk, a considerable proportion (27.77%) at medium risk and (18.88%) at high risk still confronts severe nutritional issues. These findings contrast sharply with the higher prevalence of malnutrition reported in studies like Chowdhury's (2017) in Bangladesh, underscoring the significant impact of local conditions and the effectiveness of nutritional interventions.

### ***Serum Albumin Levels***

The measurement of serum albumin levels (Table 1) as a biochemical marker for malnutrition further supported the STAMP findings. Orphanage B again stood out, with (40.00%) of individuals showing low albumin levels, indicating poor nutritional intake or possible underlying health conditions. Conversely, Orphanage C reported the best outcomes, with (96.40%) of individuals having normal albumin levels. Although Orphanages A and D showed relatively good nutritional status, with (89.30%) and (83.30%) of individuals having normal levels, respectively, the presence of individuals with low albumin levels (10.70% in Orphanage A and 16.70% in Orphanage D) underscores the need for ongoing nutritional support and monitoring. These findings necessitate targeted nutritional interventions to enhance the children's dietary intake and overall health, especially in Orphanages B, A, and D. Regular monitoring and tailored dietary programs are essential to ensure all children reach and maintain adequate nutritional status, potentially improving their long-term health and developmental outcomes.

### ***Prevalence of PEM***

**Table 1**  
*Overall risk of malnutrition using STAMP, albumin level, and classification of PEM among orphaned individuals in General Santos City*

<b>Overall risk of Malnutrition using STAMP</b>					
<b>Malnutrition Status using STAMP</b>	<b>Orphanage A n(%)</b>	<b>Orphanage B n(%)</b>	<b>Orphanage C n(%)</b>	<b>Orphanage D n(%)</b>	<b>Overall Frequency N (%)</b>
Low-risk malnutrition	9 (32.10)	2 (20.00)	23 (82.10)	14 (58.30)	48 (53.33)
Medium-risk malnutrition	15 (53.60)	4 (40.00)	3 (10.70)	3 (12.50)	25 (27.77)
High-risk malnutrition	4 (14.30)	4 (40.00)	2 (7.10)	7 (29.20)	17 (18.88)
<b>Total N(%)</b>	<b>28 (100.00)</b>	<b>10 (100.0)</b>	<b>28 (100)</b>	<b>24 (100.00)</b>	<b>90 (100.00)</b>
<b>Albumin Level</b>					
<b>Albumin Level</b>					
Low (<3.4 mg/dL)	3 (10.70)	4 (40.00)	1 (3.60)	4 (16.70)	12 (13.33)
Normal (3.4 – 5.5 mg/dL)	25(89.30)	6 (60.00)	27 (96.40)	20 (83.30)	78 (86.67)
<b>Total N(%)</b>	<b>28 (100.00)</b>	<b>10 (100.0)</b>	<b>28 (100)</b>	<b>24 (100.00)</b>	<b>90 (100.00)</b>
<b>Classification of PEM</b>					
<b>PEM Classification</b>					
Not PEM	25 (89.30)	6 (60.00)	27 (96.40)	20 (83.30)	78(86.67)
Moderate PEM	3 (10.70)	4 (40.00)	1 (3.60)	4 (16.70)	12 (13.33)
Severe PEM	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
<b>Total N(%)</b>	<b>28 (100.00)</b>	<b>10 (100.0)</b>	<b>28 (100)</b>	<b>24 (100.00)</b>	<b>90(100.00)</b>

The prevalence of PEM (Table 1) among orphaned individuals in selected orphanages in General Santos City is relatively low, with (86.67%) of the population not exhibiting PEM, suggesting effective nutritional management in these settings. Notably, no cases of severe PEM were identified, indicating successful preventive measures or healthcare interventions that prevent the progression to more serious conditions. This finding contrasts with regional studies, such as those by Crichton et al. (2019), which reported variable severe PEM rates, highlighting the persistent public health challenges in managing PEM in vulnerable populations.

Orphanage C exemplifies outstanding nutritional and healthcare practices, with (96.40%) of its residents classified as 'Not PEM' and displaying normal serum albumin levels, suggesting a highly effective alignment of its nutritional support systems with the health needs of its residents. In contrast, Orphanage B presents a significant concern, where (40%) of individuals suffer from moderate PEM and similarly low albumin levels, pointing to an urgent need for intervention. Despite the overall low prevalence of severe PEM, moderate PEM in (13.33%) of the study population underscores the need for continuous nutritional monitoring and proactive interventions to enhance health outcomes. This emphasizes the crucial role of regular assessments of PEM status and serum albumin levels as essential indicators of nutritional health in orphanage settings.

### **Association between PEM and Identified Risk Factors**

The risk factors influencing PEM (Table 2) among orphaned individuals in General Santos City provided significant insights, particularly regarding the relationships between PEM, food security, and recent illnesses. Notably, the research did not find significant correlations between PEM and water quality or sanitation factors such as the type of water source or water purification methods. For example, whether using piped water or bottled mineral water, no significant difference in PEM rates was observed ( $\chi^2 = 0.149$ ; p-value = 0.699). Similarly, personal hygiene practices, including handwashing and shared sanitation facilities, did not significantly impact PEM rates statistically.

In contrast, food security emerged as a critical determinant of nutritional status. Children facing intermittent food insecurity showed a marked increase in moderate PEM cases; 80% of those experiencing occasional food shortages were affected, highlighting a significant correlation ( $\chi^2=69.231$ ; p<0.001). Further underlining the severity of food scarcity, orphans who occasionally ate less due

to insufficient food saw a 35.49% prevalence of moderate PEM ( $\chi^2=20.105$ ;  $p<0.001$ ). The dire circumstances of having "No food at all" or "Going to sleep hungry" correlated with a 100% occurrence of moderate PEM in affected individuals, demonstrating an extreme risk ( $\chi^2=90.00$ ;  $p<0.001$  for both variables). The frequency of meals also significantly influenced PEM outcomes. Orphans eating only 1-2 times a day had a higher likelihood of suffering from moderate PEM (30.43%) compared to those eating 2-3 times daily (7.46%), further emphasizing the importance of regular and adequate meal intake in preventing malnutrition ( $\chi^2=7.819$ ;  $p=0.005$ ). Additionally, the relationship between recent illnesses and PEM was particularly striking. Orphans who reported being ill in the past two weeks had a significantly higher risk of developing moderate PEM ( $\chi^2 = 59.997$ ,  $p < 0.001$ ). This data supports the notion that recent illness acts as a critical factor in the exacerbation of malnutrition, as malnourished children are more susceptible to infections, which in turn can worsen their nutritional deficits (Walson, J.L. et al., 2018). This bidirectional relationship creates a vicious cycle that undermines the health and development of vulnerable populations.

These findings suggest that while general hygiene and sanitation are well-managed, targeted interventions to improve food security and manage infectious diseases are crucial. Ensuring regular and nutritious meals and proactive health monitoring and intervention could significantly mitigate the risk of PEM and improve the overall well-being of orphaned children in these settings. Such measures are essential for preventing immediate malnutrition and breaking the cycle of infection and malnutrition that significantly impacts long-term health outcomes.

**Table 2***Association between PEM and identified risk factors.*

Water and Sanitation					
Variables	Not PEM	Moderate PEM	Chi-square	p-value	Remarks
<b>Main Source of Water</b>					
Piped into dwelling	50 (87.72)	7 (12.28)	0.149	0.699	Not Significant
Bottled mineral water	28 (84.85)	5 (15.15)			
<b>Make your water safer to drink</b>					
Boil	8 (80.0)	2 (20.0)	3.630	0.458	Not Significant
Use water filter	26 (89.65)	3 (10.34)			
Improvised filter (cloth, sponge)	10 (100.0)	0 (0.0)			
Protected spring	16 (88.89)	2 (11.11)			
Unprotected spring	18 (78.26)	5 (21.74)			
Personal Hygiene Characteristics					
<b>Main water sources for handwashing</b>					
Piped into the dwelling	48 (85.71)	8 (14.29)	0.116	0.733	Not Significant
Tube well or borehole	30 (88.24)	4 (11.777)			
Share toilet with others					
Food Production Availability					

Water and Sanitation					
Variables	Not PEM	Moderate PEM	Chi-square	p-value	Remarks
<b>Worrying about not having enough food</b>					
Never	71 (100.0)	0 (0.0)	69.231	<.001	Significant
Sometimes	3 (20.0)	12 (80.0)			
Often	4 (100.0)	0 (0.0)			
Rarely	10 (100.0)	0 (0.00)			
<b>Eat smaller due to lack of food.</b>					
Never	49 (98.0)	1 (2.0)	20.105	<.001	Significant
Rarely	9 (100.0)	0 (0.0)			
Sometimes	20 (64.52)	11 (35.49)			
<b>No food at all</b>					
Never	78 (0.0)	0(0.0)	90.00	<.001	Significant
Sometimes	0 (0.00)	12 (100.0)			
<b>Sleep Hungry</b>					
Never	78 (0.0)	0(0.0)	90.00	<.001	Significant
Sometimes	0 (0.00)	12 (100.0)			
<b>The whole day eat nothing</b>					
Never	78 (93.97)	5 (6.03)	49.337	<.001	Significant
Sometimes	0 (0.00)	7 (100.0)			

Water and Sanitation					
Variables	Not PEM	Moderate PEM	Chi-square	p-value	Remarks
<b>Often Eat Food in a Day</b>					
1-2 Times a Day	16 (69.57)	7 (30.43)	7.819	0.005	Significant
2-3 Times a day	62 (92.54)	5 (7.46)			
Prevalence of Infectious Disease					
<b>History of illness in the past 2 weeks</b>					
No	65 (100.0)	0 (0.0)	36.000	<.001	Significant
Yes	13 (52.0)	12 (48.0)			

## Association between STAMP and Serum Albumin

The analysis between the STAMP and serum albumin levels (Table 3) among orphaned individuals highlights a significant association, underscoring the tool's effectiveness in identifying malnutrition. Statistical analysis reveals a pronounced correlation, with a  $\chi^2$  value of 59.547 and a p-value of less than 0.001, indicating a robust link between higher-risk malnutrition categories and decreased serum albumin levels.

This substantial prevalence of low albumin levels within the high-risk group underscores the serious risk of malnutrition-related complications in these individuals. The findings affirm STAMP's utility as an effective screening tool and a reliable predictor of severe nutritional deficiencies. The absence of low albumin levels among those categorized as low and medium risk further validates the accuracy of STAMP in distinguishing between varying degrees of nutritional risk. This correlation supports the conclusions of studies such as those by Reed M. et al. (2020), which emphasize STAMP's accuracy, sensitivity, and specificity in detecting nutritional deficiencies within orphaned populations. These results stress the importance of using STAMP for early detection and intervention in malnutrition, which is crucial for preventing severe complications and improving the overall health outcomes of orphaned children.

**Table 3**

*Association between STAMP and Serum Albumin*

Malnutrition Status	Low Albumin (<3.4 mg/dL) F(%)	Normal Albumin (3.4 – 5.5 mg/dL) F(%)	Chi-square Value	p-value	Remarks
Low-risk malnutrition	0 (0.0)	48 (100.0)	59.547	<.001	Significant
Medium-risk malnutrition	0 (0.0)	25 (100.0)			
High-risk malnutrition	12 (70.58)	5 (29.42)			

## Recommended action plans for orphanage programs in General Santos City

The action plan in (Table 4) addresses Protein-Energy Malnutrition (PEM) among orphaned individuals through strategic enhancements in nutritional support, food security, and best practices. It targets orphanages with notable malnutrition rates, aiming to halve them within six months by implementing balanced diet programs and personalized nutrition plans. The plan also emphasizes forming partnerships to secure consistent nutritious food supplies and promotes sharing successful practices across orphanages to improve overall health outcomes. By maintaining essential health measures and fostering a culture of best practices, the plan seeks to build sustainable improvements in the well-being of orphaned individuals.

**Table 4**  
*Recommended action plan for selected orphanages in General Santos City*

<b>Advocacy Priorities</b>	<b>Specific Objectives</b>	<b>Actions/ Activities</b>	<b>Persons Responsible</b>	<b>Target Date</b>	<b>Intended Outcomes</b>
Enhance Nutritional Support/ Nutritional Intervention	Orphanage A and D: Reduce medium and high-risk malnutrition cases by 50%	<ol style="list-style-type: none"> <li>1. Implement a balanced diet program and conduct regular nutritional assessments.</li> <li>2. Develop individualized nutrition plans for high-risk individuals</li> </ol>	<ol style="list-style-type: none"> <li>1. Orphanage A and D Management and Staff</li> <li>2. Nutritionists and Dietitians</li> <li>3. Health Workers/ volunteers</li> </ol>	6 Months (August, 2024)	<ol style="list-style-type: none"> <li>1. Lower rates of medium and high-risk malnutrition among orphaned individual in Orphanage A and D; improved overall health</li> </ol>

Advocacy Priorities	Specific Objectives	Actions/ Activities	Persons Responsible	Target Date	Intended Outcomes
	Reduce the prevalence of moderate PEM across all orphanages, with a focus on those with higher rates like Orphanage B.	<ol style="list-style-type: none"> <li>1. Conduct comprehensive nutritional assessments for each child annually using STAMP tool.</li> <li>2. Develop individualized nutrition plans based on assessment results</li> </ol>	<ol style="list-style-type: none"> <li>1. Orphanage Management and Staff</li> <li>2. Nutritionists and Dietitians</li> <li>3. Healthcare Providers (MedTech, Nurses , Doctors etc.)</li> </ol>	Within 1 year (February ,2025)	<ol style="list-style-type: none"> <li>1. Decrease in moderate PEM prevalence to below 10% in all orphanages.</li> <li>2. Improved nutritional status among orphaned individuals at risk.</li> </ol>
Increase Food Security	To ensure all orphans have access to sufficient, safe, and nutritious food to meet their dietary needs.	1. Partner with local farms and businesses for food donations/ steady nutritious food supply.	<ol style="list-style-type: none"> <li>1. NGOs</li> <li>2. Local Government</li> <li>3. Community Leaders</li> <li>4. Orphanage Administrators and Staff</li> </ol>	Within 6 months (August, 2024)	1. Reduction in the incidence of moderate PEM among orphans due to improved food security and access to nutritious meals.

Advocacy Priorities	Specific Objectives	Actions/ Activities	Persons Responsible	Target Date	Intended Outcomes
	Enhance Meal Frequency and Quality: Ensure orphans eat more frequently and consume quality foods.	<ol style="list-style-type: none"> <li>Partner with nutritionists to design balanced meal plans.</li> <li>Provide training for orphanage staff on nutrition and meal preparation.</li> </ol>	<ol style="list-style-type: none"> <li>Orphanage Administrators and Staff</li> <li>Nutritionists and Dietitians</li> <li>Food Suppliers</li> <li>Donors</li> </ol>	Within 6 months (August, 2024)	<ol style="list-style-type: none"> <li>Increased meal frequency decreases moderate PEM prevalence among orphans who previously ate less frequently.</li> </ol>
Sustain, Share, and Continue Best Practices	Orphanage C: Maintain low malnutrition risk and assist other orphanages.	<ol style="list-style-type: none"> <li>Continuation of the positive practices of orphanage C especially to the identified PEM risk factors such as; Personal hygiene, water and sanitation, food production availability and the prevalence of infectious diseases.</li> <li>Mentorship Program Development:</li> </ol>	<ol style="list-style-type: none"> <li>Orphanage C management</li> <li>Nutritionists</li> <li>External experts (MedTech, Nurses and Doctors)</li> </ol>	Within 6 months (August, 2024)	<ol style="list-style-type: none"> <li>Maintained low-risk malnutrition status at Orphanage C.</li> <li>Adoption of effective nutritional practices by other orphanages, leading to improved malnutrition risk profiles.</li> </ol>

<b>Advocacy Priorities</b>	<b>Specific Objectives</b>	<b>Actions/ Activities</b>	<b>Persons Responsible</b>	<b>Target Date</b>	<b>Intended Outcomes</b>
	Continuation of the “positive practices” in the risk factors identified	Continue positive access to clean water, good personal hygiene, high vaccination rates, and the infectious disease prevention.	<ol style="list-style-type: none"> <li>1. Local Government</li> <li>2. NGOs</li> <li>3. Orphanage Administrators</li> <li>4. Community Health Workers</li> </ol>	Within 1 year (February 2025)	1. Maintaining the positive practices of each orphanage, leading to the reduction of malnutrition and PEM.

## CONCLUSION

The research conducted in selected orphanages of General Santos City highlights a generally low prevalence of PEM among orphaned individuals, indicating effective existing nutritional and healthcare measures. However, disparities such as the higher rates of moderate PEM in Orphanage B underscore the need for targeted interventions, particularly in enhancing food security and managing health care effectively. The significant correlations between PEM and factors like food availability, meal frequency, and recent illnesses emphasize the critical impact of these elements on the nutritional status of orphans. Furthermore, the strong association between the STAMP screening results and serum albumin levels validates STAMP as an effective tool for early detection and ongoing monitoring of nutritional deficiencies. Based on these findings, developing a comprehensive action plan focused on improving food distribution, enhancing healthcare practices, and utilizing reliable screening tools is essential to mitigate PEM risks and improve health outcomes across all regional orphanages.

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