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Nutrition Status and Associated Risk Factors Among Children in Orphanages in Sanaa, Yemen

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Abstract:

The aim of the study was to determine the nutritional status (stunting or underweight status) and associated risk factors among orphaned House children in Sanaa, Yemen. A cross-sectional study was conducted among 200 children were selected. The data was using a self-administered questionnaire, developed based on a literature review and study objectives. The questionnaire include data on stunting and underweight, demographic, dietary, and hygiene factors. The results revealed that the prevalence of stunting is 37.5% while 47 % were underweight. A significant association was found ($p<0.05$) associated between Personal hygiene and underweight status, while energy intake did not significantly ($p>0.05$) affect underweight status. Additionally, factors such as the reason for a child's stay in the orphanage house, father and mother loss, and age were not significantly ($p>0.05$) related to malnutrition (stunting or underweight status). The orphanage house did not show a significant ($p>0.05$) association with malnutrition (stunting or underweight status). It recommends that government authorities and non- government organizations should pay attention to orphanages regarding provide food needs and personal hygiene materials.

Keywords:

Stunting, Underweight, Malnutrition, Orphaned Children, Yemen

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ترجمة الى العربية

الحالة التغذوية وعوامل الخطر المرتبطة بها بين أطفال دور الأيتام في مدينة صنعاء، اليمن

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2025

الملخص

هدفت هذه الدراسة الى تقييم الحالة التغذوية وعوامل الخطر المرتبطة بها بين الأطفال الأيتام الذين يعيشون في دار الأيتام (دار الشوكاني ودار الأيتام) في صنعاء، اليمن. تم اختيار عينة عشوائية من 200 طفل لتقييم انتشار التقزم ونقص الوزن، بالإضافة إلى العوامل الديموغرافية والغذائية والنظافة الشخصية المرتبطة بها. وجدت الدراسة أن 37.5٪ من الأطفال يعانون من التقزم و47.0٪ يعانون من نقص الوزن. ارتبطت النظافة الشخصية بشكل كبير بحالة نقص الوزن، في حين لم يؤثر الغذاء المأخوذ مع الطاقة المحسوبة بشكل كبير على انتشار نقص الوزن. بالإضافة إلى ذلك، لم تكن عوامل مثل سبب إقامة الطفل في دار الأيتام وفقدان الوالدين والعمر مرتبطة بشكل كبير بحالة التقزم أو نقص الوزن. لم يُظهر نوع دار الأيتام ارتباطًا كبيرًا بأي من الحالتين. تسلط هذه النتائج الضوء على الطبيعة المعقدة لسوء التغذية في دور الأيتام وتشير إلى أن النظافة الشخصية قد تلعب دورًا رئيسيًا في حالة نقص الوزن بين الأطفال في دور الأيتام. نوصي بالاهتمام بدور الايتام من قبل الجهات الحكومية ومنظمات المجتمع المدني من اجل توفير الاحتياجات التغذوية وكذلك توفير مواد النظافة الشخصية للقاطنين في دور الايتام.

الكلمات المفتاحية

التقزم، نقص الوزن، سوء التغذية، الأطفال الأيتام، اليمن

1. Introduction

Child under-nutrition is a major public health problem. Globally 5 million child death occur every year due to malnutrition (Dinachandra Singh et al., 2015) Malnutrition arises due to reduced dietary intake, malabsorption, increased nutrient losses or altered metabolic demands (Rodriguez et al., 2011) Children with malnutrition have high morbidity and mortality (Pelletier et al., 1993) Severe malnutrition results in immune response dysfunction (Scrimshaw & SanGiovanni, 1997) Signs and symptoms of nutritional deficiencies are an aid in detecting malnutrition. Cases with mild to moderate under nutrition may remain unrecognized because clinical criteria for their diagnosis are imprecise and difficult to interpret accurately (Paul & Bagga, 2013).

Malnutrition occurs as a result of inadequate dietary intake, poor absorption of nutrients, increased nutrient losses, or altered metabolic requirements (Rodriguez et al., 2011) . Children suffering from malnutrition face a higher risk of illness and death (Pelletier et al., 1993) . Severe cases can lead to immune system dysfunction (Scrimshaw & SanGiovanni, 1997). Recognizing nutritional deficiencies through their signs and symptoms is essential for early detection. However, mild to moderate under- nutrition often goes unnoticed due to the vague and challenging nature of clinical diagnostic criteria (Paul & Bagga, 2013).

Malnutrition remains a significant public health concern in Yemen, particularly among vulnerable populations. Recent studies have highlighted the broader impact of nutritional habits and deficiencies across different groups. For example, (Alsebaeai et al., 2024) reported a positive association between regular breakfast consumption and academic performance among medical students at Queen Arwa University, underscoring the role of proper nutrition in cognitive functioning. Additionally,(Alsebaeai et al., 2025) examined the prevalence of pica disorder among pregnant women in Sana'a, identifying both nutritional and non-nutritional risk factors contributing to this condition. These findings reflect the urgent need to assess nutrition-related risks in other at-risk

populations, including children in orphanage houses, who may face compounded vulnerabilities due to institutional living conditions and limited dietary options.

School-age children are particularly vulnerable to under nutrition as the priority in nutrition interventions is often to prevent malnutrition during foetal development and the first years of life – the most critical period for growth and development (Burbano et al., 2009) Stunting and wasting are also wide spread among school-age children in developing countries. High levels of stunting among children suggest that there will also be a long-term deficit in mental and physical development that can leave children ill-prepared to take maximum advantage of learning opportunities in schools (Burbano et al., 2009) .

Estimates indicate that up to 151 million children globally have experienced the death of one or both parents before 18 years of age, with the vast majority of these children living in low-income and middle-income countries.(Finlay et al., 2016) Children residing in Social Welfare Hostels/orphanages are more prone to malnutrition compared to children staying at home with their parents. This could lead to more morbidity conditions among these children (Sharada et al., 2014) Hence a proper surveillance of their nutrition status is required to ensure optimum health and nutrition care. the study was aimed to determine Nutrition Status and Associated Risk Factors Among Orphanage Children in Orphanage house in Sanaa, Yemen.

2. Research methodology

2.1. Study design:

This study employs a cross-sectional design to assess the nutritional status and associated risk factors among orphaned children living in two orphanages in Sanaa, Yemen: Alshoukani House and Orphanage House. A cross-sectional study is appropriate for identifying the prevalence of malnutrition and analyzing demographic, dietary, and hygiene-related risk factors at a specific point in time.

2.2. Study Population and Sampling

The study population consists of orphaned children residing in Alshoukani House and Orphanage House in Sanaa, Yemen. The inclusion criteria include children aged 5-15 years who have been living in the orphanage for at least six months, ensuring that the impact of the orphanage environment on their nutritional status can be assessed. The exclusion criteria include children who are younger than 5 years old or older than 15 years, as well as those who have not been residing in the orphanage for the required duration of six months.

2.3. Sample Size Determination

The sample size was determined based on previous studies on malnutrition prevalence among orphaned children. A total of 200 children were selected using random sampling from both orphanages to ensure an unbiased representation.

2.4. Data Collection Methods

A structured questionnaire was used to collect data on socio-demographic characteristics, anthropometric measurements, dietary intake assessment, and personal hygiene practices. Anthropometric measurements were conducted following standard WHO protocols to assess nutritional status. Height-for-age was measured to determine chronic malnutrition (stunting), weight-for-age was used to assess general malnutrition (underweight), and BMI-for-age was evaluated to identify thinness or overweight status. Socio-demographic data included age, gender, orphan status (loss of one or both parents), length of stay in the orphanage, and the reason for institutionalization, such as poverty, parental death, or being a street child. Dietary intake assessment involved comparing the estimated energy requirement (EER) with actual intake to determine whether children met WHO-recommended caloric needs. Additionally, the Dietary Diversity Score (DDS) was evaluated based on the consumption of different food groups over 24 hours. Personal hygiene and health status were assessed using multiple questions regarding hygiene practices, which were categorized as high or moderate.

2.5. Data Analysis

Descriptive statistics, including frequencies and percentages, were used to summarize the data and provide an overview of the study population. To determine associations between nutritional status and various socio-demographic factors, dietary intake, and hygiene practices, Chi-square tests were conducted. Statistical significance was assessed using p-values, with a threshold of $p < 0.05$ considered significant. Data analysis was performed using SPSS software version 26,

ensuring accurate and reliable statistical evaluation of the findings.

2.6. Ethical Considerations

Ethical approval for the study was obtained from the Queen Arwa University (QAU) authorities, ensuring compliance with ethical research standards. Additionally, permission was granted by the orphanage authorities to conduct the study within their facilities. Before data collection, informed consent was obtained from caregivers or legal guardians, ensuring that the participants' rights and well- being were protected throughout the research process.

3. Results and Discussion

3.1. Demographics and nutritional factors distribution of sample

The socio-demographic characteristics of the study population (n=200) reveal key insights into the backgrounds of the participants (Table 1). The study includes children from two orphanages: Alshoukani House (48.5%) and Orphanage House (51.5%).

Table 1: Socio-Demographic characteristics of the study population (n=200)

Variable	Number of participate	Percentage of participate
Name of Orphanage house		
Alshoukani House	97	48.5
Orphanage house	103	51.5
Age		
5-10	42	21.0
11-15	158	79.0
Orphan status		
Only father	167	83.5
Only Mother	9	4.5
None of them	24	12.0
Reason of stay		
Parents are not alive	11	5.5
Poverty	186	93.0
Streets children	3	1.5
Different between Estimated EER		
Higher	63	31.5
Lower	137	68.5
Personal hygiene		
High	29	14.5
Moderate	171	85.5

The majority of the participants (79.0%) are aged between 11 and 15 years, while a smaller proportion (21.0%) fall within the 5 to 10-year age range. Regarding orphan status, most children (83.5%) have lost only their father, while 4.5% have lost only their mother, and 12.0% have lost both parents. The primary reason for their stay in the orphanages is poverty, affecting 93.0% of the children, whereas 5.5% have lost both parents, and 1.5% were previously street children. When comparing the estimated energy expenditure requirements (EER), 31.5% of the children have a higher EER, while 68.5% have a lower EER. Personal hygiene levels also vary, with 14.5% of the participants maintaining a high level of hygiene, while the majority (85.5%) have moderate hygiene practices. These findings highlight the significant socio-economic and health-related challenges faced by the orphaned children in the study population.

3.2. The prevalence of Stunting and Underweight among selected sample

The prevalence of Stunting among children presented in (Table 2). Stunting, defined as impaired growth and development due to chronic malnutrition, affects 37.5% of the sampled children. This indicates that more than one-third of the children have experienced long-term nutritional deficiencies, which may be attributed to inadequate dietary intake, poor-quality food, repeated infections, or socio- economic factors. Stunting is particularly concerning because it can lead to long- term consequences such as reduced cognitive development, poor academic performance, and increased susceptibility to diseases. The fact that 62.5% of the children are not stunted suggests that a significant proportion still receives adequate nutrition to support normal growth. However, efforts should be made to address the nutritional gaps to reduce stunting prevalence further. In Yemen, the prevalence of stunting among children under five was reported at 46.4% in 2013, the highest in the Middle East region (World, 2017).

Underweight, which refers to low body weight for age, is present in 47.0% of the children as show in (Table 2) This nearly equal distribution (47% underweight vs. 53% not underweight) highlights that almost half of the children may be experiencing acute or chronic malnutrition. The prevalence of underweight is nearly to

study by Al-Zangabila et al., (Al-Zangabila et al., 2021) they collected and analyzing data from the Yemen National Demographic and Health Survey and reported that 39.9% of children under five were underweight. Underweight status could result from insufficient caloric intake, infections, or health conditions that interfere with nutrient absorption. Children who are underweight may be more vulnerable to illnesses, weakness, and delayed physical and cognitive development. The fact that the percentage of underweight children is higher than that of stunted children suggests that short-term malnutrition or weight loss may be more prevalent than chronic malnutrition in this population (Uzogara, 2016) .

Table 2 :The prevalence of Stunting and Underweight among selected sample

Variable	Number of participate	Percentage of participate
Stunting		
Yes	75	**37.5**
No	125	**62.5**
Underweight		
Yes	94	**47.0**
No	**106**	**53.0**

3.3. The relationship between different factors and Stunting

The relationship between various risk factors and nutritional status (stunting) among children, as presented in Table 3, reveals no statistically significant associations across the examined variables. Although not statistically significant (p = 0.324), a higher percentage of stunted children (56.0%) are from general orphanages compared to 44.0% in Alshoukani House. This difference may suggest that variations in care, nutrition, or living conditions between orphanages could influence stunting, though further investigation is needed.

Age does not show a significant relationship with stunting (p = 0.089); however, a higher proportion of stunted children (24.8%) are in the older age group (11-15 years) compared to 14.7% in the younger age group (5-10 years). This trend may indicate that prolonged exposure to inadequate nutrition leads to a greater risk of stunting in older children, emphasizing the need for sustained nutritional interventions throughout childhood.

Orphan status also does not show a significant association with stunting (p=0.517). The majority of stunted children (81.3%) have lost only their father, while 6.7% have lost only their mother, and 12.0% have lost both parents. These figures are similar to the distribution among non-stunted children, suggesting that orphan status alone may not be a determining factor for stunting.

Similarly, the reason for staying in the orphanage does not have a significant relationship with stunting (p = 0.454). Most stunted children (93.3%) and non- stunted children (92.8%) reside in orphanages due to poverty, with only a small proportion staying due to the loss of both parents (4.0%) or having been street children (2.7%). This indicates that poverty is a major underlying factor affecting children's living conditions, regardless of stunting status.

When examining the difference between estimated energy expenditure requirements (EER) and actual intake, there is no significant association with stunting (p = 0.906). Among stunted children, 32.0% have higher EER, while 68.0% have lower EER, similar to the distribution among non-stunted children. This suggests that energy intake discrepancies may not be the primary cause of stunting, but other factors such as nutrient quality and absorption may play a role.

Lastly, personal hygiene does not show a significant correlation with stunting (p = 0.959). The majority of both stunted (85.3%) and non-stunted (85.6%) children maintain moderate hygiene levels, while a small percentage exhibit high hygiene standard. This indicates that hygiene, while important for overall health, may not be the sole determinant of stunting among the studied children.

Table 3 :The relation between risk factors and nutritional status among children

Variable		Nutritional status (stunting)		P value
		Yes	No	
Name of Orphanage house	Alshoukani House	33(44.0%)	64(51.2%)	**0.324**
	Orphanage house	42(56.0%)	61(48.8%)	
Age	5-10	11(14.7%)	64(85.3%)	**0.089**
	11-15	31(24.8%)	94(75.2%)	
Orphan status	Only father	61(81.3%)	106(84.8%)	**0.517**
	Only Mother	5(6.7%)	4(3.2%)	
	None of them	9(12.0%)	15(12.0%)	
Reason of stay	Parents are not alive	3(4.0%)	8(6.4%)	**0.454**
	Poverty	70(93.3%)	116(92.8%)	
	Streets children	2(2.7%)	1(0.8%)	
Different between Estimated EER	Higher	24(32.0%)	39(31.2%)	**0.906**
	Lower	51(68.0%)	86(68.8%)	
Personal hygiene	High	11(14.7%)	18(14.4%)	**0.959**
	Moderate	**64(85.3%)**	**107(85.6%)**	

3.4. The relationship between different factors and Underweight Status

The relationship between various risk factors and underweight status among children, as shown in Table 4, highlights significant and non-significant associations. While some variables do not show a statistically significant relationship with underweight status, others, such as age and personal hygiene, have strong associations.

The name of the orphanage house does not have a statistically significant relationship with underweight status (p = 0.113). However, a higher proportion of underweight children (57.4%) reside in general orphanages compared to 42.6% in Alshoukani House. This trend suggests that differences in nutrition, healthcare, and living conditions between orphanages may impact children's nutritional status, though further research is needed to confirm this.

Age shows a highly significant association with underweight status (p = 0.000). The majority of underweight children (91.5%) belong to the older age group (11- 15 years), whereas only 8.5% are in the younger age group (5-10 years). In contrast, among non-underweight children, 32.1% are aged 5-10 years, and 67.9% are aged 11-15 years. This suggests that older children are at a much higher risk of being underweight, possibly due to increased nutritional needs during adolescence, prolonged exposure to food insecurity, or inadequate dietary intake over time.

Orphan status does not show a significant association with underweight status (p = 0.838). Among underweight children, 85.1% have lost only their father, 4.3% have lost only their mother, and 10.6% have lost both parents. These proportions are similar among non-underweight children, indicating that orphan status alone does not appear to be a major determinant of underweight conditions.

The reason for staying in the orphanage also does not have a significant relationship with underweight status (p = 0.327). Most underweight children (94.7%) and non-underweight children (91.5%) reside in the orphanage due to poverty. A smaller percentage are there because their parents are not alive (3.2% of underweight children vs. 7.5% of non-underweight children) or because they were previously street children (2.1% vs. 0.9%). This further emphasizes poverty as the primary factor influencing children's nutritional challenges, rather than parental loss alone.

The difference between estimated energy expenditure requirements (EER) and actual intake does not show a statistically significant relationship with underweight status (p = 0.271). Among underweight children, 27.7% have higher EER, while 34.9% have lower EER, and similar distributions are observed in non- underweight children. This suggests that while energy intake plays a role in weight status, other factors, such as dietary quality and metabolism, may also be contributing factors.

Personal hygiene, however, shows a significant association with underweight status (p = 0.010). A higher proportion of underweight children (21.3%) maintain high hygiene levels compared to only 8.5% among non-underweight children. Conversely, moderate hygiene levels are more common among non-underweight children (91.5%) than underweight children (78.7%). This finding is somewhat unexpected and may indicate that children with better hygiene awareness still struggle with malnutrition, possibly due to inadequate food intake rather than hygiene-related illnesses. Further analysis is needed to understand this relationship better.

Table 4: The relation between risk factors and nutritional status underweights among children

Variable		Nutritional status (underweight)		P value
		Yes	No	
Orphanage house Name	Alshoukani House	40(42.6%)	57(53.8%)	**0.113**
	Orphanage house	54(57.4%)	49(46.2%)	
Age	5-10	8(8.5%)	34(32.1%)	**0.000**
	11-15	86(91.5%)	72(67.9%)	
Orphan status	Only father	80(85.1%)	87(82.1%)	**0.838**
	Only Mother	4(4.3%)	5(4.7%)	
	None of them	10(10.6%)	14(13.2%)	
Reason of stay	Parents are not alive	3(3.2%)	8(7.5%)	**0.327**
	Poverty	89(94.7%)	97(91.5%)	
	Streets children	2(2.1%)	1(0.9%)	
Different between EER	Higher	26(27.7%)	68(72.3%)	**0.271**
	Lower	37(34.9%)	69(65.1%)	
Personal hygiene	High	20(21.3%)	9 (78.7%)	**0.010**
	Modrate	74(8.5%)	97(91.5%)	

4. Limitations of the Study

While this study provides valuable insights into the nutritional status of orphaned children in Sanaa, certain limitations should be considered when interpreting the findings.

Firstly, the study employs a cross-sectional design, which captures data at a single point in time. Consequently, it can identify associations between risk factors and malnutrition but cannot establish definitive cause-and-effect relationships.

For instance, the significant association found between personal hygiene and underweight status is a correlation, and causality cannot be inferred from this data alone.

Secondly, the findings may have limited generalizability. The research was conducted on a sample of 200 children from two specific orphanages in Sanaa, Yemen. Therefore, the results may not necessarily be representative of all orphaned children across Yemen or in other different settings.

Finally, the data collection relied in part on a structured questionnaire, which could be subject to recall bias, particularly in the assessment of dietary intake. There may also be other unmeasured confounding variables, such as the children's psychological well-being or specific aspects of the orphanage care environment, that could influence nutritional outcomes but were not assessed in this study.

5. Conclusion

In conclusion, the study examines the nutritional status of children in orphanages, focusing on the prevalence of stunting (37.5%) and underweight (47.0%). Personal hygiene was found to be statistically significantly associated with underweight status. However, factors such as the difference between energy requirements and intake, the reason for a child's stay in the orphanage, and parental loss did not show a significant impact on underweight prevalence. Age was identified as a significant factor influencing underweight status, but no significant association was found between the orphanage house and underweight status. Regarding stunting, personal hygiene, energy intake, parental loss, and the reason for staying in an orphanage were not significantly related to stunting prevalence. Age and orphanage house conditions were also not significantly associated with stunting. These results suggest that while personal hygiene and age play a role in underweight status, other factors may require further investigation to understand and address malnutrition in orphanages.

6. References

Al-Zangabila, K., Poudel Adhikari, S., Wang, Q., Sunil, T. S., Rozelle, S., & Zhou, H. (2021). Alarmingly high malnutrition in childhood and its associated factors: A study among children under 5 in Yemen. Medicine (Baltimore), 100(5), e24419. https://doi.org/10.1097/MD.0000000000024419

Alsebaeai, M., Al-Qubati, S., Isskandar, S., Juman, H., Alhalhali, S., Alosheeb, M., Al Badani, S., Al-duais, A. a., & Aklaan, S. (2025). The Prevalence Rate of Pica Disorder and its Nutritional and Non-nutritional Risk Factors among Pregnant Woman in Sana'a – Yemen. International Journal of Innovative Science and Research Technology, 10(3), 481-487. https://doi.org/10.38124/ijisrt/25mar207

Alsebaeai, M., Al-Rahabi, L., Al-Sarmy, N., & Taher, A. (2024). Relationship between Breakfast and Academic Grades of Medical Students College in Queen Arwa University, Yemen. Queen Arwa University Journal, 28(28), 1-13. https://doi.org/10.58963/qausrj.v28i28.30

Burbano, C., Bundy, D., Gelli, A., Grosh, M., Jukes, M., & Drake, L. (2009). Rethinking School Feeding. The World Bank. https://doi.org/10.1596/978-0-8213-7974-5

Dinachandra Singh, K., Alagarajan, M., & Ladusingh, L. (2015). What Explains Child Malnutrition of Indigenous People of Northeast India? PLoS One, 10(6), e0130567. https://doi.org/10.1371/journal.pone.0130567

Finlay, J. E., Fink, G., McCoy, D. C., Tavarez, L. C., Chai, J., Danaei, G., Ezzati, M., Fawzi, W., & Fawzi, M. C. (2016). Stunting risk of orphans by caregiver and living arrangement in low-income and middle-income countries. J Epidemiol Community Health, 70(8), 784-790. https://doi.org/10.1136/jech-2015-206346 *(10.1136/jech-2015-206346)*

Paul, V. K., & Bagga, A. (2013). Ghai essential pediatrics. CBS Publishers & Distributors Pvt Ltd.

Pelletier, D. L., Frongillo, E. A., Jr., & Habicht, J. P. (1993). Epidemiologic evidence for a potentiating effect of malnutrition on child mortality. Am J Public Health, 83(8), 1130-1133. https://doi.org/10.2105/ajph.83.8.1130

Rodriguez, L., Cervantes, E., & Ortiz, R. (2011). Malnutrition and gastrointestinal and respiratory infections in children: a public health problem. Int J Environ Res Public Health, 8(4), 1174-1205. https://doi.org/10.3390/ijerph8041174

Scrimshaw, N. S., & SanGiovanni, J. P. (1997). Synergism of nutrition, infection, and immunity: an overview. The American Journal of Clinical Nutrition, 66(2), 464S–477S-464S–477S. https://doi.org/10.1093/ajcn/66.2.464S

Sharada, R., Damayanthi, M. N., Vidya, B., & Manjunatha, S. (2014). Nutritional status of children residing in social welfare hostel in Bangalore City. https://search.bvsalud.org/gim/resource/pt/sea-159732

Uzogara, S. G. (2016). Underweight, the less discussed type of unhealthy weight and its implications: a review. American Journal of Food Science and Nutrition Research, 3(5), 126-142.

World, B. (2017). Prevalence of stunting, height for age (% of children under 5). https://data.worldbank.org/indicator/SH.STA.STNT.ZS

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