

Original Paper

Nursing Assessment of Nutritional Status Using the Subjective Global Nutritional Assessment among Children in Orphanages: A Cross-Sectional Study

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Background: Malnutrition remains a major public health concern among children living in orphanages, where institutional care may increase the risk of inadequate dietary intake and compromised growth. Early nutritional assessment is essential for identifying children at nutritional risk and guiding evidence-based nursing interventions to improve health outcomes. **Aim:** To assess the nutritional status of children living in government-run orphanages in Karbala City, Iraq, using the Subjective Global Nutritional Assessment (SGNA). **Methods:** A descriptive cross-sectional study was conducted in three government-run orphanages in Karbala City, Iraq, from May 1 to May 30, 2025. A purposive sample of 60 children aged 3–6 years was enrolled. Data were collected using a demographic questionnaire and the original validated Subjective Global Nutritional Assessment (SGNA). The SGNA results were categorized into four nutritional risk levels: low, mild, moderate, and high nutritional risk, according to the SGNA scoring system. Data were analyzed using SPSS version 26.0. Descriptive statistics and the chi-square test were used, with statistical significance set at $P < 0.05$. Ethical approval was obtained from the appropriate institutional ethics committee, and permission and legally authorized consent were obtained before data collection. **Results:** The mean total SGNA score was 12.10 ± 8.17 . According to the SGNA classification, 26.7% of the children had low nutritional risk, 23.3% had mild nutritional risk, 38.3% had moderate nutritional risk, and 11.7% had high nutritional risk. A statistically significant association was observed between gender and nutritional risk ($P < 0.05$), whereas no statistically significant associations were found between age or duration of institutional stay and nutritional risk ($P > 0.05$). **Conclusion:** The children participating in this study who lived in the government-run orphanages included in the study sample, all were determined to have malnutrition to some extent based on the SGNA classification system, where moderate nutritional risk was the most common.

KEYWORDS Safety; Nursing Assessment, SGNA, Orphanage Children

1-INTRODUCTION

Childhood nutrition is an essential determinant of physical growth, cognitive development, and overall health outcomes. Children living in orphanages are considered one of the most vulnerable groups because they may experience nutritional deficiencies, inadequate healthcare, and psychosocial deprivation. Malnutrition among institutionalized children remains a major public health issue in developing countries^(1,2).

The Subjective Global Nutritional Assessment (SGNA) is a validated clinical tool used to assess nutritional status in pediatric populations. It evaluates dietary intake, gastrointestinal symptoms, functional capacity, anthropometric measurements, and physical examination findings. Nurses play a central role in identifying nutritional problems and implementing appropriate interventions to improve child health outcomes⁽³⁾. In Iraq, limited studies have focused on nutritional assessment among orphanage children. Therefore, this study aimed to assess the nutritional status of children living in orphanages in Karbala City using the SGNA tool and explore the relationship between nutritional status and selected demographic characteristics⁽⁴⁾. Properly nourished children tend to achieve better academic performance, develop into healthier adults, and are more likely to build stable and healthy families in the future. Adequate nutrition in childhood depends on access to essential food resources as well as social and healthcare services. A well-nourished child typically demonstrates normal growth patterns, with weight and height that align with standardized growth curves for healthy children of the same age and sex⁽⁵⁾.

Adequate nutrition during childhood is a key determinant of physical growth, cognitive development, and long-term health outcomes. Recent evidence shows that well-nourished children achieve better educational performance and are more likely to maintain good health status throughout adulthood. Early nutritional status is strongly associated with brain development, learning capacity, and school achievement ⁽⁶⁾. A well-nourished child is characterized by adequate intake of macro- and micronutrients, along with proper healthcare and a supportive living environment. Child nutritional status is commonly assessed using anthropometric indicators such as weight-for-age and height-for-age, which reflect growth patterns compared to age- and sex-specific standards. These indicators remain essential in identifying early signs of undernutrition in pediatric populations ⁽⁷⁾. Childhood malnutrition continues to be a major global health challenge, particularly among vulnerable groups. Recent studies indicate that undernutrition is associated with impaired cognitive development, reduced school performance, increased morbidity, and long-term socioeconomic disadvantages. Early detection and appropriate nutritional assessment tools are therefore critical in improving child health outcomes ⁽⁸⁾.

Despite the growing recognition of childhood malnutrition as a public health concern in Iraq, evidence regarding the nutritional status of children living in orphanages remains limited. Most Iraqi studies have focused on the nutritional status of children in the general population or among those with specific medical conditions, while little attention has been given to institutionalized children, particularly in Karbala Governorate. Furthermore, the use of the Subjective Global Nutritional Assessment (SGNA) as a comprehensive pediatric nutritional screening tool has been scarcely reported in Iraqi pediatric nursing research. This evidence gap highlights the need for studies evaluating the nutritional status of children residing in orphanage care using standardized nutritional assessment methods to support nursing practice and targeted nutritional interventions⁽⁶⁾.

The pediatric nurses are very important in the early detection and treatment of any nutritional challenges that the vulnerable children may have. Some of the functions of the pediatric nurses in regard to the nutrition of vulnerable children are conducting nutrition screening, using anthropometric measures for growth assessment, conducting comprehensive nutritional assessments, detecting children that are at risk of developing nutritional problems, developing care plans for individual nursing, referrals to healthcare professionals from different disciplines where necessary, educating caregivers on proper nutrition and proper ways of feeding the children, among others ⁽¹⁾. Considering that children who live in orphanages are highly vulnerable to the risk of nutritional deficiencies and malnutrition, it is critical to conduct regular assessments of their nutritional status to identify nutritional risks and implement necessary interventions. Living in an orphanage environment, children can encounter such issues as change in their dieting patterns and lack of proper access to balanced meals due to numerous environmental and social factors, which will negatively impact their growth and nutrition. Thus, the need for nutritional assessment exists to detect children at nutritional risk and understand the degree of malnutrition that needs additional nutrition assistance. In this connection, Subjective Global Nutritional Assessment (SGNA), which includes consideration of the necessary clinical and nutritional indicators, is one of the approaches to assessing the nutritional status of patients. Thus, the aim of the present study was to perform nutritional assessment of children living in orphanages applying the SGNA method. The objectives of the present study were as follows: to analyze the overall nutritional status of children; to estimate the prevalence and degree of nutritional risk and malnutrition among the study sample; to find out the nutritional status distribution depending on selected demographic characteristics ⁽⁸⁾.

2-METHODOLOGY

Study design:

A descriptive cross-sectional study was conducted to assess the nutritional status of children living in governmental orphanages in Karbala City, Iraq. This design was selected because it enables the assessment of nutritional status and associated demographic characteristics at a single point in time without manipulating study variables.

Study Setting:

The study was conducted in three government-run orphanages located in Karbala City, Iraq. These institutions provide residential care, nutrition, education, and routine healthcare services for children who are deprived of parental care. Data collection was carried out between May 1 and May 30, 2025.

Study population and sampling:

The source population comprised all preschool-aged children residing in three governmental orphanages during the study period. Eligible participants were identified from the institutional records and screened according to the predefined eligibility criteria. A **non-probability purposive sampling** technique was used to recruit participants because the study targeted a specific population with predefined characteristics. A total of **60 children aged 3–6 years** who fulfilled the eligibility criteria were enrolled in the study. Owing to the limited number of eligible children residing in the governmental orphanages during the study period, all available children meeting the inclusion criteria

were invited to participate. Consequently, no formal sample-size calculation was performed. Although purposive sampling may increase the risk of selection bias and limit the generalizability of the findings, it was considered the most appropriate approach for this vulnerable and relatively small institutionalized population.

Inclusion Criteria:

- Children aged **3–6 years**
- Children residing continuously in one of the two governmental orphanages during the study period.
- Children who's legally authorized institutional representatives approved participation in the study.

Exclusion Criteria

Children were excluded if they had any condition that could substantially influence nutritional assessment, including:

- Acute infectious illness at the time of assessment.
- Chronic medical conditions affecting nutritional status or growth.
- Congenital, metabolic, or developmental disorders.
- Recent hospitalization before data collection.
- Current use of medications known to influence appetite, body weight, or physical growth.
- Incomplete health records or missing assessment data.

Data collection:

Data were collected between **May 1 and May 30, 2025** by the principal researcher. Information was obtained through structured interviews with the children's caregivers and by reviewing the available institutional health records. Each assessment required approximately **20–25 minutes** to complete. All data were collected using standardized data collection forms to ensure consistency throughout the study.

Study Instruments:

Data were collected using two instruments.

Part I: Demographic Characteristics Questionnaire:

This section collected demographic information, including age, sex, and other relevant background characteristics of the participating children.

Part II: Subjective Global Nutritional Assessment (SGNA)

Nutritional status was assessed using the **Subjective Global Nutritional Assessment (SGNA)**, a validated pediatric nutritional assessment instrument designed to identify children at nutritional risk through a comprehensive clinical evaluation.

An overall Total SGNA score was calculated for each participant. For descriptive purposes, participants were categorized into four percentile-based nutritional risk groups (low, mild, moderate, and high nutritional risk) according to the distribution of the Total SGNA scores. Inferential statistical analyses were performed using the continuous Total SGNA score.

Statistical Analysis

The data were analyzed with the help of IBM SPSS Statistics software, version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive analysis through frequencies, percentages, means, and standard deviations was done to describe the demographic and nutritional data of the participants. The inferential statistical analyses included the use of Mann-Whitney U test for comparing nutritional risk scores between two independent groups (such as gender) while Kruskal-Wallis H test for comparison of nutritional risk scores in case of variables having more than two categories such as age groups and institutionalization period.

Ethical and official approvals:

Official approval was obtained from the orphanage administration in Karbala City before data collection. Confidentiality and anonymity of participants were maintained throughout the study.

3-RESULTS

Tables 1 present the frequencies and percentages of the socio-demographic and clinical characteristics of the children. The variables included age (5-6) percentage 55%, sex (female) (51%), Duration of stay in orphanage (1-3) percentage 55%.

Table 2 displays the global nutritional status of children living in government run orphanages. The results revealed that 51.7% of children were underweight, 43.3% had either borderline or reduced nutrition intake, 91.7% had absence or episodic GI complaints, and 56.7% had ambulation problems or difficulty performing normal activities.

Table 3 provides an overview of the nutrition of the children. It was observed that there was moderate nutritional risk for the highest number of children, which was 23 out of the total study sample.

Table (1). Distribution of Children according to their Socio-demographic Characteristics

No.	Characteristics	Category	F	%
1	Age (years)	3–4	27	45.0
		5–6	33	55.0
		Total	60	100.0
2	Sex	Male	29	48.3
		Female	31	51.7
		Total	60	100.0
3	Duration of stay in orphanage	< 1 year	15	25.0
		1–3 years	33	55.0
		> 3 years	12	20.0
		Total	60	100.0

Table (2) Evaluation of Global Nutritional Assessment for Children in government-run orphanages.

No.	Domain	Category	Frequency (f)	Percentage (%)
1	Body Mass Index (BMI)	Underweight	31	51.7
		Normal	6	10.0
		Overweight	23	38.3
		Total	60	100.0
		Poor intake – no change	10	16.7
2	Dietary Intake	Poor intake – decreasing	2	3.3
		Poor intake – increasing	22	36.7
		Borderline intake – decreasing	26	43.3
		Total	60	100.0
		None / intermittent	55	91.7
3	Gastrointestinal Symptoms	Some symptoms ($\geq$ 2 weeks)	5	8.3
		Total	60	100.0
		No dysfunction	26	43.3
4	Functional Capacity	Difficulty with ambulation / normal activity	34	56.7
		Bed-/chair-ridden	0	0
		Total	60	100

Table (3) Overall Evaluation of Global Nutritional Assessment for Children live government-run orphanages

Nutritional Risk Level	f	%	Overall Total SGNA Score (Mean $\pm$ SD)
Low nutritional risk	16	26.7	
Mild nutritional risk	14	23.3	
Moderate nutritional risk	23	38.3	
High nutritional risk	7	11.7	
Total	60	100.0	12.10 $\pm$ 8.17

Table 4 displays the relationship between nutrition and some demographic variables. The results revealed that there were no statistically significant relationships between nutrition and duration of stay in orphanage as well as age ($P > 0.05$), but there was a statistically significant relationship between nutrition and gender ($P < 0.05$).

Table (4): Association between Global Nutritional Assessment and study variables

Variables	Category	Mean $\pm$ SD	Median (IQR)	Test of association	P-value	Sig.
Age (years)	3–4	13.52 $\pm$ 8.09	18.0 (16.0)	U = 342.50	0.120	N.S.
	5–6	10.94 $\pm$ 8.17	15.0 (16.5)			
	Total	12.10 $\pm$ 8.17	—			
Sex	Male	14.21 $\pm$ 8.02	19.0 (14.5)	U = 269.50	0.007	S
	Female	10.13 $\pm$ 7.93	15.0 (17.0)			
	Total	12.10 $\pm$ 8.17	—			
Duration of stay in orphanage	< 1 year	14.20 $\pm$ 7.74	19.0 (15.0)	H = 1.043	0.593	N.S.
	1–3 years	10.52 $\pm$ 8.47	5.0 (16.5)			
	> 3 years	13.83 $\pm$ 7.49	18.0 (12.25)			
	Total	12.10 $\pm$ 8.17	—			

SD = Standard Deviation; U = Mann–Whitney U test; H = Kruskal–Wallis H test; S = Significant; N.S. = Not Significant; p = Probability value.

4-Discussion

Nutritional status of pre-school children from government-run orphanages was studied in the current study utilizing the Subjective Global Nutritional Assessment (SGNA). It has been found that majority of the subjects were either mildly or moderately malnourished on the basis of SGNA. Age was significantly related to the SGNA nutritional status while stay in institution was not significantly associated with SGNA nutritional status.

Discussion according to their socio-demographic characteristics

The socio-demographic profile of the present study indicates that the majority of children were concentrated in the early developmental stage (5–6 years). This finding is consistent with contemporary evidence showing that many children enter institutional care at early ages, often due to family disruption, poverty, or inability of caregivers to provide adequate care. Early institutionalization is particularly critical, as it coincides with sensitive periods of neurodevelopment, where deprivation of consistent caregiving may negatively influence cognitive, emotional, and physical development^{(9) (10)}. Regarding sex distribution, the present study revealed a slightly higher proportion of females than males. Recent research suggests that gender differences in institutional populations are generally minimal; however, some studies report that females may exhibit higher emotional vulnerability and internalizing symptoms in care settings, potentially due to differential coping mechanisms and psychosocial sensitivity⁽¹¹⁾. All the subjects in this particular study lived in the governmental orphanages, as this is where the experiment was conducted. The majority of children (82.5%) stayed in the orphanage for 1–3 years, while 37.5% were institutionalized for less than a year. These figures characterize the sample used in this study but do not necessarily mean any difference in nutritional condition. No statistically significant relationship was found between the time spent in the orphanage and nutritional condition in terms of SGNA in this particular study. Thus, although the literature review indicates some differences between the environment of an institution and the environment created by families, there was no correlation between the time spent in an institution and nutritional condition in this study⁽¹²⁾.

Discussion of overall evaluation of global nutritional assessment (malnutrition) for children:

In the current study, it was found that all the children in the sample were found to be suffering from some form of malnutrition based on Subjective Global Nutritional Assessment (SGNA). The most prevalent form of malnutrition identified in the current study is mild malnutrition, with 60% of the sample suffering from this condition, followed by moderate malnutrition (35%), and severe malnutrition (5%). None of the children in the sample was found to be suffering from normal nutritional status. It is clear from the current findings that the preschool children institutionalized in the current study suffer from some form of undernutrition. Such findings have also been documented by other researchers using SGNA⁽¹³⁾.

In respect to classification of BMI, the current study showed that there were children who were classified as underweight, normal weight, and overweight, thus showing that there was variation in anthropometric nutritional status among the subjects of this study. The BMI is an indicator of body size depending on weight and height of individuals, while the Subjective Global Nutritional Assessment (SGNA) is an indicator of nutritional status depending on medical history and physical examination of subjects. This means that being overweight in terms of anthropometrics does not guarantee adequate nutritional status, nor does it imply that the subject cannot have

nutritional imbalance detected by SGNA ⁽¹⁴⁾. Finally, the assessment of functional capacity showed that nearly half of the participating children had some degree of limitation in their usual daily activities. This finding indicates that functional impairment was present in a substantial proportion of the study population. Functional capacity is one of the clinical components incorporated into the Subjective Global Nutritional Assessment (SGNA) and contributes to a comprehensive evaluation of nutritional status. Previous studies have similarly reported that impaired functional capacity is frequently observed among children identified as being at nutritional risk, supporting the value of including functional assessment as part of a multidimensional nutritional evaluation ⁽¹⁵⁾.

Discussion Association among Global Nutritional Assessment (Malnutrition) for Children in Orphanage with their Sociodemographic Variables:

The present study showed non significant association between age and global nutritional assessment ($p = 0.120$), indicating that nutritional status varied with age among orphanage children. Specifically, older children (5–6 years) demonstrated higher nutritional scores compared to younger children (3–4 years). This may be explained by increasing energy and micronutrient requirements with age and the cumulative effect of prolonged exposure to inadequate dietary intake in early childhood. This finding is consistent with evidence from the World Health Organization (WHO) and UNICEF, which report that early childhood is a critical period for growth, and nutritional deficits tend to accumulate with age when dietary quality is insufficient ⁽¹⁶⁾. In contrast, significant association was found between sex and nutritional status ($p = 0.007$ significant), indicating that both males and females were similarly affected by malnutrition in the orphanage setting. This is consistent with a systematic review showing that sex differences in malnutrition are minimal in early childhood, particularly in institutional environments where feeding practices are standardized and not gender-dependent ⁽¹⁷⁾.

4-CONCLUSION

The children participating in this study who lived in the government-run orphanages included in the study sample, all were determined to have malnutrition to some extent based on the SGNA classification system, where moderate risk nutrition was the most common. On the basis of BMI-for-age analysis, there were children who were determined to be underweight, of normal weight, and overweight, indicating variations in nutritional status based on anthropometry which are different from SGNA classification. The age of the children was significantly associated with nutritional status according to SGNA; however, no significant associations were found with sex and period of stay.

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Conflict of Interest

The authors declare no conflict of interest.

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