

# Journal of Pediatric Sciences

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Journal of Pediatric Sciences 2012;4(3):e136

### How to cite this article:

**Agarwal D, Hemamalini AJ. Usefulness of subjective global assessment tool in assessing the nutritional status of critically ill pediatrics. Journal of Pediatric Sciences. 2012;4(3):e136.**

## Usefulness of Subjective Global Assessment Tool in Assessing the Nutritional Status of Critically Ill Pediatrics

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### **Abstract:**

**Objectives:** To determine the incidence of malnutrition in pediatric patients admitted in a critical care unit and to evaluate the value of SGA as a nutrition assessment tool in this patient group.

**Patients and Method:** The study included 260 pediatric patients aged one month to 6 years who were admitted to the pediatric intensive care unit at Sri Ramachandra Hospital from January, 2010 to April, 2011. Weight of each patient was checked using a weighing pan/scale and evaluated using IAP Weight for Age criteria (W/A). Nutrition related history according to SGA protocol was taken from the care takers of each patient by a trained nutritionist. Data from the SGA history was summarized into one of three class groups; A-well nourished, B-moderately malnourished and C-severely malnourished.

**Results:** Overall, around 50.4% of our study subjects were well nourished, 34.5% were moderately malnourished and 16.1% were severely malnourished. SGA was able to identify malnourished subjects with 86.71% sensitivity and specificity of 86.36% when compared with IAP weight for age criteria.

**Conclusions:** SGA is a sensitive and specific nutrition assessment tool useful in pediatric patients admitted in a critical care unit. Application of the protocol as a complement of standard anthropometric tool can be considered.

**Keywords:** Malnutrition, Subjective Global Assessment, Critically ill Paediatrics, Nutritional assessment

Accepted: 14 April, 2012

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### **Introduction**

Malnutrition is a major problem in pediatric intensive care units therefore nutritional assessment has become an essential component of the hospitalized patients, to understand the preexisting and prognostic nutritional status of critically ill children. Nutrition assessment is a detailed evaluation and interpretation of multiple parameters and seeks to define the risk of developing nutrition-related

medical complications. It can also be used to monitor the course of nutritional therapy. It is a unique process in the pediatric intensive care unit in view of the metabolic changes of the underlying disease and also is the most important tool to avoid hospital undernutrition (1).

Nutritional assessment in the critically ill tends to be overlooked. Available parameters may be less sensitive in critically ill patients, given the combination of pre-existing

nutritional status, the severity of the acute episode along with concurrent therapies (e.g. fluid resuscitation) and possible underlying chronic diseases (2).

Essentially, there have not been any outstanding recent developments in nutritional assessment techniques. However, it appears that unavailability of any absolute gold standard for nutritional assessment has led to the development of disease specific and clinically relevant global type-assessment tools which are user-friendly and effective (3).

Subjective global assessment tool is one such method that quickly assesses the nutritional status based exclusively on a carefully performed medical history and physical examination and has been widely used to quickly assess the nutritional status of children and adults (4,5). In general, it is a reliable and a valid method to assess nutritional status in hospitalized patients. However, evidence regarding its usefulness in critically ill children is minimal. IAP weight for age criteria has been nationally accepted as a standard for assessing the nutritional status of children. However, in cases where there is fluid accumulation or the child is immobile, its use is limited. Therefore, the need to validate an assessment tool that will help in assessing the nutritional status of all critically ill children quickly and correctly is essential.

Based on the few documented studies regarding the usefulness of SGA in assessing the nutritional status we choose to adapt SGA to identify malnutrition among our study population and to evaluate the value of SGA as a nutrition assessment tool in this patient group.

## Material and Methods

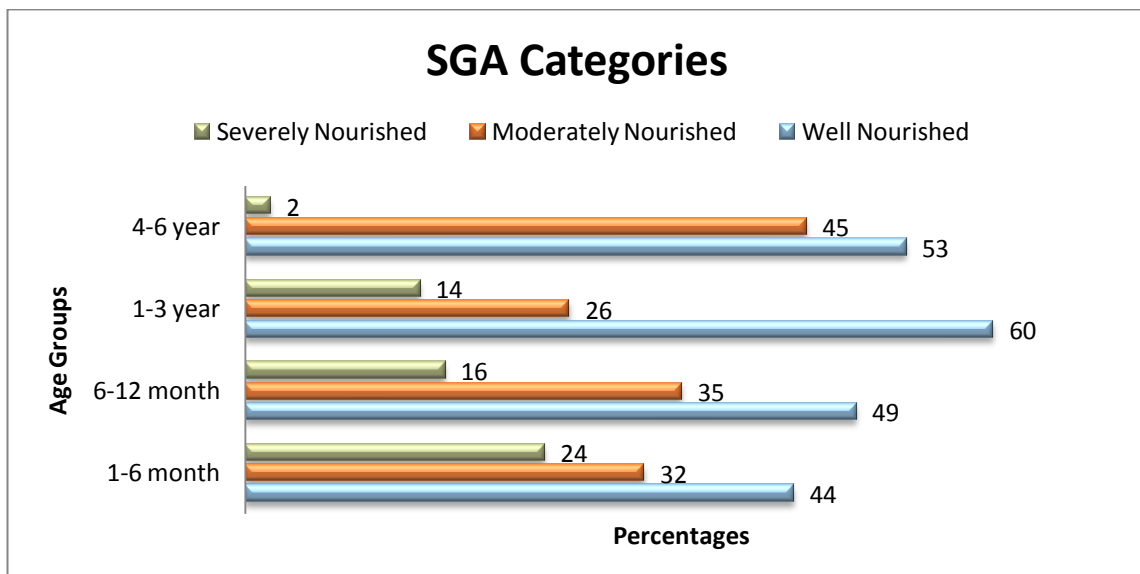
The study included 260 pediatric subjects aged one month to 6 years who were admitted to the pediatric intensive care unit at Sri Ramachandra Hospital from January, 2010 to April, 2011. Weight of each patient was checked using a weighing pan/scale and evaluated using IAP Weight for Age criteria (W/A). Nutrition related history according to SGA protocol was taken from the care takers of each patient by a trained nutritionist. Data from the SGA history was summarized into one of three class groups; A-well nourished, B-moderately malnourished and C-severely malnourished. The result of the SGA ratings were tested against IAP weight for age (W/A) criteria for protein energy malnutrition using SPSS version 17.1. Sensitivity and Specificity tests were used to analyze the data.

## RESULTS

Sixty two percent of the study subjects were less than one year of age and 38% were greater than one year of age. The mean age of the subjects was  $1.61 \pm 1.64$  years. Around 58% were boys and 42% were girls. One hundred and sixty eight (65%) of the cases were hospitalized with acute and 92 (35%) with chronic disease. Most of them (35%) were admitted with medical related problems such as failure to thrive, sepsis, acute gastroenteritis, pneumonia, protein energy malnutrition, dengue, malaria, jaundice, etc followed by respiratory illness (24%) and neurologic related diseases (20%).

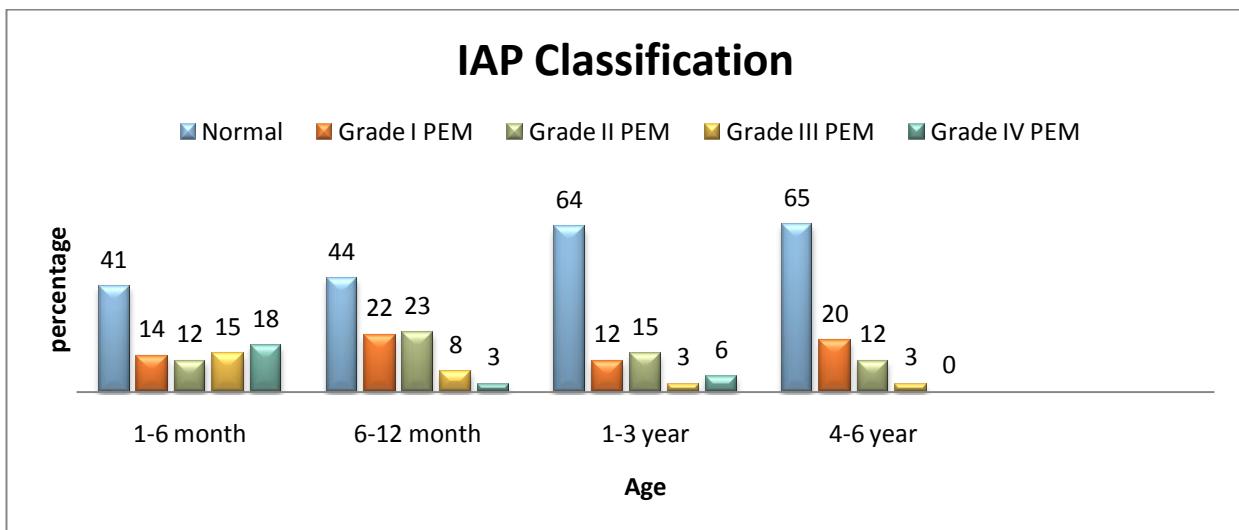
## NUTRITIONAL STATUS

Nutritional status as determined by SGA is presented in Figure 1.



It could be observed from the above figure 1 that 53% of subjects aged 1-6 months were well nourished, 45% of them were moderately malnourished and only two percentage of them were severely malnourished when classified according to SGA. Similar observation was seen in age groups 6-12 months, 1-3 year and 4-6 year wherein a large percentage (60%, 49% and 44%) respectively were well nourished, 26%, 35% and 32% were moderately malnourished and only a small percentage (14%, 16% and

24%) respectively were severely malnourished. Overall, around 50.4% of our study subjects were well nourished, 34.5% were moderately malnourished and 16.1% were severely malnourished. The results of our study were comparable with observations made in a study done by Secker D.J (2007), wherein a large percentage (49%) of their study population were well nourished, 36% of them were moderately malnourished and only 15% of them were severely malnourished.



In our study, among subjects in all three age groups, 41%, 44% and 64% were found to be normally nourished. Around 40-60% of subjects in each age group were in any one of the three stages of malnutrition. Most of them had either Grade I or Grade II PEM. However, in children aged 4-6 year 65% were normal and only 35% had malnutrition of which Grade I PEM was predominant.

Ferreira (2002), when evaluating weight for age of the patients, reported that 71.2% suffered from malnutrition at the moment of their hospitalization. A research done in Mexico purports that in 72.2% of 450 hospitalized patients, a varying degree of malnutrition was found (6). According to two studies done in different areas of Turkey, malnutrition rates varied between 55.1-56.6% (7,8). However, overall in our study population, 49.2% according to IAP criteria were underweight. These malnutrition rates are comparatively lesser to studies done among hospitalized children in different countries as mentioned above. Acute malnutrition prevalent in our study population is worth attention.

Sensitivity and Specificity of SGA against IAP weight for age (W/A) criteria used for assessing malnutrition in our study subjects is as presented in the following table 1.

**Table 1: Classification according to SGA vs IAP**

SGA	IAP	
	Malnourished	Well nourished
	Malnourished	111
Well nourished	17	114
<b>Sensitivity</b>		86.71%
<b>Specificity</b>		86.36%
<b>Positive Predictive Value</b>		86.05%
<b>Negative Predictive Value</b>		87.02%

Table 1 displays the ability of SGA to predict malnutrition among critically ill children. When compared with IAP weight for age (W/A) criteria for malnutrition, 114

(43.80%) of the subjects were correctly classified by SGA as being well nourished (true negatives) and 111 (42.70%) of the subjects were correctly classified as being malnourished (true positives). Around 17 (6.50%) of the subjects had the chances of being misclassified as being well nourished (false negatives) and 18 (6.90%) of the subjects had the chances of being misclassified as being malnourished (false positives).

SGA had a sensitivity of 86.71% and a specificity of 86.36%. The high sensitivity and specificity of SGA indicates that it is strongly able to predict nutritional status of critically ill children. The positive predictive value was 86.05% and the negative predictive value was 87.02%. The predictive accuracy depends upon sensitivity, specificity and the prevalence of malnutrition or disease (9).

Therefore, it is understood that either IAP weight for age (W/A) criteria for malnutrition or SGA are better predictors of malnutrition in critically ill children. Research indicates that the ideal nutrition assessment tool should be 100% specific and sensitive (10). However, in our study, SGA was able to identify malnourished subjects with 86.71% sensitivity and specificity of 86.36%. Overall it is inferred that SGA is a sensitive and specific nutritional assessment tool, useful in critically ill pediatrics. Application of this tool as a complement of standard anthropometric tool can be considered.

## DISCUSSION

The purpose of nutritional assessment in pediatric ICU patients differs from that in a well child clinic. An assessment in this group of patients is aimed to identify patients-at-risk of developing malnutrition-related complication and in cases for whom nutritional support may give benefit. Most pediatric clinical nutrition assessment tools are based mainly on anthropometry. However, malnutrition related complications in critically ill patients are usually associated with a change in functional status rather than body composition or physical growth. In certain instances, such functional reduction of the gastrointestinal tract does occur, but not severely enough or not long enough to put a patient out of the growth curve (5). Objective measures of nutritional status cannot take into account all of the variables that a clinician should consider to identify malnutrition. On the other hand, there may be cases who are out of the normal curve but may indeed be in a positive nitrogen balance, such as a premature baby who is catching up his weight or a child who is stunted because of genetic determination. These situations are areas in which cross-sectional anthropometry

is not specific, and nutritional assessment should not be based on a single measurement.

Subjective global assessment (SGA) is a nutritional assessment method that emphasizes the use of clinical data simply derived from careful history taking and the physical examination. It directs the clinician to piece together the nutritional components to make a complete picture; that is, Is this child short or thin? Is it by nature or because of inadequate intake? If intake is inadequate, what is the cause? Is there physical evidence of wasting to support the historical findings? Are losses of body mass affecting the child's ability to perform? Is the child's nutritional status and functioning worsening or beginning to improve? Is the child likely to continue to have problems? What needs to be treated? After completing the SGA and identifying the malnourished child, it can be determined whether the child's nutritional status is likely to improve or worsen, has established the potential cause or causes of malnutrition and identified where to target intervention (4). The SGA protocol has been proven by various authors to correlate with objective measurement and reproducible in adult and general pediatric patients (11,12). Using the history of appetite, weight change and change in functional capacity, a perspective picture of energy balance can be drawn. In our study, of twenty six patients with positive SGA malnutrition but negative W/A malnutrition criteria (IAP classification grades 2 or more), about 81% (21) of them had positive history of weight loss of >5%, moderate change in dietary intake for more than 2 weeks, presence of gastrointestinal complications but improving, moderate loss of strength and stamina, moderate stress, moderate loss of muscle mass. This indicates that standard anthropometry was less sensitive in these cases and SGA could fill the gap. Therefore, SGA tool can be adapted for use in this group of patients in complement to conventional anthropometric measurements.

## Conclusion

In conclusion, SGA is a valid method for assessing nutritional status of critically ill children. A practical problem which the authors encountered was the fact that patient history in the pediatric age group is usually secondary data, especially in small infants. Without parents with a patient, the quality of the data may not be reliable and the authors believe this is a limitation of SGA in pediatric patients.

## REFERENCES

- 1- Donald D. Hensrud. Nutrition screening and assessment. *Med Clin North Am* 1999; 83: 1525-46.
- 2- Laren M, Read WW. Classification of nutritional status in early childhood. *Lancet* 1972; 2:146-8.
- 3- Downs, Jane H, Haffejee, Aref. Nutritional assessment in the critically ill. *Curr Opin Clin Nutr Metab Care* 1998; 1: 275-279
- 4- Secker DJ, Jeejeebhoy KN. Subjective global nutritional assessment for children. *Am J Clin Nutr* 2007; 85:1083–1089
- 5- Rojratsirikul C, Sangkharkar S, Sakda P. Application of Subjective Global assessment as a screening tool for malnutrition in pediatric surgical patients. *J Med Assoc Thai* 2004, 87: 939-46.
- 6- Cortes RV, Nava-Flores G, Perez CC. Frecuenci de la desnutricion en ninos de un hospital pediatrico de tercer nivel. *Rev Mexicana Pediatr* 1995; 62: 131-3
- 7- Genel F, Alhan F, Bak M. Prevalence of anemia and malnutrition in hospitalized cases. *T Klin J Pediatr* 1997;6: 173-7.
- 8- Ozer N, Urganc N, Usta A. Determination of malnutrition in hospitalized children. *T Klin J Pediatr* 2001; 10: 133-8.
- 9- Gibson R.S. Principles of Nutritional Assessment. Oxford University Press. 1<sup>st</sup> Edition, 1990, 11-14.
- 10-Bauer J, S Capra, M Ferguson. Use of the scored patieny generated subjective global assessment as a nutrition assessment tool in patients with cancer. *Eur J Clin Nutr* 2002; 56: 779-785.
- 11-Baker JP, Detsky AS, Wesson DE. Nutritional assessment: a comparison of clinical judgement and operative measurements. *N Eng J Med* 1982; 306: 969-72.
- 12-Detsky AS, McLaughlin JR, Baker JP, Johnston N, Whittaker S, Mendelson RA, Jeejeebhoy KN. What is subjective global assessment of nutritional status? *JPEN J Parenter Enteral Nutr* 1987; 11: 8-13.