International Journal of Contemporary Pediatrics
Karnam PS et al. Int J Contemp Pediatr. 2025 Jul;12(7):1180-1187
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

Original Research Article

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20251872

Validity of screening tool for the assessment of malnutrition in paediatrics in detecting malnutrition among in-patient children aged below 12 years

Padmini S. Karnam[1]*, Garikipati Chandrika[2], Sathiyanarayanan Sathiyamoorthi[3]

[1]Department of Pediatrics, Dr. Pinnameneni Siddartha Institute of Medical Sciences and Research Foundation, Dr. NTR University of Health Sciences, Vijayawada, Andhra Pradesh, India
[2]Dr. Pinnameneni Siddartha Institute of Medical Sciences and Research Foundation, Dr. NTR University of Health Sciences, Vijayawada, Andhra Pradesh, India
[3]Department of Community and Family Medicine, All India Institute of Medical Sciences, Mangalagiri, Guntur, Andhra Pradesh, India

Received: 25 May 2025
Accepted: 13 June 2025

***Correspondence:**
Dr. Padmini S. Karnam,
E-mail: pkarnam14@gmail.com

ABSTRACT

Background: Screening tool for the assessment of malnutrition in pediatrics (STAMP) is a reliable screening tool for the identification of malnutrition risk. This study was done to assess the validity of STAMP in detecting malnutrition as compared to World Health Organization (WHO) 2006 and Indian Academy of Pediatrics (IAP) 2015 combined growth charts.
Methods: A cross-sectional study was conducted among inpatient children aged below 12 years. STAMP assessment yields a sum to calculate the overall risk of malnutrition, which is divided into three categories: 0 to 1, low risk; 2 to 3, medium risk; ≥4, high risk. In comparison to WHO growth criteria, STAMP's sensitivity, specificity, positive and negative predictive value were computed. The sensitivity and specificity of the STAMP tool was assessed using a receiver operating characteristic (ROC) curve. To identify risk factors for malnutrition, logistic regression analyses were conducted.
Results: Out of 63 children studied, 36 (57.1%) were male and 27 (42.9%) were female. The median [interquartile range] age was 3 years [1.5, 8.0]. Children who were categorized as medium or high risk as per STAMP tool had a higher likelihood of being underweight. Regression analysis found weight for age was the most important factor associated with the risk of malnutrition with p value 0.040. The sensitivity of STAMP in detecting underweight, stunting and wasting was 95.2%, 84.6% and 81.8% respectively using ROC analysis.
Conclusions: The nutritional risk scores by STAMP are feasible and can identify children at risk of malnutrition. Future studies in outpatient settings are required to confirm these results.

Keywords: STAMP, Malnutrition, Risk, Validity, Screening, Pediatrics

INTRODUCTION

Childhood malnutrition is associated with poorer somatic growth and development and reduced or delayed mental and psychomotor development.[1-3] Various forms of malnutrition, such as undernutrition, namely wasting, stunting, and under-weight, has been coined as the "silent emergency" by the United Nations Children's Fund (UNICEF).[4] The World Health Organization (WHO) defines malnutrition as excesses, imbalances, or shortages in an individual's energy or nutritional intake.[5] Being underweight (low weight for age), stunting (short for age), wasting (underweight for height), and nutritional deficits or inadequacies, such as a lack of vital vitamins and minerals, are all examples of undernutrition.[6]

In underdeveloped nations, malnutrition causes over 3.1 million child deaths each year.[7,8] Malnutrition is a leading cause of child deaths in India, accounting for over 70% of child deaths in 2021. The most recent National Family Health Survey-5 (NFHS) in India found that 32.1% of children under five are underweight, 19.3% are wasting, and 35.5% are stunted, indicating a considerable incidence of malnutrition.[9] Since malnourished children are linked to worse outcomes and higher healthcare expenses, it is clinically important to identify them as soon as possible.[10-12] Particularly, in lower and middle-income nations, anthropometric measurements can be regarded as the cornerstone of routine nutritional assessments in pediatric patients.[13] However, because they are quick, affordable, and verified, nutritional screening techniques are better when used widely.[14]

Numerous nutritional risk screening (NRS) techniques have been developed as a result of the need to detect children who are at elevated nutritional risk.[15] Though it can be challenging in real-world situations, it is essential to build screening tools that are particular to distinct specialties and have acceptable repeatability when utilized by different practitioners.[16] The goal of nutrition screening is to quickly and easily identify those who are malnourished or at risk of becoming so that the proper nutritional intervention can be started. The ideal nutrition screening tool is one that is reproducible and reliable in identifying people at risk of malnutrition, makes it easier to refer patients for the proper nutritional assessment, and can be completed by any member of the healthcare team without specialized nutrition training or knowledge.[17]

Screening tool for the assessment of malnutrition in pediatrics (STAMP) was developed in the United Kingdom in 2004 and assessed in 2007. Three factors - diagnosis, nutritional intake, weight, and height - are taken into consideration and the scores are categorized as low, medium, and high risk, in addition to recommending a care plan.[18] STAMP provides a reliable screening tool for the identification of malnutrition and malnutrition risk. Additionally, a rise in anthropometric measurements and the documenting of nutritional status after study implementation suggest that using STAMP in a primary health care clinic will boost clinicians' awareness of nutritional status.[19]

Growth charts are invaluable tools in the assessment of childhood nutrition and growth. Indian Academy of Pediatrics (IAP) produced and recommended IAP 2015 Growth charts for monitoring Indian children between the age of 5 to 18 years and recommended simplified WHO 2006 growth charts for monitoring of children under the age of five years. A combined WHO – IAP height and weight chart allows us to monitor growth from birth to 18 years on a single chart.[20]

There is a need to assess the validity of STAMP in detecting malnutrition as compared to WHO growth charts in developing countries to help and implement appropriate preventive measures to decrease their prevalence. Not only detecting malnutrition but also determining its related risk factors are crucial to manage childhood malnutrition. Since the risk factors are very complex, whereby biological, cultural and socio-economic factors are interrelated, in-depth research is required.[21] Thus, long-term growth faltering, impaired development and also poor health-related quality of life will be prevented, in the hospitalized children.

Objectives

Objectives of the study were to assess the validity of STAMP in detecting malnutrition as compared to WHO 2006 and IAP 2015 combined growth charts among inpatient children aged below 12 years of age; and to estimate the prevalence of malnutrition among inpatient children aged below 12 years in a tertiary care setting.

METHODS

Study design

It was a cross-sectional study.

Study period

The duration of the study was for six months (July to December 2024).

Study population

Inpatient children of both genders aged below 12 years of age in a tertiary care hospital were a part of the study population.

Inclusion criteria

Children of both genders aged <12 years of age who were admitted as in-patients in the hospital for both medical and surgical indications were included in the study after obtaining a written informed consent in their own understandable language.

Exclusion criteria

Children with persistent neuromuscular disorders and those suffering from acute gastroenteritis who were dehydrated were excluded from the study.

A pretested semi-structured questionnaire was used to collect basic demographic data including age, gender, address, educational qualification, occupation, socio-economic status (modified B.G. Prasad scale-2021), indications for admission, birth history and past medical history.

Anthropometric measurements

Height/length, and body weight were measured. A calibrated scale was used to measure weight to the closest 0.1 kg. An infantometer with a solid headboard and movable footboard was used to measure the length of newborns under one-year-old. Using a stadiometer, height was measured to the last completed 0.1 cm in children older than one year. The measurements were then plotted for each gender for ages 0–18 on the WHO 2006 and IAP 2015 combined growth charts. The reference for anthropometry was – weight for age: for children <5 years of age, <3rd percentile was considered as underweight and <0.1 percentile as severely underweight. Height for age: for children <5 years of age, <3rd percentile was considered as stunting and <0.1 percentile as severely stunted. For children aged >5 years of age, <3rd percentile was considered as stunting. Weight for height: for children aged <5 years, <3rd percentile was considered as wasting, <0.1 percentile as severe wasting, >2 standard deviation (SD) from mean as overweight and >3 SD from mean as obese; for children aged >5 years, <3rd percentile was considered as wasting, >23rd adult equivalent as overweight and >27th adult equivalent as obese.[22]

Applying screening tool for the assessment of malnutrition in pediatrics

STAMP consists of three parameters evaluating the medical condition, nutritional intake, and anthropometry of a child that yield a sum to calculate the overall risk of malnutrition, which is divided into three categories: 0 to 1, low risk; 2 to 3, medium risk; ≥4, high risk. Care plan will be developed for the child and repeat screening was done based on the risk category of the child.[18]

Sample size

Based on a previous study, the area under the curve (AUC) for STAMP was taken as 0.775 and expecting a true positive rate of 75%, with 80% power and 5% alpha error, the sample to be studied is 59 children using riskcalc sample size software.[23]

Statistical analysis

The statistical analysis was performed by statistical package for the social sciences (SPSS) 11.5 package program. Descriptive data including prevalence rates were expressed as frequencies and proportions. Descriptive data was presented in median and interquartile range. To investigate the relationship between categorical variables, the chi-square test was employed. In comparison to WHO growth criteria, STAMP's sensitivity, specificity, positive predictive value, and negative predictive value were computed. The sensitivity and specificity of the STAMP tool have been assessed using a ROC curve. To identify risk factors for malnutrition, univariate and multivariate logistic regression analyses were conducted. A p value of <0.05 was considered for statistical significance.

RESULTS

Sociodemographic characteristics and profile

A total of 63 children were included in the present study. Out of which, 36 (57.1%) were male and 27 (42.9%) were female. The median [IQR] age of the study participants was 3 years [1.5, 8.0]. According to modified Kuppuswamy classification, 35 children (55.6%) belonged to upper lower; 22 children (34.9%) belonged to lower middle and 6 children (9.5%) belonged to upper middle-class family. About 35 (55.6%) children were given medical treatment and 28 (44.4%) children were given surgical intervention as a part of their treatment. Cleft palate was the most common illness with nine (14.30%) children, followed by broncho pneumonia in eight (12.70%) children, cleft lip and cleft palate in seven (11.12%) children, viral fever in six (9.52%) children, dengue fever and febrile seizures in four (6.34%) children each. Three (4.76%) children were admitted for organophosphorus poisoning, two (3.16%) children for accidents and iron deficiency anemia. Also, one child (1.59%) each were admitted for the following conditions - meningitis, urinary tract infection, congenital hydrocele, cryptorchidism, hypospadias, acute pharyngitis, status epilepticus, type-1 diabetes mellitus, upper respiratory tract infection, Pott’s spine, thalassemia, cleft alveolus and chronic kidney disease.

Anthropometry assessment

The nutritional status of all study children was assessed using the combined WHO 2006 and IAP 2015 growth chart. Based on anthropometry, 21 children (33.3%) are underweight, 26 children (41.3%) are stunted, and 11 children (17.5%) are wasted. Of all forms of malnutrition, stunting is more prevalent followed by underweight and wasting (Figure 1). Association between risk factors of malnutrition and nutritional status of children were analyzed using Chi square test. Calorie and protein deficiency means children with at least 10% deficient of recommended dietary intake. Upper middle and middle class were considered as one group and lower middle were considered as one group for the purpose of analysis of associations. Among the risk factors, age group <5 years (p=0.001), dietary calorie deficiency (p=0.007) and dietary protein deficiency (p=0.012) were statistically significant with underweight and stunting while only dietary protein deficiency (p=0.053) was statistically significant with wasting (Table 1).

STAMP tool assessment

All children were also assessed with STAMP tool, which categorized risk of malnutrition three categories -0 to 1, low risk; 2 to 3, medium risk; ≥4, high risk based on the scores. Medium and high risk were considered as one group for association analysis as compared to low-risk category. Analyzing the association between risk factors for malnutrition and STAMP categories using chi square test revealed that risk factors like age group, gender, treatment intervention, socioeconomic status, dietary calorie deficiency and dietary protein deficiency were not significant. Similar analysis against nutritional status of children with STAMP revealed that a significant association was found between the weight for age and the risk of malnutrition as determined by the STAMP (p value=0.005). This suggests that children who were categorized as medium or high risk as per STAMP tool had a higher likelihood of being underweight (Table 2).

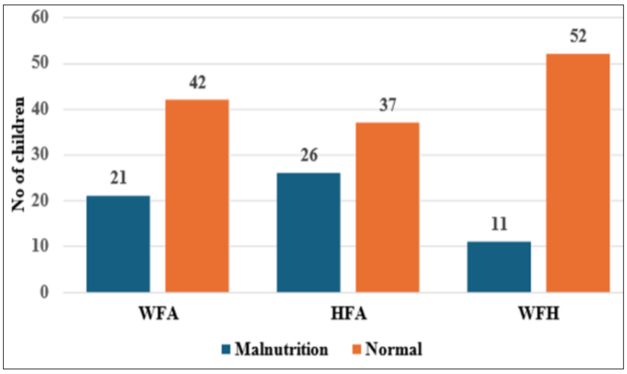


Figure 1: Malnutrition profile of study participants based on anthropometry (n=63).

WFA - weight for age; HFA - height for age; WFH - weight for height

Regression analysis

Univariate and multivariate logistic regression analyses were performed to detect different risk factors for malnutrition using STAMP. The univariate logistic regression analysis revealed that weight-for-age, weight-for-height, and height-for-age were associated with the risk of malnutrition according to STAMP, with p values 0.019*, 0.09, 0.474, respectively. In addition, the multivariate logistic regression analysis demonstrated that weight for age was the most important factor associated with the risk of malnutrition according to STAMP with p value 0.040* (Table 3).

ROC analysis

In this study, anthropometric measurements were used as the gold standard for assessing malnutrition. Consequently, the results of the STAMP tool, divided into low- and medium-high-risk groups to determine sensitivity and specificity, were compared to anthropometric measurements for predicting malnutrition risk. The gold standard was determined using a ROC curve for the risk of malnutrition by applying the STAMP on nutritional status of children with an AUC of 0.694, 0.631 and 0.548 for weight for age, height for age and weight for height respectively (Figures 2-4).

When it comes to predicting underweight, STAMP has a 57.1% accuracy rate, a 94.1% negative predictive value (NPV), a 43.5% positive predictive value (PPV), a 95.2% sensitivity, and a 38.1% specificity. In terms of predicting stunting, STAMP has 84.6% sensitivity, 35.1% specificity, 47.8% PPV, 76.5% NPV, and 55.5% accuracy. When it comes to predicting wasting, STAMP has an accuracy of 38%, a sensitivity of 81.8%, a specificity of 28.8%, a PPV of 19.6%, and an NPV of 88.2% (Table 4).

Table 1: Association between risk factors and nutritional status (n=63).

Variables	Underweight, n (%)	P value	Stunting, n (%)	P value	Wasting, n (%)	P value
Age group (years)						
≤5	19 (48.7)	0.001*	22 (56.4)	0.002*	07 (17.9)	0.896
>5	02 (8.3)		04 (16.7)		04 (16.7)	
Gender						
Male	12 (33.3)	1.000	15 (41.7)	0.941	07 (19.4)	0.632
Female	09 (33.3)		11 (40.7)		04 (14.8)	
Treatment intervention						
Medical	10 (28.5)	0.370	11 (31.4)	0.076	06 (17.1)	0.941
Surgical	11 (39.3)		15 (53.6)		05 (17.9)	
Socio economic status						
Lower	15 (42.9)	0.073	15 (42.9)	0.775	07 (20.0)	0.553
Upper and middle	06 (21.4)		11 (39.3)		04 (14.3)	
Diet calorie deficiency						
Yes	17 (47.2)	0.007*	19 (52.8)	0.032*	09 (25.0)	0.069
No	04 (14.8)		07 (25.9)		02 (7.4)	
Diet protein deficiency						
Yes	20 (41.7)	0.012*	24 (50.0)	0.012*	11 (22.9)	0.053*
No	01 (6.7)		02 (13.3)		0 (0.0)	(Fisher exact)

*Statistically significant using Chi square test

Table 2: Association between risk of malnutrition and STAMP risk categories (n=63).

Variables	Weight for age			Height for age			Weight for height		
	Underweig-ht, n (%)	Normal, n (%)	P value	Stunting, n (%)	Normal, n (%)	P value	Wasting, n (%)	Normal, n (%)	P value
STAMP									
>Low risk	01 (5.9)	16 (94.1)	0.005*	04 (23.5)	13 (76.5)	0.082	02 (11.8)	15 (88.2)	0.712 (Fisher exact)
>Medium or high risk	20 (43.5)	26 (56.5)		22 (47.8)	24 (52.2)		09 (19.6)	37 (80.4)	

*Statistically significant using Chi square test

Table 3: Univariate and multivariate logistic regression for anthropometric measures affecting risk of malnutrition using STAMP.

Variables	Univariate				Multivariate			
	P value	Odd's ratio	95% CI		P value	Odd's ratio	95% CI	
			Lower	Upper			Lower	Upper
STAMP								
WFA	0.019*	12.30	1.503	100.779	0.040*	11.815	1.117	124.989
HFA	0.09	2.979	0.844	10.515	0.464	1.683	0.418	6.776
WFH	0.474	1.824	0.352	9.456	0.747	0.710	0.088	5.714

*Statistically significant; WFA - weight for age; HFA - height for age; WFH - weight for height

Table 4: ROC curve for risk of malnutrition using STAMP on anthropometry indices as gold standard.

Parameters	AUC	TP (%)	TN (%)	FP (%)	FN (%)	Sensitiv-ity (%)	Specific-ity (%)	PPV (%)	NPV (%)	Accuracy (%)
STAMP										
Underweight	0.694	20	16	26	01	95.2	38.1	43.5	94.1	57.1
Stunting	0.631	22	13	24	04	84.6	35.1	47.8	76.5	55.5
Wasting	0.548	09	15	37	02	81.8	28.8	19.6	88.2	38.0

AUC – Area under the curve; TP – true positive; TN – true negative; FP – false positive; FN – false negative; PPV – positive predictive value; NPV – negative predictive value

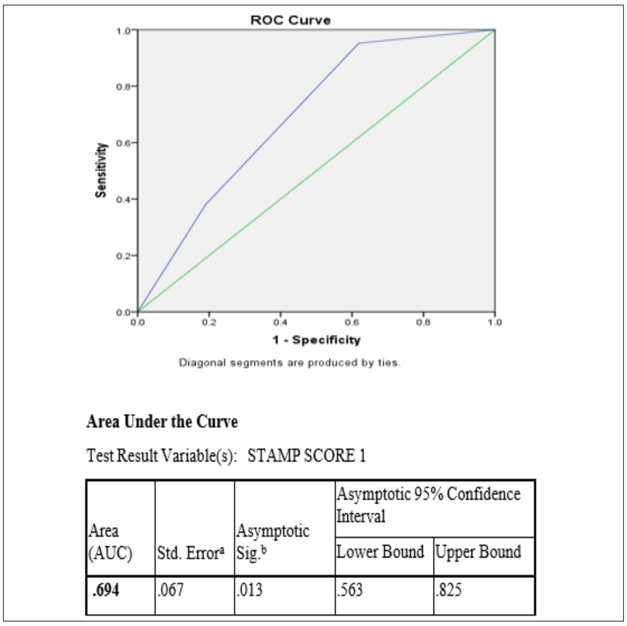


Figure 2: ROC curve for risk of malnutrition using STAMP on anthropometry as gold standard (weight for age).

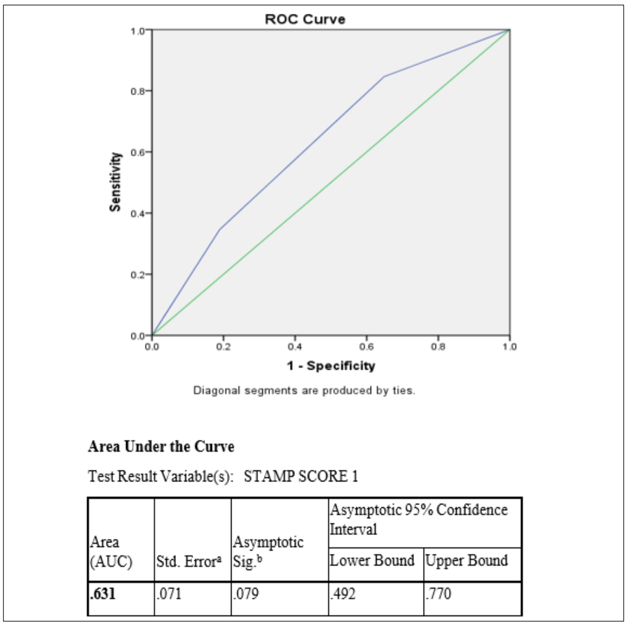
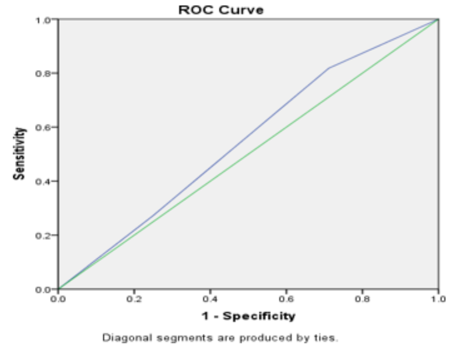


Figure 3: ROC curve for risk of malnutrition using STAMP on anthropometry as gold standard (height for age).



Area Under the Curve

Test Result Variable(s): STAMP SCORE 1

Area (AUC)	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
.548	.092	.619	.368	.728

Figure 4: ROC curve for risk of malnutrition using STAMP on anthropometry as gold standard (weight for height).

DISCUSSION

The study included 63 children below 12 years of age. Out of which, 39 (61.9%) children were below five years, and 24 (38.1%) children were above five years. The median [interquartile range] age of the study children was 3 years [1.5, 8.0]. Pérez-Solís et al studied children ranging from one month to sixteen years, with a median age of 4.1 years.[24] In another study done among children between two to five years, with a mean±SD of 3.50±0.95 years.[25] In a similar study done among children <12 years in Egypt reported the median age as 68.5 months (5.7 years).[23] There were more male children overall in our sample than female children. Our ratio was 1.34:1, with 36 males (57.1%) and 27 females (42.9%). Wong et al in their study had 39.4% females and 60.6% males.26 In contrast to our study, Sayed et al in their study had 54.1% were girls, and 45.9% were boys.[23]

In our study, according to treatment intervention, among the admitted in-patients, 35 (55.6%) children were admitted for medical indications whereas 28 (44.4%) children for surgical indications. In a similar study done in Spain, the reasons for admission were as follows: surgical in 22 cases (27.2%), infectious in 33 cases (40.7%), and other causes in 26 instances (32.1%).[24]

Based on anthropometry, 33.3% were underweight, 41.3% were stunted and 17.5% were wasted in the present study. Our study results are comparable to other studies with little variations. A similar study found 19.1% underweight, 21.5% stunting among their study participants.[27] Shaimaa Sayed et al revealed that 1.7% were underweight, 35% were stunted and 10.2% were wasted in their study, while another study had reported 11.8% as stunted and 2.9% as underweight.[23,25] According to reports, 7.3% of 1,217 preschoolers in Alexandria were underweight and 15% of them were stunted as reported by El-Sayed et al.[34] According to a 2014 Egyptian demographic and health survey, the percentages of children under five who were stunted, wasting, or underweight were 21%, 8%, and 6%, respectively.[29]

Using STAMP, the present study identified 17 (27%) children as low risk, 46 (73%) children as moderate/ high risk. In a similar way, Wong et al. identified 30 (58.8%) of the 51 individuals who underwent screening as nutritionally "at risk" (STAMP ≥2) and 12 (23.5%) as "high risk" (STAMP ≥4).[26] Of the 135 individuals tested by STAMP, 17.7% were found to be nutritionally at risk (STAMP ≥2) and 25.1% to be at high risk (STAMP ≥4), according to another study.[25]

McCarthy et al in their study done in England found 14% of 238 children between the ages of two and 17 years were found to be at nutritional risk (STAMP ≥2), and 18% had a score of 4 or above, indicating high risk.[18] In the study done by Oztürk et al, STAMP revealed that 24.3% of the patients were high risk and 40.5% of the patients were at medium risk.[30]

The study analyzed dietary deficits and their correlation with STAMP and malnutrition. Underweight children make up 41.7% of those with protein deficiencies and 47.2% of those with calorie deficiencies. 50% of children with protein deficiencies and 52.8% of children with calorie deficiencies were stunted. 22.9% of children with a protein shortage and 25% of children with calorie deficiency were wasted. Based on STAMP screening, among children in moderate and high-risk category, 80.6% had calorie deficiencies and 77.1% of children had protein deficiencies.

The sensitivity and specificity were ascertained using the ROC curves. Most of the studies have reported ROC curve analysis for the risk of malnutrition by STAMP on weight for height (an indicator of chronic malnutrition or wasting). In our study, STAMP has a sensitivity of 81.8%, specificity of 28.8%, positive predictive value of 19.6%, negative predictive value of 88.2%, and accuracy of 38% when compared to the gold standard of utilizing weight for height. According to the study by Sayed et al, the STAMP has an accuracy of 80.6%, a specificity of 81.4%, and a sensitivity of 73.5% for predicting wasting.[23] A study by Tuokkola et al found that the STAMP has 100% sensitivity and 69% specificity.[31] In their work, Oztürk et al demonstrated that the sensitivity of STAMP in chronic malnutrition is 82%.[30] More significant agreement was obtained with STAMP, which had a sensitivity of 76.19% and a specificity of 82.05%.[19] Sensitivity and specificity were assessed at 70% (51–84%) and 91% (86–94%), respectively, in the study conducted by McCarthy et al.[18] According to Wong et al, STAMP had an 83.3% sensitivity and a 66.7% specificity.[26]

Though overall the findings of the present study are comparable to similar validation studies across the world, varied sample size, time difference, environmental changes, regional variances and other differences may all have contributed to the slight variability in the results.

CONCLUSION

The sensitivity of STAMP in detecting underweight, stunting and wasting was 95.2%, 84.6% and 81.8% respectively. The use of nutritional screening tools like STAMP to evaluate the nutritional status of children is valuable and recommended as a simple, as it requires no training and no dietary expertise to apply, rapid, and inexpensive method for the early identification of malnutrition risk in pediatric inpatients. The nutritional risk scores by STAMP are feasible and can identify children at risk of malnutrition. Future studies in outpatient settings are required to confirm these results.

ACKNOWLEDGEMENTS

The authors would like to thank the children and their parents/guardians who agreed to participate in this study. They also thank the ward staff, and the hospital for their cooperation and support.

Funding: Dr. NTR University of Health Sciences, Andhra Pradesh, under Student Research Scholarship category
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Brotherton A, Simmonds N, Stroud M. Malnutrition Matters: Meeting Quality Standards in Nutritional Care. Redditch: BAPEN. 2010.
2. World Health Organization (WHO). WHO child growth standards and the identification of severe acute malnutrition in infants and children: A Joint Statement by the World Health Organization and the United Nations Children's Fund. 2009. Available at: http://www.who.int/nutrition/publications/severemalnutrition/9789241598163_eng.pdf. Accessed on 07 May 2024.
3. Pelletier DL, Frongillo Jr EA, Habicht JP. Epidemiological evidence for a potentiating effect of malnutrition on child mortality. Am J Public Health. 1993;83:1130-3.
4. Bellamy C. The state of the World's Children – Focus on Nutrition. UNICEF, New York. Oxford University Press. 1998;9.
5. World Health Organization. Malnutrition: key facts. 2021. Available at: https://www.who.int/news-room/questions-and-answers/item/malnutrition#:~:text=Malnutrition%20affects%20people%20in%20every,some%20150%20million%20are%20stunted. Accessed on 12 March 2025.
6. Maleta K. Undernutrition. Malawi Med J. 2006;18(4):189-205.
7. Yirga AA, Mwambi HG, Ayele DG, Melesse SF. Factors affecting child malnutrition in Ethiopia. Afr Health Sci. 2019;19(2):1897-909.
8. Masoud M, Elsary A. Nutritional survey among under five children at Tamyia district in Fayoum, Egypt. Int J Community Med Public Health. 2017;9:4.
9. National Family Health Survey India (NFHS-5). (2022). Available at: http://rchiips.org/nfhs/index.shtml. Accessed on 14 March 2025.
10. National Institute for Health and Clinical Excellence (NICE). Guidance on the prevention, identification, assessment and management of overweight and obesity in adults and children. NICE: London. 2006.
11. National Institute for Health and Clinical Excellence (NICE). Nutrition support in adults: Oral nutrition support, enteral tube feeding and parenteral nutrition. NICE: London. 2006.
12. Department of Health. Better Hospital Food Catering Services for Children and Young adults. NHS Estate. Department of Health: London. 2003. Available at: http://www.bapen.org.uk/pdfs/bhfi/bhfi_catering.pdf. 2003. Accessed on 25 February 2025.
13. Mansi Y, Ghaffar SA, Sayed S, El-Karaksy H. The effect of nutritional status on outcome of hospitalization in pediatric liver disease patients. J Clin Diagn Res. 2016;10:SC01-5.
14. Reber E, Gomes F, Vasiloglou MF, Schuetz P, Stanga Z. Nutritional Risk Screening and Assessment. J Clin Med. 2019;8:1065.
15. Huysentruyt K, Alliet P, Muyshont L, Rossignol R, Devreker T, Bontems P et al. The STRONG (kids) nutritional screening tool in hospitalized children: a validation study. Nutr Burbank Los Angel Cty Calif. 2013;29(11-12):1356-61.
16. Lee YJ. Nutritional Screening Tools among Hospitalized Children: from Past and to Present. Pediatr Gastroenterol Hepatol Nutr. 2018;21(2):79-85.
17. Baer MT, Harris AB. Pediatric nutrition assessment: identifying children at risk. J Am Diet Assoc. 1997;97(10): S107-15.
18. McCarthy H, Dixon M, Crabtree I, Eaton-Evans MJ, McNulty H. The development and evaluation of the Screening Tool for the Assessment of Malnutrition in Paediatrics (STAMP©) for use by healthcare staff. J Hum Nutr Diet Off J Br Diet Assoc. 2012;25(4):311-8.
19. Rub G, Marderfeld L, Poraz I, Hartman C, Amsel S, Rosenbaum I, et al. Validation of a Nutritional Screening Tool for Ambulatory Use in Pediatrics. J Pediatr Gastroenterol Nutr. 2016;62(5):771-5.
20. Parekh BJ, Khadilkar V. Paediatrician friendly IAP Growth Charts for 0-18 years. Indian Academy of Pediatrics. Available at: https://iapindia.org/pdf/4422_Pediatrician-friendly-growth-charts-for-0-18-year-old-Indian-children. Accessed on 25 February 2025.

21. Hoq M, Ali M, Islam A, Banerjee C. Risk factors of acute malnutrition among children aged 6-59 months enrolled in a community-based programme in Kurigram, Bangladesh: a mixed-method matched case-control study. J Health Popul Nutr. 2019;38(1):1-7.
22. Prasad HK, Khadilkar V. Growth Charts and Monitoring. Indian J Pract Pediatr. 2017;19(4):319-26.
23. Sayed S, El-Shabrawi MH, Abdelmonaem E, El Koofy N, Tarek S. Value of Nutritional Screening Tools Versus Anthropometric Measurements in Evaluating Nutritional Status of Children in a Low/Middle-Income Country. Pediatr Gastroenterol Hepatol Nutr. 2023;26(4):213-23.
24. Pérez-Solís D, Larrea-Tamayo E, Menéndez-Arias C, Molinos-Norniella C, Bueno-Pardo S, Jiménez-Treviño S, et al. Assessment of Two Nutritional Screening Tools in Hospitalized Children. Nutrients. 2020;12(5):1221.
25. Nassar MF, Mohamed A, Heba E, Ahmed KA. Nutritional Screening for 2-5 Years Old Children in Urban and Rural Outpatient Settings. Med J Cairo Univ. 2020;88(September):1767-75.
26. Wong S, Graham A, Hirani SP, Grimble G, Forbes A. Validation of the Screening Tool for the Assessment of Malnutrition in Paediatrics (STAMP) in patients with spinal cord injuries (SCIs). Spinal Cord. 2013;51(5):424-9.
27. Barros TA, Cruvel JMDS, Silva BM, Pires BRF, Dos Santos AGMA, Barroso MPRS, et al. Agreement between nutritional risk screening tools and anthropometry in hospitalized pediatric patients. Clin Nutr ESPEN. 2022;47:227-32.
28. El-Sayed N, Mohamed AG, Nofal L, Mahfouz A, Zeid HA. Malnutrition among school children in Alexandria. J Health Popul Nutr. 2001;19(4):275-80.
29. El-Zanaty and Associates. Ministry of Health and Population Cairo. Egypt demographic and health survey 2014. 2015. Available at: https://dhsprogram.com/pubs/pdf/fr302/fr302.pdf. Accessed on 09 April 2025.
30. Elif Öztürk M, Yabancı Ayhan N. Evaluation of malnutrition and screening tools in hospitalized children. Clin Nutr ESPEN. 2023;57:770-8.
31. Tuokkola J, Hilpi J, Kolho KL, Merras-Salmio L. Nutritional risk screening-a cross-sectional study in a tertiary pediatric hospital. J Health Popul Nutr. 2019;38:8.

Cite this article as: Karnam PS, Chandrika G, Sathiyamoorthi S. Validity of screening tool for the assessment of malnutrition in paediatrics in detecting malnutrition among in-patient children aged below 12 years. Int J Contemp Pediatr 2025;12:1180-7.