Supplementary material, Various nutritional screening tools used in pediatric patients

1. Screening Tool for the Assessment of Malnutrition in Paediatrics (Supplementary Table 1)

Each of the 3 aspects (diagnosis, nutritional intake, and weight and height changes) measured has scores 0-3 depending on the severity or applicability of the factors.

The total score determines the overall risk of malnutrition as follows: high risk (score ≥ 4), medium risk (2–3), and low risk (0 to 1). Then, a care plan is formulated based on the child's overall risk score. Patients falling into the high-risk category should be hospitalized for parenteral nutrition and therapeutic interventions and monitored by a clinical dietician. A more critical evaluation, e.g., Paediatric Yorkhill Malnutrition Score (PYMS), may be performed in these patients. Medium-risk patients should be monitored for diet and weight for 3 days, after which the Screening Tool for the Assessment of Malnutrition in Paediatrics (STAMP) examination is repeated, and necessary amendments in the care plan should be made. For low-risk patients, STAMP should be repeated once weekly.[31,32]

2. Paediatric Yorkhill Malnutrition Score

PYMS consists of 4 steps. Firstly, the child's body mass index (BMI) is compared with the standard growth chart, i.e. UK 1990 growth chart. If the recorded BMI is less than the standard value, the score assigned is 2, and 0 if both BMIs match. Secondly, weight loss is measured. If the child has lost weight, then the score assigned is 1 (judged by poor weight gain, loose previously fit clothes, and unintentional weight loss). The third aspect is dietary intake for the last week. If the child has not eaten, then the score is 2; if appetite has decreased/ not able to eat due to vomiting, diarrhea, etc., the score is 1; and 0 if the diet history is good. Lastly, the clinician judges if malnutrition will affect the disease outcome for at least one week. If yes, then score is 2 or else 1.[17]

Supplementary Table 1. Screening Tool for the Assessment of Malnutrition in Paediatrics

Diagnosis		Nutritional intake		Weight and height	
Does the child have a diagnosis that has any nutritional implications?	Score	What is the child's nutritional intake?	Score	Growth chart/centile quick reference tables must be referred to determine the child's measurements.	Score
Definitely	3	None	3	>3 centiles/columns apart	3
Possibly	2	Recently decreased/poor	2	>2 centiles/columns apart	1
No	0	No change/good	0	Similar centiles/columns	0

3. Screening Tool for Risk on Nutritional Status and Growth (Supplementary Table 2)

This tool has the following items: Item A, which has a nutritional risk screening questionnaire that consists of 4 items, each of them having 1–2 points.[19]

Further, Item B comprises the anthropometric measurements, where weight and height in supine/standing position will be recorded at the time of admission. Following this, the height-for-age (HFA) and weight-for-height (WFH) are measured. An standard deviation (SD) score of <2 for WFH is used to indicate acute malnutrition, and an SD score of <2 for HFA indicates chronic malnutrition.

4. Pediatric Nutrition Screening Tool

It consists of 4 questions regarding recent unintentional weight loss, poor weight gain over the last few months, less dietary intake in the past few weeks, and a subjective assessment by the healthcare worker about the child being underweight. The child is suffering from malnutrition if 2 or more questions can be answered with "yes."

5. Subjective Global Assessment and Subjective Global Nutritional Assessment

For an informative check, dietitians and nurses ask questions focusing on the following points:
• Dietary intake (type, volume, and frequency of liquid and solid feedings for infants and frequency of eating and a brief description of daily dietary intake for children; rating of appetite and recent changes, feeding or eating problems, or

Soni P, et al. Nutritional screening tools for hospitalized children

www.e-cep.org

diet restrictions)
- Frequency and duration of gastrointestinal symptoms (loss of appetite, vomiting, or diarrhea/constipation)
- Current functional capacity and recent changes (alertness, amount of energy or activity for infants and school attendance, ability to run and play games or sports with friends, and time sleeping for children

Anthropometric measurements were obtained for the following parameters: length or height, weight, percentage of ideal body weight for height, BMI for age, midarm circumference, triceps skinfold thickness, midarm muscle area, handgrip strength, concentrations of serum albumin, transferrin, hemoglobin, and total lymphocyte count. No rigid scoring system is assigned in Subjective Global Nutritional Assessment, and deduction needs expert judgement for this analysis.[25-27]

Supplementary Table 2. Screening Tool for Risk on Nutritional Status and Growth (STRONG[kids])

Question type	Description	Score
Subjective clinical assessment	Is the patient in a poor nutritional status, for example, diminished subcutaneous fat and/or muscle mass and/or hollow face?	1
High-risk disease	Is there any underlying illness with a risk of malnutrition or expected major surgery	2
Nutritional intake and losses	Is one of the following items present in the patient?	
	• Excessive diarrhea (5 times/day) and/or vomiting (>3 times/day) for the last few days	
	• Reduced food intake during the last few days before admission	
	• Preexisting dietetically advised nutritional intervention	
	• Inability to consume adequate food because of pain	1
Weight loss or poor weight gain?	Is there weight loss or no weight gain (in infants <1 year) during the last few weeks or months	1

6. Nutrition Evaluation Screening Tool

There are 4 screening questions. The first 2 questions are: Has the child lost weight? Or has diet decreased/appetite lost? If yes, then a score of 1 is assigned for each. The next 2 questions are more critical, hence scored 2 if the answer is positive: does the child have a critical diagnosis? And is the height/weight chart ≥ 2 SD apart from the ideal measurement? If the score is 0–1, it indicates low risk and a weekly check-up is recommended, between 2–3 indicates moderate risk, implying diet change and physician consultation, and scores 6–8 indicate high risk, where immediate hospital care is recommended.[35]

7. Pediatric Nutritional Risk Score

This tool considers anthropometric measurements, food intake, and ability to eat, ability to retain food due to vomiting and diarrhea, pain or other symptoms that interfere with food intake, and disease severity. The diet intake is measured by food intake, difficulty in retaining food (diarrhea and vomiting), pain, and the ability to eat. Food intake of the child was evaluated with certain criteria, like dysphagia and assisted feeding, or with factors that impeded food intake, such as dyspnoea and depression. The dietary change is noted if intake is < or >50% of the allowed diet. Retention problem is noted if episodes exceed the cutoff for >3 episodes/day for vomiting and >5 episodes/day for diarrhea. Pain was assessed by using age-appropriate methods. For infants, history is taken from parents and nursing staff regarding any pain-related symptoms like incessant crying, abnormal movement, or any other relevant signs of pain. For children aged >6 years, a visual analogue scale with ratings from 0 (no pain) to 100 (worst pain imaginable) was used. The cutoff point was a rating >40. Pathologic condition was classified as mild (grade 1), moderate (grade 2), or severe (grade 3). The American Academy of Pediatrics and the American Dietetic Association recommended that pathological classification be used as follows:
- Grade 1 conditions involved mild stress factors, e.g., admission for diagnostic procedures, minor infection not necessarily requiring hospitalization, other episodic illnesses, or minor surgery.
- Grade 2 conditions involved moderate stress factors, e.g., severe but not life-threatening infection, routine surgery, fracture, chronic illness without acute deterioration, or inflammatory bowel disease.
- Grade 3 conditions involved severe stress factors, e.g., acquired immune deficiency syndrome, malignancy, severe sepsis, major surgery, multiple injuries, acute deterioration of chronic disease, and major depression. Also, the weight on discharge or the lowest weight before discharge is measured and scored if it is less than the cutoff (>2 % of the ideal weight).[20,36]