

# Hospital malnutrition in children: what are the challenges?

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Hospital malnutrition can be regarded as a universal problem. It is highly prevalent in the young,<sup>1</sup> in acute<sup>2</sup> and chronic<sup>1</sup> disease conditions and in developed<sup>1</sup> as well as developing<sup>2</sup> countries. It is associated with many adverse outcomes, including prolonged ICU<sup>1</sup> and hospital length of stay,<sup>1,3,4,5</sup> prolonged ventilation days,<sup>1</sup> increased number of complications,<sup>1,3,4,5</sup> increased costs,<sup>3,5,6</sup> increased number of re-admissions,<sup>3</sup> and ultimately, increased mortality.<sup>1,6</sup>

The challenge in adult and paediatric patients alike is the early identification and appropriate treatment thereof. The first step in the diagnostic procedure is screening for at-risk patients. In the paediatric population, a number of screening tools have been validated and recommended for use. These include the Screening Tool for the Assessment of Malnutrition in Paediatrics (STAMP), Screening Tool for Risk Of impaired Nutritional Status and Growth (STRONG kids), Paediatric Nutritional Risk Score (PNRS), Subjective Global Nutritional Assessment (SGNA), Paediatric Yorkhill Malnutrition Score (PYMS) and Nutrition Risk Score (NRS).<sup>7</sup> Early identification of those at risk is essential to ensure appropriate and timely action is taken. Following identification of at-risk individuals, a proper nutrition status assessment should be performed to diagnose malnutrition.

Traditionally, malnutrition in paediatric populations was diagnosed based only on anthropometric criteria with low weight-for-age, length/height-for-age or weight-for-height parameters being used.<sup>8</sup> This practice has been challenged, since it did not take into consideration any potential causes and underlying diseases. This has led to the establishment of a working group by the American Society for Parenteral and Enteral Nutrition (ASPEN) to establish new diagnostic guidelines for the diagnosis of paediatric malnutrition.<sup>9</sup> The working group defined paediatric malnutrition as “an imbalance between nutrient requirement and intake, resulting in cumulative deficits of energy, protein, or micronutrients that may negatively affect growth, development and other relevant outcomes”.<sup>9,10,11</sup>

They proposed that the identification of malnourished individuals should be based on information gathered on the following 5 domains: anthropometric variables; assessment of growth; an indication of the duration of the malnutrition;

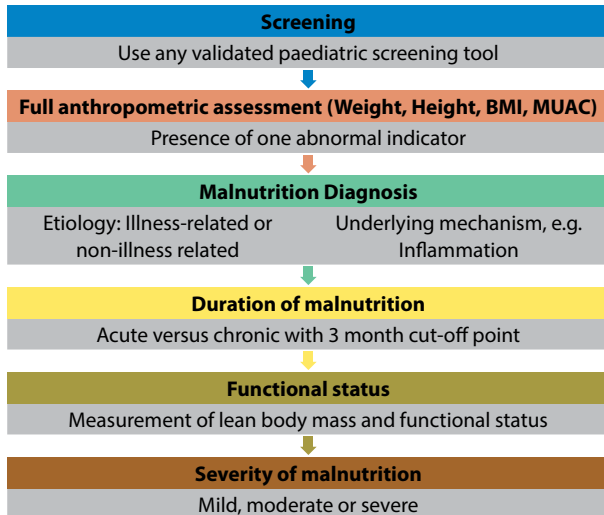
the aetiology of the malnutrition and lastly, an assessment of functional status.<sup>8,9,10</sup>

With the new proposed diagnostic criteria for malnutrition, the primary judgement is still based on the anthropometric assessment. Length/height-for-age, weight-for-height and BMI-for-age z-scores, as well as mid-upper arm circumference (MUAC) values are used to classify malnutrition into mild, moderate or severe. Even though more than one measurement can be assessed, the diagnosis is made on only one abnormal value and the severity index is based on the most severe indicator.<sup>9,10</sup> This is in contrast to adult malnutrition diagnostic criteria which requires two characteristics to be present.<sup>12</sup>

The diagnosis of malnutrition also takes into consideration duration<sup>8,9,10,11</sup> (acute malnutrition if less than 3 months and chronic if more than 3 months) and the presence of illness, which could assist with the aetiology of the malnutrition. With illness-related malnutrition, the malnutrition is normally secondary to a disease, which could influence nutritional requirements, decrease food intake, increase nutrient loss or alter utilisation. There is normally more than a single causative agent for the malnutrition. In the case of non-illness-related malnutrition, environmental or behavioural factors are normally present. The resulting malnutrition is usually secondary to inadequate dietary intake.<sup>8,9,10</sup> It is also suggested that the diagnostic criteria should consider indicators of inflammation (e.g. CRP), as well as measurements of functional outcome (e.g. muscle strength).<sup>9</sup>

The final diagnosis is then made according to whether a single measurement or repeated measurements are available for use. When information on a single data point is available, the diagnosis is made based on z-scores for height-for-age, weight-for-height, BMI-for-age or MUAC criteria. When data on more than two points is available, information on weight changes (gain or loss) as well as inadequate nutrient intake is used.<sup>10,11</sup>

The ASPEN diagnostic criteria were developed for use in developed countries.<sup>6,9</sup> The application thereof in developing, resource-limited countries needs to be investigated.



BMI: Body mass index; MUAC: Mid-upper arm circumference

**Figure 1:** Flow diagram to illustrate paediatric malnutrition diagnostic procedure (Adapted from <sup>10</sup>)

The article by Quadros et al. in this current issue adds to the relative paucity of data on malnutrition in a hospital environment and describes the prevalence of hospital-acquired malnutrition at Aga Khan University Hospital in Nairobi. Anthropometric assessments were performed on 170 children on admission and discharge from hospital. Based on a single data point (admission), 17.4% of children were malnourished according to weight-for-height (WFH) z-scores. Determining weight changes and using data from two data points (admission and discharge), it was found that 60.6% of children showed a decrease in WFH z-scores, or BMI z-scores during hospitalisation. This resulted in 22.9% of children being diagnosed as malnourished (based on weight-for-height (WFH) z-scores) at discharge. Malnutrition was more common in children aged 12–24 months and those with infectious diseases (gastroenteritis, gastritis and pneumonia), and was also significantly related to longer length of hospital stay. The authors stress the importance of implementing strict protocols to ensure that all children at risk for malnutrition should be identified with proper screening on admission to hospital. Appropriate nutrition support should then be implemented to prevent further hospital weight loss.

Quadros et al. did not use the ASPEN proposed diagnostic criteria, however, they did mention most of the characteristics needed for the diagnosis. The measurement of CRP or other parameters to indicate infection was not done, but since

malnutrition was reported to be more common in those with infectious diseases (based on disease diagnostic criteria), one can assume that the aetiology component was illness-related. The study would have added value had it included measurement of functional status.

Appropriate diagnosis of paediatric malnutrition, inclusive of a time-frame and factors indicating its aetiology, should assist with appropriate management in the short-term, but also with implementing preventive measures to address the problem in the longer-term.

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