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## Determining the prevalence of malnutrition in hospitalised paediatric patients

L V Marino, E Goddard, L Workman

**Aim.** To determine the prevalence of malnutrition in hospitalised paediatric patients at Red Cross War Memorial Children's Hospital.

**Method.** A 1-day cross-sectional survey was completed in all medical and surgical wards and some specialist outpatient clinics.

**Results.** A total of 227 children participated in the study. Thirty-five per cent of patients were moderately malnourished ( $\leq -2$  z-score), of whom 70% had no road to health card with them. Thirty-four per cent of children under 60 months of age received supplements in addition to a normal ward diet, 7.8% were enterally fed and less than 1% were parenterally fed. Almost 14% of children were found to be overweight/obese, which is higher than the national average of 6%. The

prevalence of HIV infection on the day of the audit was 18% across all age groups compared with the Western Cape antenatal prevalence of 15.7% (2005).

**Conclusion.** The overall prevalence of undernutrition was 34%, which is comparable with similar studies. However, the proportion of overweight children (14%) was greater than the national average. In view of the level of malnutrition seen, a nutrition risk-screening tool, identifying risk factors for malnutrition such as food access and vulnerability, should be developed. The tool should be used to assess nutrition status and risk during the course of hospitalisation, in addition to planning appropriate nutrition care plan interventions for discharge.

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Over the last 20 years studies focusing on malnutrition have helped to define the benefits of nutrition intervention. Malnutrition remains a widespread and largely unrecognised problem.<sup>1,2</sup>

Department of Dietetics, Red Cross War Memorial Children's Hospital, Rondebosch, Cape Town

L V Marino, MMedSci, RD

Department of Gastroenterology, Red Cross War Memorial Children's Hospital, Rondebosch, Cape Town

E Goddard, MSc Biochem, MB ChB, MMed (Paed), PhD

Institute of Infectious Disease and Molecular Medicine, University of Cape Town

L Workman, SRN

Corresponding author: L V Marino ([lmario@pgwc.gov.za](mailto:lmario@pgwc.gov.za))

Malnutrition may be defined as a nutrition disorder resulting from reduced nutrient intake or impaired metabolism. There is currently no 'gold standard' or single measure of malnutrition.<sup>3</sup>

Malnutrition impacts on the length of hospital stay (LOS), cost of stay, morbidity, mortality, infectious complications and quality of life, and deprives the patient of participating in usual family or social dynamics.<sup>4</sup>

Malnutrition is associated with children who are going through periods of rapid growth. Surveys of hospitalised patients in developed and developing countries have found a prevalence of 35 - 60% of patients nutritionally at risk with a further 25% of patients documented as having overnutrition.<sup>1,2,5</sup>

It has been argued by some that increased hospital stay may not be a result of malnutrition but rather underlying pathology.<sup>6</sup> Despite improvements in nutritional therapy, in



some hospitalised paediatric groups many of the strategies remain ineffective in dealing with malnutrition and/or identifying it timeously.<sup>7</sup>

Growth failure and malnutrition are commonly seen in children with HIV, and are recognised as poor prognostic factors for short-term survival in addition to being sensitive markers for disease progression.<sup>8</sup>

## Aim

The aim of this study was to determine the prevalence of malnutrition of children at Red Cross War Memorial Children's Hospital via a 1-day cross-sectional survey.

## Methods

The 1-day cross-sectional survey was undertaken in September 2005 at Red Cross War Memorial Children's Hospital. It included patients in all medical and surgical wards and in some specialist outpatient clinics. Ethical approval was obtained from the Ethics Committee, University of Cape Town.

Dietitians were responsible for collecting anthropometric, biochemical, clinical and dietary information using a standardised proforma.

## Results

Two hundred and twenty-seven children were surveyed, of whom 52% were male, and 44% ( $N = 90$ ) were less than 1 year of age. The LOS varied from < 24 hours to 295 days, with the overall average being 19.4 days (standard deviation (SD) 36.7).

Table I indicates a comparison between the prevalence of malnutrition in a survey completed in 1999 versus the current 2005 survey. Although the trends in respect of moderate to severe malnutrition with regard to height-for-age z-scores (HAZ) and weight-for-height z-scores (WHZ) are similar

(28% v. 34% (HAZ) and 19% (WHZ)), there is a trend towards increasing prevalence of malnutrition.

Eighty per cent (80%) of malnourished children ( $\leq -2$  z-scores) had an albumin level of < 35 g/l. No correlation could be found between haemoglobin (Hb) and malnutrition. On average those with an Hb of > 10 g/l had a WHZ of -1.6 z-scores.

Thirty-four per cent of children between the ages of 13 and 60 months received nutrition supplementation, 7.8% were enterally fed and < 1% were parenterally fed. According to the national surveillance figures from the Department of Health 7% of all infants are exclusively breastfed; the incidence of exclusive breastfeeding on the day of the audit was 12%.

Of particular interest is the double disease burden (Table I) evident among the population surveyed. While the national average for overweight/obesity  $\geq +2$  z-scores is 7.6%, the average of  $\geq +2$  z found among the participants at Red Cross War Memorial Children's Hospital was as high as 13.5%. The concern regarding this trend is the early rebound adiposity seen in the 13 - 60-month age group.

## Discussion

In order to promote good nutrition status it is essential to develop and implement nutrition guidelines and support algorithms to assist with early appropriate interventions, which should ideally be planned by a dietitian.<sup>6</sup> A nutrition risk-screening tool may determine the extent of malnutrition within a population and is associated with a decrease in LOS, morbidity and mortality and improved nutrition status.<sup>3,9</sup>

The results from this survey mirror findings by other centres with regard to malnutrition and LOS. However, limitations of the study should be noted, e.g. that it was only a 1-day sample, conducted during springtime. The overall prevalence of malnutrition in the population surveyed at Red Cross War

**Table I. Over- and undernutrition**

Prevalence of moderate malnutrition	< 12 months	13 - 60 months	> 60 months	1999 survey Waterlow criteria
> -2 z-scores				
WAZ	40% ( $N = 39$ )	27% ( $N = 17$ )	29% ( $N = 22$ )	
HAZ	33.5% ( $N = 35$ )	31% ( $N = 20$ )	31% ( $N = 19$ )	28%
WHZ	27% ( $N = 27$ )	21% ( $N = 13$ )	14% ( $N = 19$ )	19%
WHZ	> 7 days			
$\geq -2$ Z scores & LOS	$p = 0.0093$ (95% CI = 1.17 - 3.4)			
Overall	34%	32%	19%	
Prevalence of overweight/obesity				
$\geq +2$ z-scores	< 12 months	13 - 60 months	All ages	
WAZ	13.5% ( $N = 13$ )	11% ( $N = 7$ )	6.6% ( $N = 20$ )	
WHZ	9% ( $N = 7$ )	9.5% ( $N = 6$ )	7% ( $N = 16$ )	

WAZ = weight-for-age z-score; HAZ = height-for-age z-score; WHZ = weight-for-height z-score; LOS = length of hospital stay.



Memorial Children's Hospital was 34% (including weight for age). Twenty per cent (20%) were wasted (weight for height) and 34% were stunted (height for age), compared with the national average of 10% wasting and 22% stunting respectively.<sup>10</sup>

Despite an active dietetic department in addition to each ward having a dedicated dietitian, the prevalence of malnutrition is still unacceptably high, with no discernable improvement over the last 7 years. Confounding factors such as HIV/AIDS obviously play a role in the increasing disease burden. But can all findings be related to an increase in disease prevalence or are our strategies at treating malnutrition becoming less effective, especially as many of the HIV-infected children are receiving antiretrovirals?

The HIV prevalence rate on the day of the study was 18% among all age groups, compared with the Western Cape antenatal prevalence of 15.7% (2005).<sup>11</sup> While this figure may contribute to the prevalence of malnutrition seen among our population group, it does not entirely explain the continued high incidence recorded. This would suggest that other factors are contributing to the high prevalence of malnutrition, such as issues surrounding food security and vulnerability.

The Integrated Nutrition Programme has a targeted Nutrition Supplementation Programme (NSP) indicated for growth-faltering children. The programme is successful in providing nutrition products targeted at the individual for a period of 6 months. The NSP is currently unable to tackle issues around food security and vulnerability, so while disease-related malnutrition may be successfully treated in a few, malnutrition as a result of socio-economic causes is unlikely to result in successfully rehabilitated patients unless socio-economic issues are addressed.

The results from this survey also indicate the evidence of a double disease burden among the population surveyed. The national average for overweight/obesity  $\geq +2$  z-scores is 7.6%. The average found among the survey participants was as high as 13.5%. Most of this was seen in children under the age of 5 years indicating that they had experienced early rebound adiposity. Early rebound adiposity is associated with an

increased risk of chronic diseases of lifestyle later in life. While it is outside of the scope of this audit to link those patients to disease profiles, it raises the question regarding the practice of aggressive 'catch-up growth' past the age of 2 years and whether or not we should be recommending concurrent linear growth in addition to weight gain alone.<sup>12</sup>

To date effective ways of treating malnutrition in this patient population group have remained elusive. Perhaps it is time to question strategies around malnutrition and nutrition supplementation in relation to food security and vulnerability to accommodate a sustainable access to food in vulnerable households.

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