Introduction

The European Society for Clinical Nutrition and Metabolic Care defines malnutrition as ‘a state of nutrition in which a deficiency, excess or imbalance of energy, protein, and other nutrients causes measurable adverse effects on tissue, body form (shape, size and composition) and function as well as clinical outcome’. This definition emphasizes that malnutrition is a disease with adverse consequences on body composition and function, and not just a change of body shape or appearance ***(Lochs et al., 2006).***

Malnutrition in hospitalized children is a highly relevant pathologic condition and a risk factor for unfavourable outcome, prolonged hospital stay, delayed recovery and increased care costs. The reduction of dietary intake, together with the increase of energy requirements are the main causes of hospital undernutrition***(Bejon et al., 2008).*** The reported prevalence of acute malnutrition in infants and children admitted to hospitals from different countries ranges from 6.1 to 40.9% ***(Pawellek et al., 2008).*** In children with an underlying disease, higher prevalence of chronic malnutrition (44–64%) was reported in several studies ***(Joosten et al., 2010 & Salvatore et al., 2010).***

To prevent hospital-acquired malnutrition, the risk of nutritional depletion needs to be identified as soon as possible, best at admission, so that appropriate nutritional intervention can be initiated at an early stage. Routine nutritional screening is rarely carried out in pediatric patients because of the lack of a simple and properly validated nutritional screening tool. The current practice of identifying children at risk of malnutrition is heavily reliant on the interpretation of anthropometric data and clinical judgment, the reliability of which is dependent on pediatric nutrition knowledge of Pediatrician. Severe cases of malnutrition are relatively easily recognized; however, the identification of children with mild or moderate malnutrition or at risk of malnutrition, which is also very important, is not as easily achieved ***(Hartman et al., 2012).***

Anthropometric assessment using weight and height is generally considered to be a basic requirement of the admission process. However, in clinical practice, many limitations exist as lack of functioning, calibrated equipments, non standardizedtechniques and the poor recording of measurements, if done at all. The information that can be derived from single measurements is limited because growth rates differ between children and with the developmental stage. Thus, the use of anthropometric indices to define nutritional status and the risk of malnutrition in hospitalized children is

currently less than satisfactory. Further, from a clinical point of view, the availability of methods allowing a quick assessment of daily energy intake would be of utmost interest also in children ***(O'Connor et al., 2004).***

In order to improve nutritional care in pediatric hospitals, the European Society for Paediatric Gastroenterology, Hepatology and Nutrition Committee on Nutrition has recommended the establishment of nutrition support teams whose tasks should include among others 'identification of patients at risk of malnutrition, provision of adequate nutritional management, education and training of hospital staff and audit of practice' ***(ESPGHAN Committee on Nutrition, 2005).***Currently, there is no consensus to the best method of assessing nutritional risk of children admitted to the hospital.

Any pediatricnutrition screening tool for broad use should be rapid and easy to use by admitting staff without the need of involving qualified nutrition experts. The ideal screening tool should consist of a few easily obtainable data points, which might include both objective (anthropometry) and subjective (disease state/food intake/nutrition history) data ***(Hartman et al., 2012).***

Aim of the Work

The aim of this work is to evaluate the use of simple and useful nutrition screening tool for children to address the risk of malnutrition in hospitalized children.

Malnutrition

Proper nutrition is a powerful good: people who are well nourished are more likely to be healthy, productive and able to learn. Good nutrition benefits families, their communities and the world as a whole. Undernutrition is, by the same logic, devastating. It blunts the intellect, saps the productivity of everyone it touches and perpetuates poverty***(UNICEF, 2013).***

Poor nutrition severely hinders personal, social and national development. The problem is more obvious among the poor anddisadvantaged. The ultimate consequence is millions of severely malnourished children throughout the world. In developing countries, regrettably the death rate during treatment is as high as 30-50% in some hospitals. With appropriate treatment, this unacceptably high death rate can be reduced to less than 5%***(WHO, 2003).***

This disparity is not due to differences in the prevalence of severe cases of malnutrition, but it is rather the result of poor treatment practices. Where mortality is low, a set of basic principles has been followed. High case fatality rates and poor rates of weight gain result from a failure to appreciate that treatment has to be carried out in stages and that the

order in which problems are addressed is fundamental to effective care:

- Firstly, severe malnutrition represents a medical emergency with an urgent need to correct hypothermia, hypoglycemia and silent infection;

- Secondly, there is an impairment of the cellular machinery. Tissue function cannot be restored unless the machinery is repaired, which includes remedying multiple specific deficiencies. These may not be visible, and often are the consequence of multiple silent infections;

- Thirdly, tissue deficits and abnormal body composition are obvious, but cannot be safely corrected until the cellular machinery has been adequately repaired***(WHO, 2003).***

Definition

Malnutrition is defined as a state of nutrition in which deficiency or excess of energy, protein, and other nutrients causes measurable adverse effects on tissue and body form and function, and clinical outcome***(Joosten and Hulst, 2008).***

Malnutrition is technically a category of diseases that includes undernutrition, obesity, overweight and micronutrient deficiency among others***(WHO, 2012).***

Childhood malnutrition is a disease of relevance and importance to public health; it is directly linked to poverty***(Rocha et al., 2006).***

Malnutrition seen in hospitalized patients is often a combination of cachexia (disease-related) and malnutrition (inadequate consumption of nutrients) as opposed to malnutrition alone. The definition of malnutrition refers to the complex interplay between underlying disease, disease-related metabolic alterations and the reduced availability of nutrients (because of reduced intake, impaired absorption and/or increased losses or a combination of these)***(Muscaritoliet al., 2010).***

Clinically malnutrition affects about 20–50% of all medical and surgical patients admitted to hospitals depending on hospital setting, population, and the different definitions and criteria used for the diagnosis of malnutrition***(Pirlicha et al.,2006).***

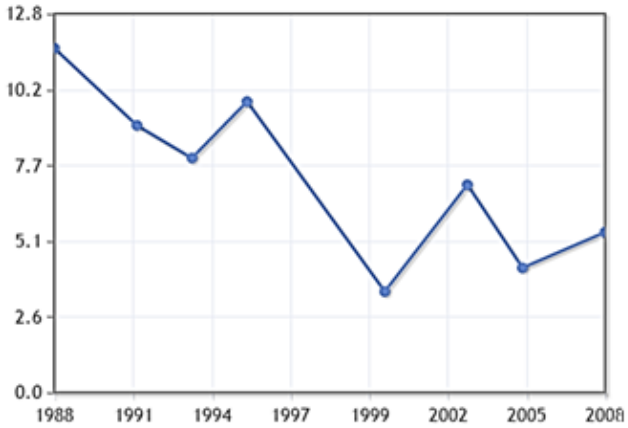
Prevalence of malnutrition

In 2012, an estimated 25 per cent of children under five years of age or 162 million children, which represents a 37 per cent decrease from an estimated 257 million in 1990. However, a new Lancet article on nutrition from 6 June 2013 shows that progress is not fast enough, so what is needed now is strong, global commitment and leadership to accelerate efforts ***(UNICEF, 2013).***

Egypt – Malnutrition prevalence

Malnutrition prevalence, weight for age, female (% of children under 5)

Malnutrition prevalence, weight for age, female (% of children under 5) in Egypt was 5.40 as of 2008. Its highest value over the past 20 years was 11.60 in 1988, while its lowest value was 3.40 in 2000.

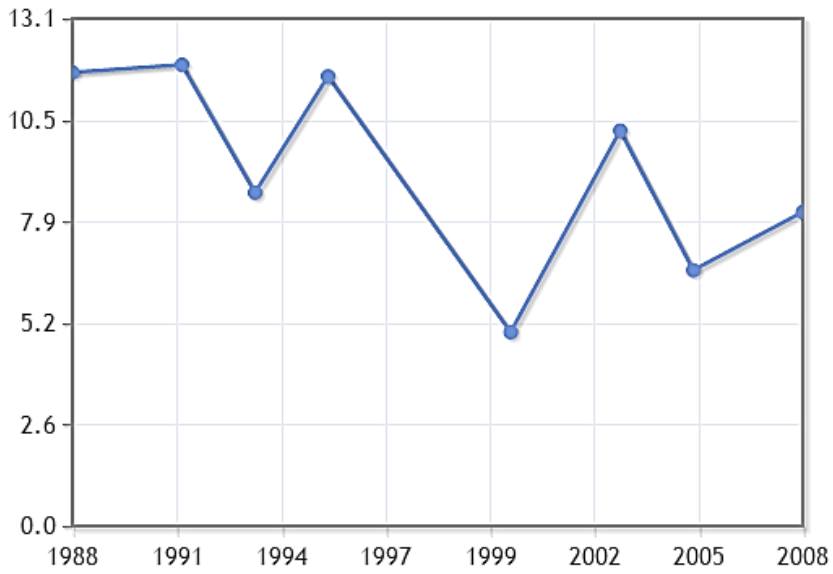


Year	1988	1991	1993	1995	2000	2003	2005	2008
Value	11.60	9.00	7.90	9.80	3.40	7.00	4.20	5.40

Figure (1): Malnutrition prevalence, weight for age, in females under the age of 5 years ***(WHO, 2010).***

Malnutrition prevalence, weight for age, male (% of children under 5)

It was 8.10 as of 2008. Its highest value over the past 20 years was 11.90 in 1991, while its lowest value was 5.00 in 2000.



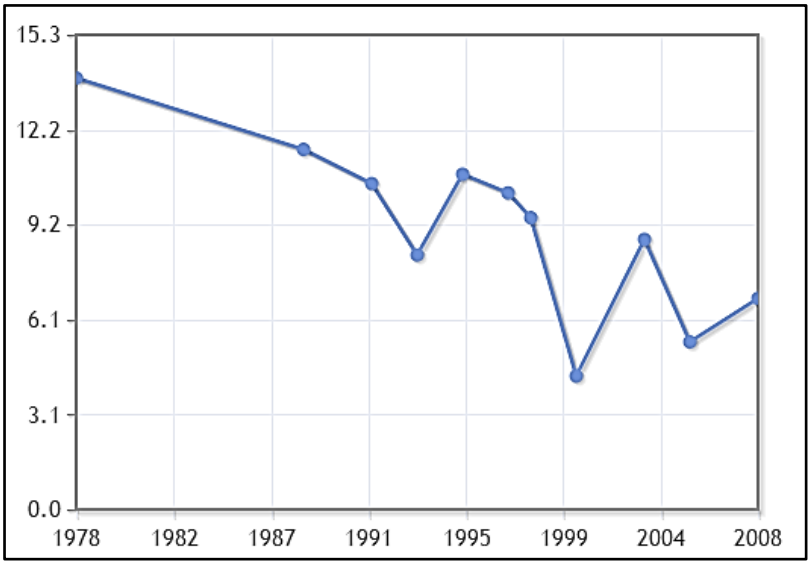
Year	1988	1991	1993	1995	2000	2003	2005	2008
Value	11.70	11.90	8.60	11.60	5.00	10.20	6.60	8.10

Figure (2): Malnutrition prevalence, weight for age, in males under the age of 5 years *(WHO, 2010).*

Malnutrition prevalence, weight for age (% of children under 5)

It was 6.80 as of 2008. Its highest value over the past 30 years was 13.90 in 1978, while its lowest value was 4.30 in 2000.

Aggregation is based on UNICEF/WHO Joint Global Malnutrition Analysis Date Set 2011, and additional analysis by UNICEF.

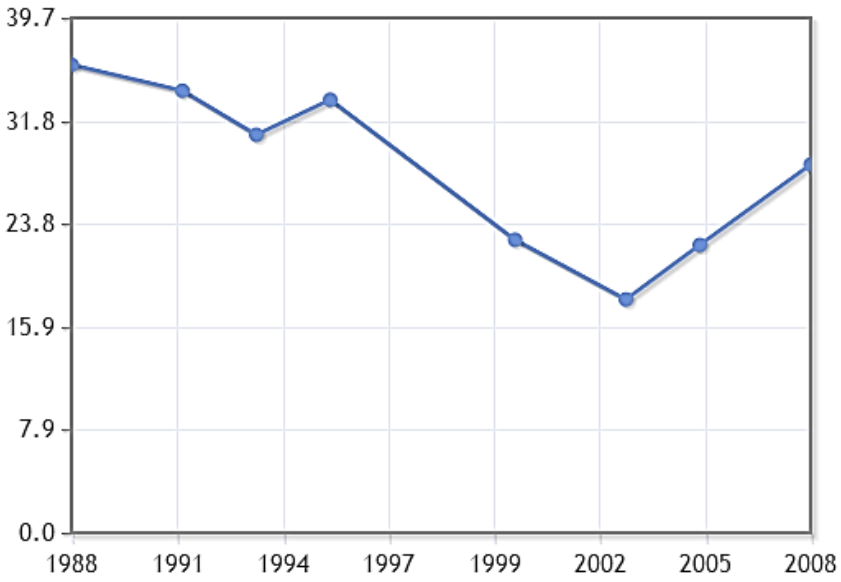


Year	1987	1988	1991	1993	1995	1999	2003	2005	2008
Value	13.90	11.60	10.50	8.20	10.80	9.40	8.70	5.40	6.80

Figure (3): Malnutrition prevalence, weight for age, in childrenunder the age of 5 years ***(WHO, 2010).***

Malnutrition prevalence, height for age, female (% of children under 5)

It was 28.40 as of 2008. Its highest value over the past 20 years was 36.10 in 1988, while its lowest value was 18.00 in 2003.

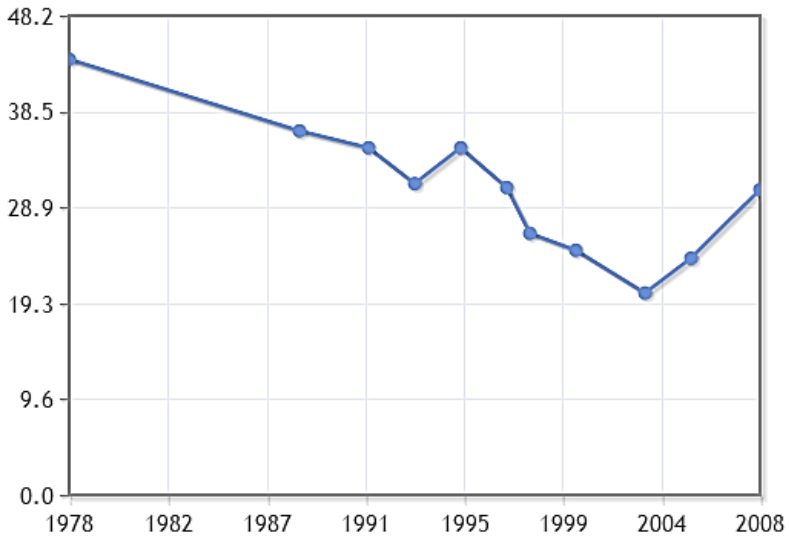


Year	1988	1991	1993	1995	2000	2003	2005	2008
Value	36.10	34.10	30.70	33.40	22.60	18.00	22.20	28.40

Figure(4): Malnutrition prevalence, height for age, in females under the age of 5 years ***(WHO, 2010).***

Malnutrition prevalence, height for age (% of children under 5)

It was 30.70 as of 2008. Its highest value over the past 30 years was 43.80 in 1978, while its lowest value was 20.30 in 2003.



Year	1978	1988	1991	1993	1995	1998	2000	2005	2008
Value	43.80	36.60	34.90	31.30	34.90	26.30	24.60	23.80	30.70

Figure (5): Malnutrition prevalence, height for age, in children under the age of 5 years *(WHO, 2010).*

Causes of Malnutrition

Malnutrition can develop as a consequence of deficiency in dietary intake, increased requirements associated with a disease state, from complications of an underlying illness such as poor absorption and excessive nutrient losses, or from a combination of these aforementioned factors as shown in figure ***(Barker et al., 2011).***

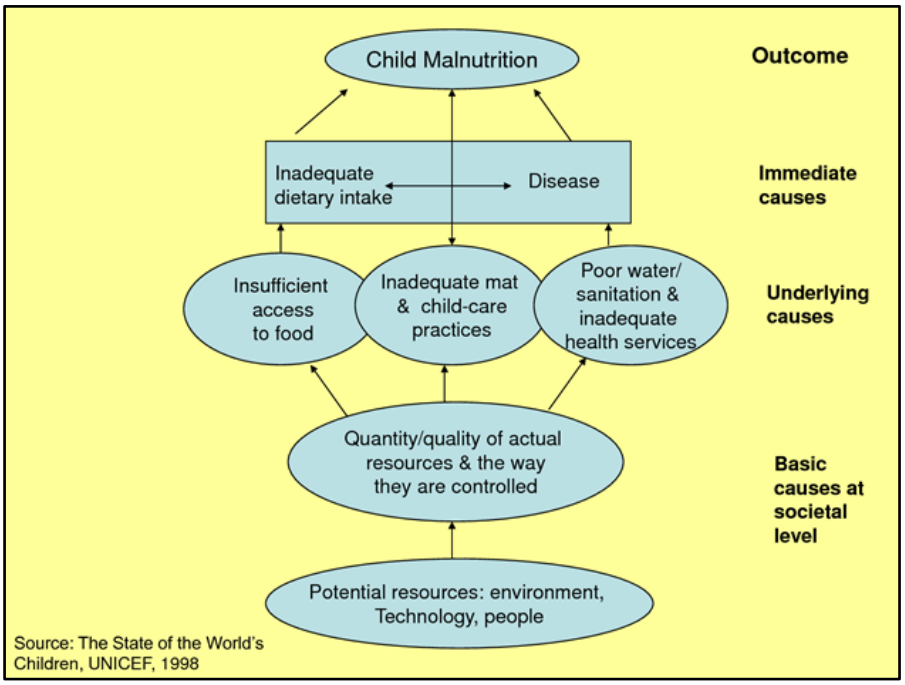


Figure (6): Causes of malnutrition ***(UNICEF, 1998)***

Inadequate food intake is the most common cause of malnutrition worldwide. In developing countries, inadequate food intake is secondary to insufficient or inappropriate food supplies or early cessation of breastfeeding. In some areas, cultural and religious food customs may play a role. Inadequate sanitation further endangers children by increasing the risk of infectious diseases that increase nutritional losses and alters metabolic demands***(Muller et al., 2005).***

In developed countries, inadequate food intake is a less common cause of malnutrition. Instead, diseases and, in particular, chronic illnesses play an important role in the etiology of malnutrition. Children with chronic illness are at risk for nutritional problems for several reasons, including the following:

- Children with chronic illnesses frequently have anorexia, which leads to inadequate food intake.
- Increased inflammatory burden and increased metabolic demands can increase caloric need.
- Any chronic illness that involves the liver or small bowel affects nutrition adversely by impairing digestive and absorptive functions***(Turkel, 2007).***

Chronic illnesses that commonly are associated with nutritional deficiencies include the following:

- Cystic fibrosis
- Chronic renal failure
- Childhood malignancies
- Congenital heart disease
- Neuromuscular diseases
- Chronic inflammatory bowel diseases

In addition, the following conditions place children at significant risk for the development of nutritional deficiencies:

- Prematurity
- Developmental Delay***(Turkel, 2007).***