



Italian pediatric nutrition survey



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ARTICLE INFO

Article history:

Received 4 October 2016

Accepted 8 May 2017

Keywords:

Malnutrition

Pediatrics

Nutritional support

Wasting

Stunting

SUMMARY

Introduction: the prevalence of malnutrition in children and its impact on clinical outcomes is under-recognized by clinicians in Italy as well as worldwide. A novel definition of pediatric malnutrition has been recently proposed by a working group of the Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.), based on the correlation between illness and the use of z-scores of anthropometric measurements.

Aim: to investigate the prevalence of malnutrition and related nutritional support among hospitalized children in Italy, in a nationwide survey performed in a single day (16/4/2015).

Methods: an open access website (<http://nday.biomed.net>) was used to collect data from 73 hospitals and 101 wards in 14 Italian regions (1994 patients). Anonymous information was collected on hospitals' characteristics, patient's anthropometry, admission diagnosis, presence of chronic diseases and use of nutritional support: oral nutritional supplements (ONS), enteral nutrition (EN) or parenteral nutrition (PN). Z-scores of anthropometric measurements, calculated with Epi Info 7.1.5, defined nutritional status: wasting was identified by BMI or Weight-for-Length z-score (<−1 mild, <−2 moderate, <−3 severe), stunting by Height-for-Age Z-score <−2. WHO 2006 and CDC 2000 growth charts were used respectively for children younger and older than 2 years old.

Results: 1790 complete records were obtained for hospitalized patients aged 0–20 years, with median age 6.16 (0.1–20 years and 53.3% males). 52.9% were aged 0–6 years and 58.8% of children suffered from chronic diseases. Wasting was detected in 28.7% of the total sample with higher occurrence observed in age ranges 0–6 and 14–20 years, while 17.3% of patients showed stunting; surprisingly almost 27% of them were aged 0–2. A ranking of the admission diagnosis with the highest rate of malnutrition was compiled. The prevalence of wasting was significantly ($p < 0.005$) higher amongst children with chronic diseases (34.1% vs. 27.1%); stunting prevalence tripled in patients with chronic disease (24.5% vs. 8.3%). Only 23.5% of malnourished children (17%, 25.6% and 36.7%, respectively mild, moderate and severe malnutrition) received nutritional support: 11.7% received oral nutrition supplements (ONS, modular or complete), 11.5% enteral nutrition (EN, 6.4% via nasogastric tube, 5.1% via gastrostomy) and 6.8% received parenteral nutrition (PN); in some patients a combination of two. Nutritional support is more commonly used among stunting patients, 39.5% of children under treatment.

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Conclusion: Malnutrition of any grade was observed in nearly 1/3 and stunting in 17% of the reported hospitalized children, and it is likely to be underrecognized as the nutritional support reached only a small part of the malnourished children.

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1. Introduction

Malnutrition (undernutrition) is defined as an imbalance between nutrient requirement and intake, resulting in cumulative deficits of energy, protein or micronutrients that may negatively affect growth in weight and height, development, and provoke ill health and retard recovery [1]. Compared to adults children are particularly susceptible to undernutrition due to their high energy need per unit of body mass, limited energy reserves and the additional demands for growth. The prevalence of acute malnutrition among hospitalized children is generally high although it can vary considerably (between 6.1% and 31.8%) due to the applied methodology and the analysis population [2]. Hospitalization often enhances illness-related malnutrition even in children with mild clinical conditions [3]. Furthermore, pediatric malnutrition may influence both short and long term health outcomes as children should be in a permanent positive energy balance (anabolic state) to maintain optimal growth and development [4].

Despite the wide evidence of the high prevalence and the adverse effects of illness-related malnutrition, this condition is probably underestimated. Even in chronically ill hospitalized pediatric patients the condition diagnosed only in a small percentage despite reports of prevalence rates ranging from 24% to 50% worldwide [5–10].

The lack of uniform definitions and failure to prioritize nutrition support as part of the patient care are some of the factors responsible for the underrecognition of malnutrition in hospitalized children and its impact on clinical outcomes. There are no reported epidemiological data on the extent and type of nutritional support among malnourished patients either globally or in relation to the severity of malnutrition.

New guidelines recommend the use of Z-scores in lieu of percentiles for anthropometric measurements. They allow the collection of homogenous data on prevalence derived from uniform diagnostic tools and compare malnutrition prevalence between clinical centers, development of thresholds for intervention and evidence-based analysis of the impact of malnutrition and its treatment on patient outcomes [1].

The purpose of this study was to assess the prevalence of malnutrition, its correlation with acute and chronic diseases and the related nutritional support provided to hospitalized children in Italy, in a nation-wide survey performed on a single day.

2. Patients and methods

The study was designed and coordinated by the Italian Society of Paediatric Gastroenterology and Nutrition (SIGENP) in a crowd-sourcing manner. An open access website (<http://nday.biomedica.net>) was specifically constructed to collect information on hospital characteristics (institution type, i.e. university or general hospital), location, number of beds; participants were recruited from general paediatrics and all medical pediatric specialties, pediatric surgery and pediatric onco-hematology wards. The Nutrition Survey of 16 April 2015 was advertised through the website. An e-mail was sent to all members of SIGENP and the Italian Society of

Paediatrics (SIP), in which participating centers were asked to join for the study and login with given credentials. Starting on 16 April and for the next 48 h the website was open to receive patient data.

Anonymous (each center supplied its own patient data without sharing identity with the coordinating authors) information was gathered on patient's sex, age, weight and length/height, admission diagnosis (Fig. 1; 16 choices with the adjunction of premature and small for gestational age children), existence of chronic diseases (none or one of 16 choices) and use of nutritional support: oral nutritional supplements (ONS), enteral tube nutrition (EN) or parenteral nutrition (PN). In particular, the participating centers were asked a closed question (Yes or No) for every type of nutritional support. For the positive answers they were further asked to specify which of the reported choices applied. The latter are: modular (one or two nutrients) or complete ONS, nasogastric, gastrostomy or jejunostomy tube feeding and parenteral nutrition (more than two nutrients given intravenously). Patients may receive more than one type of nutritional support.

After excluding 141 patients whose only weight was available (mainly due to inaccurate height/length due to spastic posture), 1790 complete records were obtained for hospitalized patients aged 0–20 years old.

Z-scores of anthropometric measurements were calculated with Epi Info 7.1.5 and defined nutritional status using the A.S.P.E.N. criteria [1]: wasting or acute malnutrition, intended as a low weight-for-height [19], was identified by BMI and Weight-for-Length Z-score (<-1 mild, <-2 moderate, <-3 severe), stunting or chronic malnutrition, defined as low stature for age [19], by Height-for-Age Z-score <-2 . Overweight is defined by BMI or Weight-for-Length Z-score > 2 .

WHO 2006 and CDC 2000 growth charts were used respectively for children younger and older than two years old [1].

The distribution of data was checked using the Shapiro–Wilkinson test. Given the skewed distribution, continuous data were expressed as median value and interquartile ranges while categorical variables were expressed as proportions (percentages). Differences in proportions were tested by chi-squared test. The risk of acute and chronic malnutrition in chronically ill patients was expressed by the risk ratio. Significance level was fixed at <0.05 . Statistical analysis was performed using STATA 11, StataCorp 4905 Lakeway Drive, College Station, Texas 77845 USA.

Given the anonymous collection of data, the Ethical Committee of the co-ordinating center advised that ethical approval was not necessary.

3. Results

The website registered 2003 accesses of which 1994 were valid records – patients aged more than 20 years and those without available anthropometric measurements were excluded. The data were collected from 14 out of the 20 Italian regions, 73 hospitals (9 children's hospitals, 18 university hospitals and 46 general hospitals) and 101 wards: 84.6% paediatrics, 6.7% pediatric surgery and 8.7% pediatric onco-hematology. 1071 (59.8%) patients come from third level pediatric hospitals and 719 (40.2%) from general

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