

Original

Nutritional status among hospitalized children with mixed diagnoses at a referral teaching hospital in Manizales, Colombia

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Abstract

Introduction: Despite advances in the treatment of malnutrition in pediatric hospitals, this remains a problem that must be recognized and to call the attention of academia and health authorities to be handled in time.

Objective: To evaluate the nutritional status of hospitalized children at a referral teaching hospital and to describe the current prevalence of malnutrition.

Methods: The study was conducted during the months of February, March and April 2010 at the University Hospital Rafael Henao Toro Colombian Red Cross in Manizales, Colombia, South America. We evaluated all patients admitted to a day of each month by calculating the Z score of the, weight for age, height or length for age, body mass index, mid-arm circumference, triceps and subscapular folds for children under 5 years and height for age and body mass index for school children and adolescents.

Results: A total of 174 children (age 1-216 mo) were evaluated during the 3-days survey. There were 52.8% children less than 60 months old, 17.2% between 61 and 120 months and 29.9% over 121 months. There were 44.3% females and 55.7% males. Children from the urban residence were 83.3% and 16.6% were rural. The overall prevalence of underweight was 27%, stunting 22.4%, wasting 16.6% and overweight and obesity 6.3%. Males less than five years old were more affected than older children. Rural children were more affected than urban children. The prevalence of overweight children was greater in children 61-120 months than other ages.

Conclusion: Given the observed levels of malnutrition, it takes up a system for early identification of children hospitalized with nutritional risk in order to provide adequate and timely support and prevent hospital-acquired malnutrition. This requires the use of previously validated pediatric protocols.

(Nutr Hosp. 2012;27:1451-1459)

DOI:10.3305/nh.2012.27.5.5875

Key words: Child malnutrition. Growth charts. Hospitalized children. Teaching hospitals.

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Recibido: 13-II-2012.
Aceptado: 10-IV-2012.

ESTADO NUTRICIONAL EN NIÑOS HOSPITALIZADOS CON DIAGNÓSTICOS MIXTOS EN UN HOSPITAL UNIVERSITARIO DE REFERENCIA EN MANIZALES, COLOMBIA

Resumen

Introducción: A pesar de los avances en el tratamiento de la malnutrición en hospitales pediátricos, éste sigue siendo un problema que debe ser reconocido y que debe llamar la atención de la academia y de las autoridades de salud con el fin de ser manejado a tiempo.

Objetivo: Evaluar el estado nutricional de los niños internados en un hospital pediátrico universitario de referencia y describir la prevalencia de malnutrición.

Métodos: El estudio fue realizado durante los meses de Febrero, Marzo y Abril del 2010 en el Hospital Universitario Rafael Henao Toro de la Cruz Roja Colombiana en Manizales-Colombia-Sur América. Se evaluaron todos los pacientes internados en un día de cada mes mediante el cálculo del puntaje Z del peso para la edad, la estatura o longitud para la edad, el índice de masa corporal, la circunferencia media del brazo y los pliegues tricípital y subescapular para niños menores de 5 años y la estatura para la edad y el índice de masa corporal para escolares y adolescentes.

Resultados: En total se evaluaron 174 niños entre 1 y 216 meses de edad. El 52,8% fueron menores de 60 meses, el 17,2% entre 61 y 120 meses y el 29,9% mayores de 121 meses. Un 44,3% fueron mujeres y un 55,7% hombres. El 83,3% de los niños eran procedentes de área urbana y el 16,6% de área rural. La prevalencia de desnutrición global fue de 27%, desnutrición crónica 22,4%, desnutrición aguda 16,6% y 6,3% de sobrepeso y obesidad. Los más afectados fueron los niños y niñas procedentes del área rural y los niños menores de 5 años. La prevalencia de sobrepeso fue mayor en niños en edades de 61 a 121 meses de edad.

Conclusión: Dados los niveles de malnutrición observados, se necesita instaurar un sistema para la identificación temprana de los niños hospitalizados con riesgo nutricional con el fin de proveer un soporte adecuado y oportuno y evitar la malnutrición adquirida en el hospital. Para ello se requiere el uso de protocolos pediátricos previamente validados.

(Nutr Hosp. 2012;27:1451-1459)

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Palabras clave: Malnutrición infantil. Curvas de crecimiento. Niños hospitalizados. Hospital universitario.

Abbreviations

BID: Banco Interamericano de Desarrollo.
BMI/A: Body mass index for age.
BMI: Body mass index.
ENSIN: Encuesta Nacional de Situación Nutricional en Colombia.
H/A: Height for age.
L or H/A: Length or height for age.
MNT: Malnutrition.
MUACA: Mid upper arm circumference for age.
MUAC: Mid upper arm circumference.
NCHS: The National Center for Health Statistics.
PAHO: Pan American Health Organization.
SSF/A: Sub scapular skin fold for age.
SSF: Sub scapular skin fold.
TSF/A: Triceps skin fold for age.
TSF: Triceps skin fold.
W/A: Weight for age.
W/H: Weight for height.
WHO: World Health Organization.

Introduction

Despite the Cancun international declaration on the right to an adequate nutritional support at the hospital¹ and global improvements on diagnostic and treatment tools, malnutrition, (MNT) referred as under-nutrition or overweight, still underlies half of in-patient morbidity and mortality in some regions,² especially in developing countries.

There are two reasons why this happens. First one is because in these countries MNT is an important public health problem causing adverse effects in body composition and function.^{3,4} According to PAHO⁵ more than 2.5 million children in Latin America and the Caribbean aged between 0 and 36 months display serious height and weight deficiencies. On the other hand, obesity rates are increasing among children less than 5 years old (7% to 12%) and adolescents (20%)⁶ In Colombia is calculated that 13.2% of children are stunted, 2.5% wasted, 3.4% underweight^{7,8} and 8 to 17% overweight.^{7,9} These facts increase the proportion of hospital discharges related to under nutrition¹⁰ and obesity¹¹ in pediatric hospitals. The second reason is because the nutritional assessment is omitted in many hospitals and consequently there is a lack of nutritional therapy^{12,13} and limited information about nutritional status of hospitalized children. Furthermore, there are less studies reporting malnutrition in pediatric in hospital population than in adults.¹⁴ In Colombia also there are fewer studies on malnutrition in these settings.

Malnutrition impacts on costs due to the length of hospital stay, morbidity, mortality and infectious complications. It deprives the patient of participating of family or social dynamics and deteriorates the quality of life^{15,16} Hospital stay has an effect on the

nutritional status of children admitted with normal anthropometric measurements and mild clinical conditions. More ever, children already malnourished on admission can suffer further worsening due to a decrease in intake and increase in nutritional requirements because their illness.^{17,18} Even in teaching hospitals or in hospitals with regulated food plans, frequently, dietary prescription do not cover the energetic requirements because the timetables for food are not flexible¹⁹ or mothers are not allowed to stay with their children.

Malnutrition is usually determined by measurements of height, weight, skin fold thickness by gender and age that are easy to perform. The most used classifications are: wasted (low weight for height, W/H, or by body mass index BMI), underweight (low weight for age, W/A) and stunted (low height for age, H/A).²⁰ Dogan et al.,²¹ showed that early diagnosis of children at risk of malnutrition allows timely intervention and prevent further specific deficits like iron as it was demonstrated in a Brazilian pediatric hospital where the mortality was reduced from 33.8% to 16.2%.¹⁹ For this purpose, the medical staff should be trained in diagnosing and treating MNT and health authorities be aware for the need of opportunistic actions to reduce mortality.²²

Although food is a basic human need for health and survival, yet many hospitals fail giving nutritional care enough priority in their practice. It is also necessary to draw the attention of medical authorities to introduce this matter into the curriculum, especially in teaching hospitals.

Objective

The aim of this study was to determine the prevalence of under nutrition and overweight in a referral teaching pediatric hospital to provide information to support decision making policies and strategies for intervention.

Patients and methods

This was a 3-days cross-sectional nutritional survey over three months from February to April 2010 at the Cross Red University Children Hospital in Manizales-Colombia. The institution is a tertiary care referral and teaching hospital composed of 95 beds. Medical students and students of pediatrics from two faculties of medicine receive training in this hospital.

Ethical approval was obtained from the Ethics Committee of the Faculty of Health Sciences at University of Caldas and the Hospital director gave the authorization. Informed written consent was also obtained from parents or guardians.

All children hospitalized in the chosen day of each month were eligible for the study. Oncology, pediatric, pediatric surgery, intensive care and burned wards

were included. Emergency was excluded. Before the data collection a pilot study with 10 patients for an anthropometrical standardization was performed. The technique was reviewed and corrected when it was needed.

During the three days, a total of one hundred and eighty eight children (age 1-220 mo) were considered for the study. Fourteen patients were excluded: one because their parents did not authorize the evaluation, six because they were in critical conditions in the intensive care unit with respiratory support, two because data were not consistent and five because they were immobilized and their conditions did not allowed a proper evaluation: severe burns, fractures, or abdominal trauma. Ages were corrected for children with gestational ages less than 37 weeks in two cases. Therefore, our final study sample comprised data on 174 hospitalized children: 61 in February, 58 on March and 55 in April.

Indicators analyzed were: Weight for age (W/A), only for children less than ten. Length or height for age (L or H/A), and Body mass index for age (BMI/A) were examined for children at all ages. Mid upper arm circumference (MUAC), triceps skin fold (TSF) and sub scapular skin fold (SSF) for age were examined for children less than five as the World Health Organization (WHO) do not have reference data for elders.

All measurements were done by two of the authors according to Lohman et al.²³ A 10 g precision scale (ACS-20B-YE Electronic) was used for infants weighing < 15 kg and an electronic scale (Tanita Illinois, U.S.A, precision 100 g) was used for children weighing > 15 kg. Infants were weighed without clothing or diapers. Children older than 2 years were weighed with minimal clothing and without shoes.

Recumbent length of infants < 2 y old was measured to the nearest 0.1 cm using a standard measuring board. Height was measured to the nearest 0.1 cm by a wall-mounted scale for children > 2 y old. Mid upper arm circumference (MUAC) was measured to the nearest 0.1 cm using a fiberglass tape and the skin fold thickness to the nearest 1 mm using a Lange caliper.

We also registered the weight at admission from the clinical record of those where they were available. We compared this weight with that from the day of survey.

Statistical analysis

The data obtained were recorded using standard data-entry form²⁴ for school children and adolescents to facilitate consistent reporting. The data were entered on databases and double checking was done for validation and internal consistency. Statistical analysis was performed using SPSS version 11. For children below five years old the nutritional status was determined by calculating Z-score for W/A, L-H/A, BMI, MUAC, sub scapular and triceps skin folds thicknesses using the current World Health Organization reference stan-

dards for personal computer (PC) as supplied in the WHO Anthro software (v 2.04)²⁴ and its Anthropometric calculator. School children and adolescents (61-228 months) data were analyzed using the Anthro Plus software (v. 1.0.3), for application of the WHO Reference 2007 for 5-19 years. The macros for SPSS package were used for the statistical analysis and calculation of the indicators of growth. The patient's characteristics are presented as mean and standard deviation (SD). The prevalence of malnutrition is presented as percentages.

When z score was between -2 and 2 SD, nutritional status was considered normal. Subjects with a z score of less than -2 SD were considered as having moderate malnutrition. Subjects with a z score of less than -3 SD were considered as having severe malnutrition. These applied for acute malnutrition or wasting (by BMI), chronic malnutrition or stunting (L/H/A Z score), global malnutrition or underweight (W/A), and for MUAC, triceps and sub scapular skin folds.

According the WHO,²⁵ weight-for-age reference data are not available beyond age 10 "because this indicator does not distinguish between height and body mass in an age period where many children are experiencing the pubertal growth spurt and may appear as having excess weight (by weight-for-age) when in fact they are just tall".

Results

A total of 174 children aged 1-216 months were evaluated during the 3-days survey. Their characteristics are presented in table I. Ninety two 92 children (52.8%) were less than 60 months old, 30 (17.2%) were between 61 and 120 months and 52 (29.9%) were over 121 months. There were 77 (44.3%) females and 97 (55.7%) males. Children from the urban residence were 145 (83.3%) and 29 (16.6%) were rural.

Results are presented as percentage by gender, and group of age as recommended by WHO.²⁴ Table II shows data for children less than five. Table III shows data for children over five. Table IV shows the results by residence. W/A was calculated only for children less than ten years old. Length or stature/A and BMI/A were examined for children at all ages. MUAC, TSF and SSF for age were examined for children less than five years.

Figure 1 shows groups of pathologies according to the diagnosis associated at admission and to the International classification of diseases²⁶.

From 174 only 10 patients (5.7%) had a nutritional diagnosis and only five (2.9%) received nutritional support: oral (3), enteral (1) or parenteral (1). The average stay was of 4.5 days (\pm 4.01). Even, 13 patients (7.4%) did not have a weight at admission. From the 163 patients who had a weight record at admission 24 (14.7%) did gain weight, 30 (18.4%) lost weight and 109 (66.8% did not gain or lost weight). The average of

Table I
Patient's characteristics

Age groups	Gender	n	Weight*	Length/height*	BMI*	MUAC*	TSF*	SSF*	Urban	Rural
mo			Kg	cm	Kg/m ²	cm	mm	mm	n	n
1-60	Female	37	8.9±3.5	75.6±14.8	15.0±1.9	13.7±2.4	8.7±2.9	6.3±2.2	31	6
	Z-Score [§]		-1.4±1.7	-1.6±2.1	-0.6±1.6	-0.6±1.6	4.8±28.7	-0.7±1.83		
	Male	55	9.2±5.4	74.6±19.5	15.5±3.0	13.6±2.2	8.0±2.3	6.0±1.6	48	7
	Z-Score [§]		-1.4±1.8	-1.4±2.4	-0.8±2.1	-0.8±1.5	-0.4±1.5	3.0±25.4		
	Total Z-Score [§]	92	-1.4±1.8	-1.5±2.26	-0.7±1.9	-0.7±1.5	1.8±18.9	1.4±19.3		
61-120	Female	15	26.6±9.5	123.7±11.9	16.9±3.0	NA	NA	NA	12	3
	Z-Score [§]		-0.03±1.8	-0.5±1.1	-0.38±1.4					
	Male	15	23.4±7.2	119.1±11.0	16.3±2.8	NA	NA	NA	13	2
	Z-Score [§]		0.05±1.4	-0.8±1.4	-0.36±1.7					
	Total Z-Score [§]	30	0.0±1.6	-0.3±1.3	-0.3±1.5					
121-216	Female	25	45.2±11.8	155.1±10.4	18.5±3.6	NA	NA	NA	21	4
	Z-Score [§]		NA	-0.5±0.9	-0.8±1.1					
	Male	27	42.9±12.4	152.11±14.7	18.2±3.1	NA	NA	NA	20	7
	Z-Score [§]		NA	-1.1±1.5	-0.7±1.8					
	Total Z-Score [§]	52	NA	-0.8±1.3	-0.8±1.5					

*Mean ± SD.

[§]Mean ± SD of Z-score for variables by age.

[§]Mean ± SD of Z-score for variables by age for females and males.

NA: not applicable.

BMI: Body mass index for age; MUAC: Mid upper arm circumference for age; TSF: Triceps skin fold; SSF: Sub scapular skin fold.

gain was 1.37 kg and the average lost was 1.53 kg. We did not find children with edema.

Discussion

Malnutrition in developing countries reflects their social and economic situation and has an important impact on hospitalized children. Colombia is no exception. The overall prevalence of malnutrition in the population surveyed at Rafael Henao Toro of the Colombian Red Cross University Children Hospital was underweight 27%, (only for children less than ten) stunting 22.4% wasting (16.6 %) and overweight/obesity 6.3%.

The analysis by age showed that underweight, stunting and wasting were more marked for children

less than five. Although malnutrition affects individuals at all ages, those younger than five years old are the most vulnerable population and can experience greater morbidity and mortality.¹³ They require more attention due to their needs for growth and development.

Albeit under nutrition was the main problem, over nutrition reached 6,3% and must not be overlooked. The overweight/obesity was more evident in female children between 61 to 120 months. In our hospital this is a new finding and changes the traditional profile of malnutrition. Macías-Rosales et al.,¹¹ studied 641 patients in a pediatric referral hospital of Mexico and found that overweight risk was present in 15.4% of them and 12.2% were overweighted, almost as prevalent as wasting (8.0%) and stunting (17.0%). School children and adolescents were also the most affected in

Table II
Percentage of severe and moderate malnutrition by gender in children less than five years

	Gender	n	W/A	L-H/A	BMI/A	MUAC/A	TSF/A	SSF/A
Age/months 1-60	Female	37	32.4	32.4	18.9	10.8	8.1	21.6
	Male	55	32.7	30.9	21.8	12.7	10.9	12.7
	Total	92	32.6	31.5	20.7	12.0	9.8	16.3

W/A: Weight for age; L or H/A: Length or height for age; BMI/A: Body mass index for age; MUAC/A: Mid upper arm circumference for age; TSF/A: Triceps skin fold for age; SSF/A: Sub scapular skin fold for age.

Table III
Percentage of severe and moderate malnutrition by age and gender in school children and adolescents

Age/months	Gender	n	W/A	L-H/A	BMI/A
61-120	Female	15	13.3	13.3	13.3
	Male	15	6.7	0.0	6.7
	Total	30	10,0	6.7	10.0
121-180	Female	11	NA	9.1	18.2
	Male	17	NA	17.6	11.8
	Total	28	NA	14.3	14.3
181-216	Female	14	NA	14.3	7.1
	Male	10	NA	20.0	20.0
	Total	24	NA	16.7	12.5

W/A: Weight for age; L or H/A: Length or height for age; BMI/A: Body mass index for age.

Table IV
Percentage of severe and moderate malnutrition by residence

Age/months		n	W/A	L-H/A	BMI/A	MUAC/A	TSF/A	SSF/A
1-60	Urbano	79	29,1	29,1	19,0	11,4	7,6	16,5
	Rural	13	53,8	46,2	30,8	15,4	15,4	15,4
61-120	Urbano	25	12,0	8,0	12,0			
	Rural	5	0,0	0,0	0,0			
121-180	Urbano	22	NA	13,6	13,6			
	Rural	6	NA	16,7	16,7			
181-216	Urbano	19	NA	15,8	10,5			
	Rural	5,0	NA	20,0	20,0			

W/A: Weight for age; L or H/A: Length or height for age; BMI/A: Body mass index for age; MUAC/A: Mid upper arm circumference for age; TSF/A: Triceps skin fold for age; SSF/A: Sub scapular skin fold for age.

this country. It may reflect the severe proportions of overweight/obesity in this population were one in four children; one in three teenagers and over 65 percent of the adult population is overweight or obese.³²

It has been shown that obese children have an increased number of admissions, incidence rates of respiratory morbidity,³³ length of stay and increased costs.³⁴

We did not find any other similar study reporting the prevalence of malnutrition in hospitalized children in Colombia. In 2008 Bernal et al.³⁵ described the treatment of severe malnutrition children in an institution of Turbo-Colombia where all malnourished children are referred for treatment and it is not indicative of a general children hospital. The study by Pérez-Camacho¹⁰ described malnutrition in children in Cali-Colombia that consulted only to the emergency ward for the first time in a period of 6 months. From 358 children, they found 36.7% with some type of malnutrition (57.76% underweight, 36.94% stunted, 36.67% wasted and 0.67% overweight) by using different methods and the Centers for disease control and prevention (CDC) and National Center for Health Statistics (NCHS) reference.³⁶ Except for overweight/obesity, in the present study we found lower percentages of

malnutrition than those in these studies. However, It is known that when different settings, ages, methods, reference standards and cut off points to classify the MNT are used,^{4,21,28} it is difficult to make comparisons between results. We used the z score parameters suggested by The WHO Multicentre Growth Reference Study (MGRS)³⁷ because they identify 8 times more undernourished children than NCHS.³⁸ Weisstaub et al.,³⁹ report that up to 21% of kwashiorkor would remain undetected depending on the indicators used. In a search for Ibero-American countries reporting MNT, the design of the studies and the ages included varied importantly. The table 5 shows some of these studies.

It was found a disagreement between underweight (W/A) and MUAC data in this survey. Whilst using W/A a 32.6% of children less than five were classified as having moderate and severe underweight, MUAC only detected a 12.0% of malnourished children. Similar results were found with skin folds. Margo⁴⁰ described the same situation in three studies involving 621 children aged 13-60 months. They found different rates of malnutrition: 22.7% using W/A and 7.8% using MUAC, three folds more by W/A. Bejon et al.,⁴¹ consider MUAC as the most reliable anthropometric

Table V
Ibero American studies of malnutrition in hospitalized children

Country	n	Age months	% Wasted (W/L-H)	% Underweight W/A	% Stunted L-H/A	% Overweight risk/Overweight	Reference
Colombia (this survey)	174	0-216	16.6	27.0	22.4	6.3	This survey
Mexico	641	1 - 180	8	NA*	17	15.4/12.2	11
Honduras	107	2-168	67.3	NA*	61.2	NA*	14
Colombia (Cali)	360	2-180	36.7	57.8	36.94	0.67	10
Cuba	156	24-228	22.5	33.3	14.5	10.9	27
Brazil	426	1-144	10	18	21	NA*	28
Argentina	470	1-71.6	28.0	49.6	35	7.2/1.9	29
Chile	123	0-220	10	NA*	NA*	11	30
Spain	268	1- 228		17.2	NA*	NA*	31

*NA: Not available.

W/L-H: Weight for length/height; W/A: Weight for age; L or H/A: Length or height for age.

marker for malnutrition because does not change markedly with dehydration. Nevertheless, some studies refer that MUAC is better as a predictor of mortality.^{42,43} The WHO⁴⁴ suggests that when weight for height is below -3 SD of their reference in 6-60 month old children, a classification based on a MUAC cut-off of 115 mm, yields comparable results.

During this study it was found that health professionals do not routinely document the nutritional status at hospital admission. The emergency service did not have a stadiometer to measure height on admission and in 7.4% of the cases, weight was not measured. Not having appropriate devices is one of the main reasons why children do not get weighed in hospital and clinicians need to know if the appropriate equipment is ready before they can bring in an assessment tool. It is also necessary to provide appropriate growth reference charts.¹³

The nutritional therapy and follow up of malnourished children during hospitalization were also missing. Only 5.7% of the patients had a nutritional diagnosis despite the anthropometric measurements showed percentages of malnutrition 1-5 times more than that in the different categories. A similar situation has been reported in other institutions.⁴⁵ These facts prevent a complete evaluation of the problem and underscore the importance of developing hospital medical facilities regarding diagnosis and therapeutic approach to malnutrition, based on the conduct guidelines proposed by WHO.⁴⁶

Almost any moderate or severe chronic diseases increase the risk of under nutrition because respiratory muscle weakness, chewing or swallowing problems, impaired appetite, digestion, absorption, taste or smell can have serious consequences for nutrition.⁴⁷ In this survey, respiratory diseases (30%) and digestive

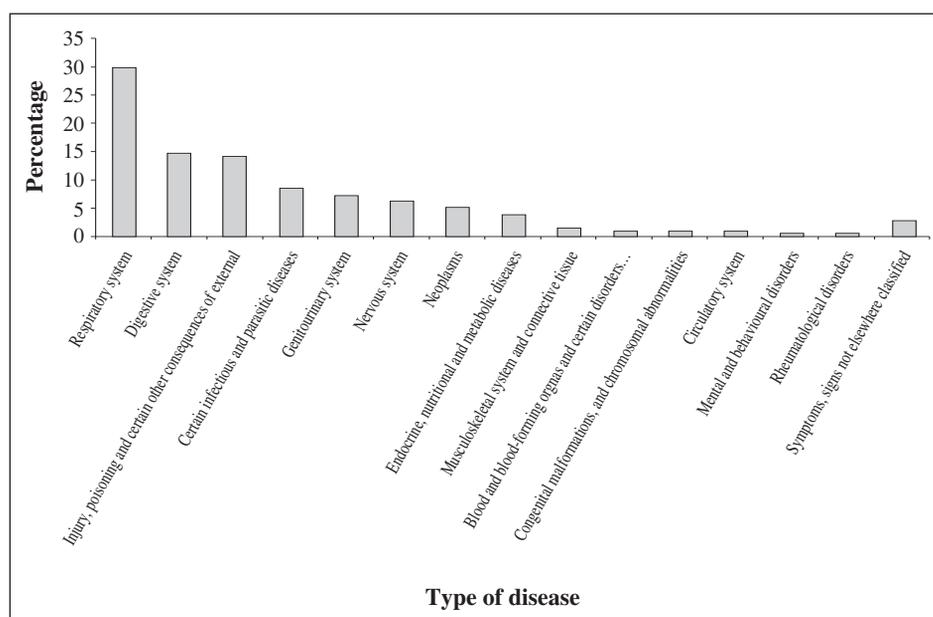


Fig. 1.—Percentage of pathologies according to the International Classification of Diseases (ICD)²⁶.

diseases (15%) were the most frequent causes for hospitalization. Gomila et al.,²⁹ in Argentina reported similar findings: 32% of respiratory diseases and 17.7% of digestive diseases. These are also the most prevalent pathologies found in studies with severely malnourished children admitted to a reference center in São Paulo⁴⁸ and Recife⁴⁹ (Brazil).

Teaching hospitals are in prime position to identify nutritional problems and take appropriate steps aimed at solve them. The Rafael Henao Toro of the Colombian Red Cross University Children Hospital Manizales-Colombia-South-America is a referral teaching hospital where nurses, doctors and pediatricians are trained. During the data recollection it was realized that a standard protocol for the management of malnourished children does not exist. However, some authors have shown that the implementation of WHO guidelines issued in 2006⁴⁶ has reduced mortality in some pediatric hospitals.⁵⁰ The results of this study should draw attention to this problem to ensure that children receive optimal care and nutrition.

Differences in hospital performance in quality of care and outcomes when treating severely malnourished children may be due to differences in leadership, teamwork, more positive attitudes to the children, staff more diligent in rehydration procedures and feeding, better induction and supervision of incoming staff and better support structures.²²

Finally, one way to combat malnutrition is to involve local community directly and include larger populations than hospital-based programs within the new concepts of “community based medicine” and “responsive feeding” as mentioned by Engle and Pelto.⁵¹ We could also revive the agreement of Alma-Ata about primary health care as suggested by Lawn et al.⁵² to address childhood malnutrition and prevent further malnourished children coming to our hospitals.

The study may have limitations because biochemical variables of malnutrition were not taken into account and we could not diagnose hidden deficits of micronutrients such as zinc or iron. Further studies need to address this issue. In addition, this study only reflects the regional situation and more studies should be undertaken in hospitals across the nation in order to establish the national prevalence.

As a practical application and according to our results and suggestions from different authors, it is important to put into practice in our hospital and similar hospitals the following 12 steps:

1. Build a policy that applies to both, the managerial level and the academic level: all children need a nutritional assessment on admission and a basic follow-up at wards as a routine part of hospital care.
2. Hold meetings to reach consensus and motivation over the need for action on hospital malnutrition and give nutrition the same priority as a hospital acquired infection.

3. Establish nutrition teams for assessment and nutrition counseling, rehabilitation (including speech and language therapist for help with feeding difficulties such as chewing or swallowing).
4. Implement compulsory training and continued education for the incoming staff on performing the WHO case-management guidelines for severe malnutrition.⁴⁶
5. Have a protocol including a simple triage to select patients for risk of malnutrition.⁵³
6. Supply all wards with weigh scales, stadiometers, tapes and reference standard charts.
7. Make a timely treatment and appropriate follow up if a child is found malnourished.
8. Have formalized monitoring and enforcement of policies and guidelines adopted.
9. Implement protected meal times by using trained volunteers to help.
10. Use red trays to identify patients who need help to eat or drink.
11. Strengthen breastfeeding.
12. Add nutritional diagnosis to be visible in the statistics.

Conclusions

The prevalence of malnutrition is still high and widespread in developing countries like Colombia and at its University Children Hospital in Manizales. Most children are not diagnosed in clinical settings due to lack of routine measurements of weight and height. Maybe, less efficient treatments of malnutrition, an increasing disease burden and factors as food insecurity contribute to the vulnerability of our children. As managers and doctors do not consider the importance of nutrition, there is an urgent need to draw their attention to the priority that should be given to inpatient nutrition issue. Implementing a good nutritional quality of care and guidelines of the World Health Organization for severely malnourished children, it is possible to improve not only nutrition but the overall care of pediatric patients in our hospitals.

Acknowledgements

We would like to acknowledge the children and parents who participated in the study and the pediatric staff of the Rafael Henao Toro of the Colombian Red Cross University Children Hospital for their support.

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