Nutrición Hospitalaria

Original

Evolution of nutritional status of pediatric in patients of a tertiary care general hospital in Brazil

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Abstract

Justification and objective: Identify changes in the nutritional status of hospitalized children is fundamental for the early establishment of interventions. This study aims at describing the prevalence of undernutrition at admission and over the weeks of in-hospital stay in pediatric patients and evaluate the association between nutritional status and length of in-hospital stay.

Materials and methods: A cohort study was carried out. It followed all the in-patients admitted to the general pediatric unit, composed of 72 beds, in the Hospital de Clínicas de Porto Alegre (HCPA), in the south of Brazil, from 20 march to 20 october in 2004. Patients who were between 1 month and 12 years of age and who had been admitted for clinical or/and surgical reasons were included. Those with Down Syndrome or without clinical condition and/or stature for weight measurement were excluded. Anthropometric data were collected up to 48 hours after admission and, weekly, up to hospital discharge (at admission, on 7th, 14th, and 21st day after admission). In children below 5 years of age, the standard defined by the World Heath Organization (WHO/2006) for the classification of the z-score for the stature/age (S/A), weight/age (W/A) and weight/stature (W/S) scores was used. In children from 5 to 10 years of age, the standards of the *National Center for Health Statistics* (NCHS, 1977) were used to classify the same rates as reference values. In children above 10 years of age, the classification of the Body Mass Index (BMI) was used (OMS/1995). In order to compare the z-scores over the four evaluation moments, analysis of variance (ANOVA) was used for repeated measurements, with Bonferroni's *Post-Hoc* test, and, for the evaluation of the in-hospital stay length, according to the nutritional status, Kaplan-Meier's survival curve, in the SPSS program, version 12.0, was used.

Results: 426 patients were included in the study. 57% of them were male and 50.7% were below one year of age. At admission, the prevalence of malnutrition was 10%, 18%, 21% and 14.7%, according to the W/S, W/A, S/A,

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EVOLUCIÓN DEL ESTADO NUTRITIVO DE PACIENTES PEDIÁTRICOS INGRESADOS EN HOSPITAL GENERAL TERCIARIO DE BRASIL

Resumen

Justificación y objetivo: Identificar los cambios en el estado nutritivo de niños hospitalizados es fundamental para el establecimiento precoz de las intervenciones. Este estudio pretende describir la prevalencia de la hiponutrición al ingreso y a lo largo de las semanas de estancia hospitalaria de pacientes pediátricos y evaluar la asociación entre el estado nutritivo y la duración de la estancia hospitalaria.

Material y métodos: Se realizó un estudio de cohortes. Se siguió a todos los pacientes ingresados en la Unidad de Pediatría General, compuesta de 72 camas, en el Hospital de Clínicas de Porto Alegre (HCPA), en el sur de Brasil, desde el 20 de marzo hasta el 20 de octubre de 2004. Se incluyeron aquellos pacientes entre 1 mes y 12 años de edad, ingresados por motivos médicos y/o quirúrgicos. Se excluyó a aquellos con síndrome Down o con una situación clínica y/o por peso que impidiesen la medición del peso. Se recogieron los datos antropométricos hasta 48 horas después del ingreso y luego semanalmente hasta el alta hospitalaria (al ingreso, y en los días 7º, 14º y 21º tras la admisión). En niños menores de 5 años, se utilizó el estándar definido por la Organización Mundial de la Salud (OMS/2006) para la clasificación de la puntuación z de las puntuaciones de talla / edad (T/E), peso/edad (P/E) y peso/talla (P/T). En niños de 5 a 10 años, se utilizaron los estándares del Centro Nacional para Estadísticas Sanitarias (NCHS, 1977) para clasificar las mismas tasas como valores de referencia. En niños mayores de 10 años de edad, se empleó la clasificación del Índice de masa corporal (IMC) (OMS/1995). Con el fin de comparar las puntuaciones z a lo largo de los 4 momentos de evaluación, se empleó el análisis de varianza (ANOVA) para mediciones repetidas, con un test Post-Hoc de Bonferroni, y para la evaluación de la duración de la estancia hospitalaria en función del estado nutritivo, se empleó la curva de supervivencia de Kaplan-Meier del programa SPSS, versión 12.0,

Resultados: 426 pacientes fueron incluidos en el estudio. 57% eran varones y 50,7% eran menores de 1 año de edad. Al ingreso, la prevalencia de malnutrición fue del 10%, 18%, 21% y 14,7%, según los criterios de P/T, P/E, T/E e IMC, respectivamente. Se apreció una mejoría del estado

and BMI criteria, respectively. Improvement of the nutritional status over the in-hospital stay was observed (at admission to 21st day) in children below 5 years (Z-score W/A: from -1.49 ± 2.47 to -0.85 ± 2.36, p = 0.001, and S/A: from -1.69 ± 2.05 to -1.21 ± 1.99, p = 0.007) and also in 5 to 10 years of age (S/A: from -0.43 ± 1.31 to -0.30 ± 1.37, p = 0.024). Undernourished patients, compared to nourished patients (according to the W/S rate for children below 10 years of age and BMI for above 10 years of age), showed a higher probability of remaining hospitalized (HR = 1.41; IC95%: 1.02-1.92).

Conclusions: The prevalence of malnutrition by the W/S score was about half the prevalence found by the W/A and W/A indices, possibly reflecting a chronic impairment of the nutritional status. Undernutrition was confirmed as a health problem, once undernourished patients remained hospitalized for longer periods, which is a treatable problem as it was observed an improvement in the nutritional status rates over in-hospital stay.

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nutritivo a lo largo de la estancia hospitalaria (desde el ingreso hasta el día 21º) en los niños menores de 5 años (puntuación Z P/E: desde -1,49 ± 2,47 a -0,85 ± 2,36, p = 0,001, y T/E: desde -1,69 ± 2,05 a -1,21 ± 1,99, p = 0,007) y también en aquellos entre 5 y 10 años (T/E: desde -0,43 ± 1,31 a -0,30 ± 1,37, p = 0,024). Los pacientes malnutridos, en comparación con los bien nutridos (según la tasa P/T para los niños menores de 10 años y el IMC para los mayores de 10 años de edad), mostraron una mayor probabilidad de permanecer hospitalizados (TH = 1,41; IC 95%: 1,02-1,92).

Conclusiones: La prevalencia de malnutrición por la puntuación P/T fue aproximadamente la mitad de la prevalencia hallada mediante los índices T/E y P/E, lo que probablemente refleje el trastorno crónico del estado nutritivo. La hiponutrición se confirmó como un problema sanitario puesto que los pacientes malnutridos permanecieron hospitalizados durante más tiempo, lo cual es un problema tratable puesto que se observó una mejoría del estado nutritivo a lo largo de la estancia hospitalaria.

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Palabras clave: *Hiponutrición. Estado nutritivo. Riesgo nutricional. Hiponutrición hospitalaria. Niños. Pediatría.*

Introduction

In-hospital undernutrition is recognized as a risk factor for morbid-mortality.[1-4] In Brazil, the rate of in-hospital lethality in hospitalized children with severe undernutrition is about 20%. This rate can be underestimated, once the diagnosis of undernutrition is not performed at all times and recorded in the medical record of the patients.[3-5]

The magnitude of the problem may vary in different hospital contexts and may reach alarming rates. In children hospitalized in public hospitals in Latin America, the prevalence of undernourishment was described as being between 7% and 90%.[5-12]

Identifying alteration in the nutritional status in hospitalized children is fundamental for the early establishment of interventions, preventing the installation of undernourishment in risk situations or diminishing its severity when it is already present.[13,14] There are several methods for the evaluation of the nutritional status and there is no technique which is not subject to criticism. The recommendation is that the one that is better to detect the nutritional problem of the population under study should used.[15] The most often used measurements, weight and stature, are elemental in the assessment of growth. The advantages of anthropometry are its low cost, its facility of execution and, mainly, its universal use.

Once one has the weight and stature measurements, one can calculate the three anthropometric rates which are most often used and recommended by the World Health Organization (WHO): stature/age (S/A), weight/age (W/A) and weight/stature (W/S). The impairment of the stature/age (S/A) rate indicates that the child's growth is altered in long term processes (*"stunting",* or nanism), traditionally known as an index of previous undernutrition, reflecting deficient health and feeding conditions. The weight/age (W/A) rate may be related either to the nutritional past of the child or to current problems may result in insufficient weight gain or weight loss, and may also reflect deficiency of weight and stature. The deficit in the weight/stature index (W/S) reflects a more recent impairment; it indicates the current nutritional status (*"wasting").*[16]

Considering the importance of the nutritional status for a good evolution of the hospitalized patient, the present study aims at learning more, from the nutritional point of view, about the pediatric population attended in a general school hospital in the south of Brazil. More specifically, the objectives of this study are: a) describing the prevalence of undernourishment at admission and over the weeks of in-hospital stay in these patients; b) evaluating the association between nutritional status and in-hospital stay; c) identifying the proportion of medical records who have a record of nutritional status at the information of hospital discharge and; d) evaluating the percentage of adequacy, compared to the recommendations for age and sex, of the calorie and protein prescription.

Materials and methods

A cohort study was carried out. It followed all the in-patients admitted to the general pediatric unit, composed of 72 beds, in the Hospital de Clínicas de Porto Alegre (HCPA), in the south of Brazil, from 20 march to 20 october in 2004. Patients who were between 1 month and 12 years of age and who had been admitted

for clinical or/and surgical reasons were included. Those with Down Syndrome or without clinical condition and/or stature for weight measurement such as: wearing a cast, with muscular spasticity or with bone deformity were excluded.

Anthropometric data were collected up to 48 hours after admission and weekly up to the discharge form hospital (at admission, on the 7th day, 14th day and 21st day of in-hospital stay).

For the measurement of body weight, digital scales existing in the pediatric unit and which had been previously checked were used. Children below 2 years of age or below 15 kg were weighed completely naked, placed lying or sitting in the middle of the scale, without any external support. Older children were weighed wearing light clothing and with their feet bare, placed standing in the middle of the scale. For the measurement of their length, children below 2 years of age were measured lying, on a flat surface, with the use of a ruler whose extremities have a fixed support for the positioning of the head and retractile support for the positioning of the feet (procedure carried out by two examiners in order to make sure that the body was stretched and the position correct). For the measurement of the height of older children, a wall anthropometer was used. The child was placed on it bare footed, with their heels together touching the haste vertical of the anthropometer, with the head erect, being the horizontal cursor of the anthropometer retracted to the highest point of the head.

For children below five years of age, the data were analyzed in the ANTHRO/2006 software, which used the standards of the World Health Organization/2006, for the calculation of the z-score for the Stature/Age (S/A), weight/age (W/A) and weight/stature (W/S). For children from five years old and a month to children nine years old and eleven months of age, the data were analyzed in the Epi Info software version 12.0 (Atlanta, Georgia), which used as its reference the standards of the *National Center for Health Statistics,*[17] recommended by the WHO for this age group for the calculation of the z-score for the S/A, W/A, and W/S rates. According to these rates, the nutritional status can be classified as: undernutrition for weight deficit (Z-Score $\leq$ -2 for the W/A and W/S indices), low stature (Z-score $\leq$ -2 for S/A), nutritional risk for low weight (Z-score between -1.99 and -1.28 for W/S and W/A), eutrophism (Z-score between -1.27 and +1.27 for W/S and W/A, and > -1.99 for S/A), overweight risk (Z-score between +1.28 and +1.99 for W/S or W/A) and overweight and obesity (Z-score $\geq$ +2.00 for W/S and W/A).[18-21] For the premature birth patients who were younger than 2 years of age, chronological age was corrected according to prematurity.[22]

For children in the age group above 10 years of age, the Body Mass Index (BMI) was used. Patients who were below the 5th percentile were diagnosed as undernourished, between the 15th and the 85th percentile were classified as eutrophic, between the 85th and the 95th percentile as overweight, and those who were above the 95th percentile as obese. Patients between the 5th and the 15th percentile[16,23] were considered at nutritional risk.

The adequacy of the total prescription de calories per day was assessed based on the *Recommended Dietary Allowances*[24] and the prescription of grams of protein per day based on the *Dietary Reference Intake,*[25] in accordance to the age group and sex. The prescription of calories and proteins was considered adequate when it represented 90 to 110% of the recommendation, "too many calories" if above 110% of the recommendation and "too few calories" if below 90% of the recommendation.

In order to compare the scores over the four evaluations, analysis of variance (ANOVA) was used for repeated measures. It was followed by Bonferroni's Post-Hoc test. For the evaluation of length of hospital stay, according to nutritional status, Kaplan-Meier's survival curve was used in the analysis. These analyses were done with the use of the SPSS software *(Statistical Package for the Social Sciences)* version 12.0.

The study was approved by the Research Ethics Committee of the institution and a free and written informed consent was obtained from all the parents and/or people responsible for the children. There was no interference of the researchers regarding the patients' admission, handling, or length of hospital stay in the study.

Results

426 patients were included in the study, being 57% male and approximately half (50.7%) below one year of age (table I).

The median of the length of hospital stay was 8 days (5-15). Up to the second anthropometrical evaluation, on the 7th day of hospitalization, 143 patients remained hospitalized (33.5% of the initial sample). Up to the 14th day, 74 children remained hospitalized (17.4% of the initial sample). On the fourth anthropometrical measurement, on the 21st day of the in-hospital stay, 31 patients were still hospitalized (7.3% of the initial sample).

The main clinical diagnosis at admission was respiratory disease (50%) and the diet was predominantly administered orally (82%). Over the following weeks, the diminution of acute respiratory problems and surgical corrections as reasons for the hospitalization were observed, considering that hepatic disease, cystic fibrosis, and endocrine disease were clinical reasons that proportionally started to be more observed in patients who remained hospitalized for a longer period (table I).

At admission, the prevalence of undernutrition was 10%, 18%, 21%, and 14.7% according to the W/S, W/A, S/A, and BMI criteria, respectively (table II). As the clinical diagnosis tends to be different for the

Table I

Demographical and clinical characteristics of patients at admission and at every 7 days of hospitalization.
Data expressed in absolute number (%) of patients

	Admission n = 426	7 days n = 143	14 days n = 74	21 days n = 31
Male sex	243 (57.0)	86 (60.1)	41 (55.4)	19 (61.3)
Age group				
< 12 months	216 (50.7)	61 (42.7)	26 (35.1)	14 (45.2)
12 months-60 months	121 (28.4)	42 (29.4)	17 (23.0)	6 (19.4)
61 months-120 months	55 (12.9)	21 (14.7)	15 (20.3)	7 (22.6)
> 120 months	34 (8.0)	19 (13.3)	16 (21.6)	4 (12.9)
Clinical diagnosis				
Respiratory disease*	213 (50.0)	52 (36.4)	20 (27)	8 (25.8)
Gastrointestinal disease	33 (7.7)	13 (9.1)	6 (8.1)	0
Surgical corrections	27 (6.3)	8 (5.6)	1 (1.4)	0
Neurological disease	28 (6.6)	10 (7)	6 (8.1)	1 (3.2)
Hepatic disease	20 (4.7)	11 (7.7)	7 (9.5)	5 (16.1)
Cystic fibrosis	18 (4.2)	16 (11.2)	14 (18.9)	7 (22.6)
Endocrine disease	7 (1.6)	4 (2.8)	4 (5.4)	3 (9.7)
Psychiatric disease	9 (2.1)	6 (4.2)	6 (8.1)	1 (3.2)
Other	71 (16.7)	23 (16.1)	10 (13.5)	6 (19.4)
Administration of diet				
Oral	350 (82.2)	110 (76.9)	50 (67.6)	18 (58.1)
Enteral	55 (12.9)	19 (13.3)	14 (18.9)	7 (22.6)
Oral + Enteral	16 (3.8)	14 (9.8)	10 (13.5)	6 (19.4)
No oral or enteral diet	5 (1.2)	0	0	0

* Respiratory disease = bronchilitis, asthma, bronchitis, upper airways infections.

patients who remained hospitalized for a shorter or longer period, the evolution of nutritional status over the in-hospital days was evaluated breaking the patients into those who stayed in-hospital for up to 7, 14 or 21 days (fig. 1). For children below five years of age, it was observed that, even for patients who remained hospitalized for a shorter period (7 days), there was improvement of the nutritional status during the in-hospital stay (Z-score W/A: from -1.18 ± 1.74 to -1.04 ± 1.69. $p < 0.001$, and S/A: from -1.21 ± 1.71 to -1.02 ± 1.71, $p < 0.001$). The same occurred for children who remained in hospital for up to 2 weeks (W/A: from -1.59 ± 2.01 to -1.17 ± 1.85, $p < 0.001$, and S/A: from 1.63 ± 1.94 to -1.27 ± 1.81, $p < 0.001$) and 3 weeks in hospital (W/A: from -1.49 ± 2.47 to -0.85 ± 2.36, $p = 0.001$, and S/A: from -1.69 ± 2.05 to -1.21 ± 1.99, $p = 0.007$). For the W/S rate, although in absolute terms the values observed were not statistically different from admission to the 21st day ($p = 0.163$), a linear improvement over this period was observed (from -0.41 ± 1.94 to -0.02 ± 1.76, $p = 0.024$). In the age group from 5 to 10 years of age, despite the small number of patients, the same pattern of improvement was observed significantly for the S/A score (from -0.43 ± 1.31 to -0.30 ± 1.37, $p = 0.024$, from admission to the 21st day).

Figure 2 shows that undernourished patients, compared to nourished patients (according to the W/S score for children below 10 years and BMI for children

above), showed a probability 41% greater of remaining hospitalized (HR = 1.41; IC 95%: 1.02-1.92).

When the adequacy of the dietary prescription was evaluated (table III), it was noticed that the proportion of patients who received less calories than recommended in the RDA diminished from approximately 30% at admission to 25% on the 21st day of in-hospital stay, whereas the protein intake was predominantly superior to that which is recommended in the DRI, increasing over the in-hospital stay and reaching 90% of the patients on the 21st day. Regarding the medical note of the nutritional status of the patients on the discharge papers, it was found that, from the 426 medical records checked, 29 (7%) made a reference to weight loss or gain during hospital stay and 8 (2%) had a record of the diagnosis of undernutrition.

Discussion

In this study, which followed patients from 1 month to 12 years of age during in-hospital stay, in a tertiary care hospital in the south of Brazil, the prevalence of undernutrition found at admission was from 10 to 21%, depending on the nutritional evaluation index used. These results are very similar to those found by Durán & Ramos[6] in 661 patients younger than six years of age in Argentina and those by Rocha et al.[7] in 203 children

Table II

Classification of the nutritional status, according to criteria of the WHO/2006* for children below 60 months and NCHS/1977** for children between 61 and 120 months of age, at admission and every 7 days of hospitalization. Data expressed in absolute number (%) of patients

	Admission n = 426	7 days n = 143	14 days n = 74	21 days n = 31
Nutritional Diagnosis***				
Children < 120 months	392	124	58	27
W/S[#]				
Undernourished weight deficit	39 (10.1)	20 (16.1)	9 (15.5)	2 (7.4)
Risk low weight	45 (11.6)	14 (11.3)	7 (12.1)	3 (11.1)
Eutrophic	248 (63.9)	74 (59.7)	30 (51.7)	14 (51.9)
Overweight/obese	56 (14.4)	16 (12.9)	12 (20.6)	8 (29.6)
W/A[##]				
Undernourished weight deficit	71 (18.1)	31 (25)	14 (24.1)	6 (22.2)
Risk low weight	58 (14.8)	19 (15.3)	8 (13.8)	5 (18.5)
Eutrophic	230 (58.7)	62 (50)	28 (48.3)	10 (37)
Overweight/obese	33 (8.4)	12 (9.6)	8 (13.8)	6 (22.2)
S/A[###]				
Low stature	82 (20.9)	26 (21)	12 (20.7)	8 (29.6)
Eutrophic	310 (79.1)	98 (79)	46 (79.3)	19 (70.4)
Children ≥ 120 months	34	19	16	04
BMI[♦]				
Undernourished	5 (14.7)	2 (10.5)	2 (12.5)	1 (25)
Risk low weight	4 (11.8)	4 (21.1)	3 (18.8)	2 (50)
Eutrophic	22 (64.7)	11 (57.9)	9 (56.3)	1 (25)
Overweight/obese	3 (8.8)	2 (10.5)	2 (12.5)	0

*World Health Organization; **National Center Health Statistics; ***According to Z-score and BMI; [#]Weight/Stature; [##]Weight/Age; [###]Stature/Age; [♦]Body Mass Index.

younger than five years of age in a hospital in Fortaleza (Brazil). On the other hand, higher frequencies of undernutrition are described in other Brazilian hospitals. Ferreira et al.,[11] using the W/A score, found a prevalence of undernutrition of 40% in a University Hospital in Alagoas (Brazil), which is almost twice as high as that found in our study. Barbosa et al.,[12] in a study carried out at the Nutrology Unit of the Children's Hospital in Florianópolis (Brazil), found 90% of the children undernourished by the W/A score. Sanabria et al.[8] identified, in patients younger than five years of age in Paraguay, by means of the W/A and W/S indices, prevalence of undernutrition of 31% and 13%, respectively.

The high prevalence of S/A deficit (21%) and the lower prevalence of W/S (10%) deficit may be explained by the information of the Brazilian Health Department that in the Brazilian population, as a whole, the prevailing type of undernutrition is the insidious type, which has a more chronic character, that is, it presents linear growth retardation and, most times, adequate weight for the stature. This type of undernutrition may be easily overlooked, mainly in populations that are used to low stature, which is then attributed to genetic factors.[21] This is not a pattern only in Brazil. Studies involving Latin American populations of low socioeconomic level a high prevalence of S/A deficit and, simultaneously, a low prevalence of W/S deficits.[26-29] This reinforces the necessity of

giving more importance to the three indices (S/A, W/A, and W/S) so that undernutrition is detected, either if the results from a chronic or an acute impairment, so that adequate nutritional therapy for the recovery and/or nutritional improvement is planned.

A comforting result of the present study was an improvement of the nutritional status observed over the hospital stay. This result differs from that obtained by Ferreira & França,[11] who found a high prevalence of the deficit for the W/A score among children at the moment of admission, without any alteration on the occasion of the discharge from hospital, regardless of the clinical diagnosis and the length of hospital stay. On the other hand, Oliveira et al.,[30] when assessing the nutritional evolution of children among six months and 3 years of age, found a significant improvement of the W/S score during the hospitalization. Sarni et al.,[31] however, assessing the evolution of the anthropometric data of undernourished children from zero to five years of age, also found an improvement in the W/S and W/A scores, followed by the S/A.

Several factors may be involved in the improvement of the nutritional condition during hospitalization that was observed in the present study, such as the termination of the acute phase of some diseases, the diminution of the clinical symptoms of infection, availability of nutritional formulae that favor an adequate handling of the diet, as
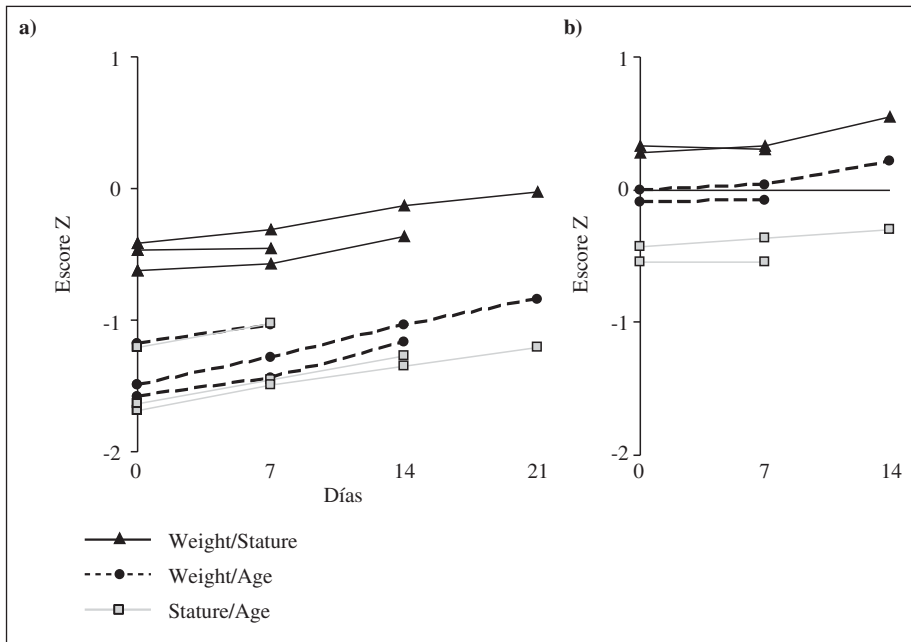
Fig. 1.—Z-score for the Weight/Stature, Weight/Age and Stature/Age scores, according to: a) the criterion of the WHO/2006 for children from Zero to 60 months of age, which remained for up to 7 days hospitalized (n = 103), up to 14 days (n = 43) and up to 21 days (n = 20) and b) the criterion NCHS/1977 for children from 5 years and 1 month of age to 9 years and 11 months of age, who remained for up to 7 days hospitalized (n = 21) and up to 14 days (n = 15). The points represent the median of the patients for each evaluation.

well as the use of a nutritional assessment protocol that enables a permanent observation of the patient's nutritional status, from admission to hospital discharge.[1,32-34]

When it was analyzed if the nutritional status influences the patient's length of hospital stay, it was found that undernourished children have 41% more probability of staying in hospital when compared to other children. Oliveira et al.[30] and Ferreira & França[11] also noticed that chil-

dren with higher nutritional deficit were the ones who stayed in hospital for a longer period.

The profile of our patients, regarding the most frequent clinical diagnosis is similar to that of other studies, as respiratory diseases are the main reason for hospitalization.[6,7,12,31] On the other hand, the Hospital de Clínicas de Porto Alegre is also a reference center for the treatment of cystic fibrosis and for pediatric liver
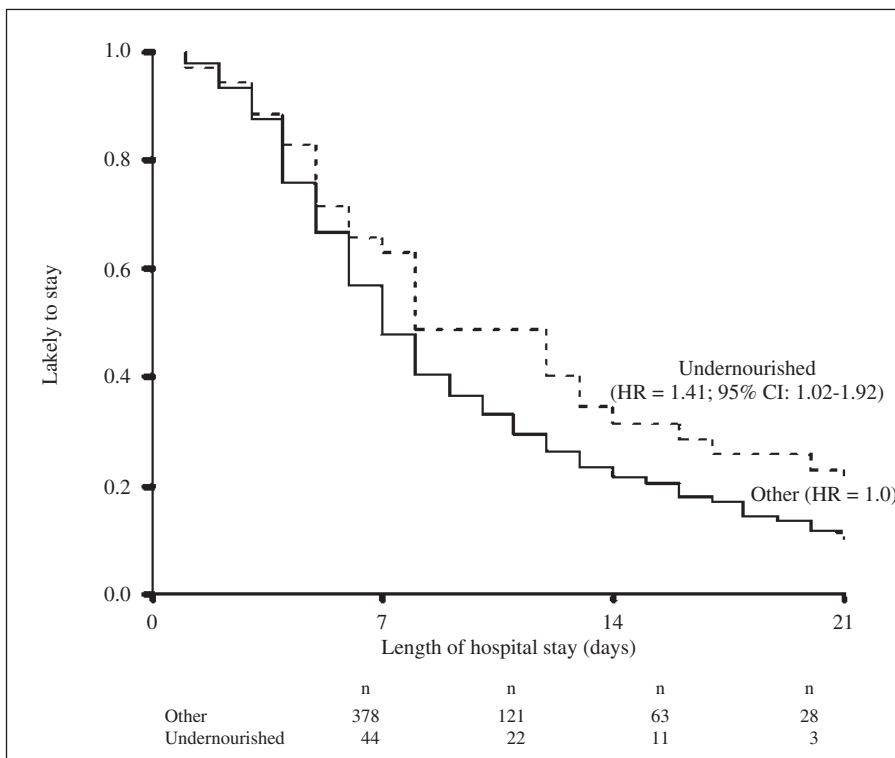

Fig. 2.—Survival curve in relation to the length of hospital stay of patients admitted undernourished compared to the nourished patients (by the classification of the Weight/Stature for children below 10 years of age and Body Mass Index for older children).

Table III

Adequacy to the recommendation, according to the age range and sex, for calories and total grams of proteins prescribed.
Data expressed in absolute numbers (%) of patients

	Admission n = 426	*7th day* n = 143	*14th day* n = 74	*21st day* n = 31
Adequate calories (90 to 110% of the RDA)	143 (33.6)	49 (34.3)	28 (37.8)	11 (35.5)
Too many calories (> 110% of the RDA)	147 (34.6)	55 (38.5)	25 (33.8)	12 (38.7)
Too less calories (< 90% of the RDA)	131 (30.8)	39 (27.3)	21 (28.4)	8 (25.8)
Adequate proteins (90 to 110% of the RDI)	54 (12.6)	12 (8.4)	5 (6.8)	3 (9.7)
Too many calories (> 110% of the RDI)	336 (78.9)	129 (90)	69 (93.2)	28 (90.3)
Too less calories (< 90% of the RDI)	31 (7.3)	2 (1.5)	0	0
No oral or enteral diet	05 (1.2)	0	0	0

RDA: Recommended Dietary Allowances; RDI: Reference Dietary Intakes.

transplantation, which justifies the high percentage of pneumopathic patients and chronic hepatopaths in longer hospital stays. Nevertheless, it was not possible to establish an association to nutritional diagnosis and the clinical diagnosis of the patients because of the small number of individuals in each category.

Regarding the adequacy of the prescription of calories and proteins,[24,25] the present study shows what is usually observed in the clinical practice: that the protein intake is superior to the recommendation. This overcharge may be necessary, once the nutritional requirements of the patients that are under metabolic stress may be higher than those of healthy subjects,[35,36] even though there is no consensus regarding the best method to estimate the requirements of hospitalized children. Moreover, even among the population, the consumption of protein is much greater than reference values.[21]

The small number of undernutrition diagnoses as a health problem in medical records is not a problem of our institution. Kanashiro[37] verified that in hospitals in Belo Horizonte, Brazil, in there was a specific note regarding the nutritional status of the patients in only 2.7% of the medical records. It is possible that factors such shared responsibility in the care of a child, failure in considering health habits, and a focus on the basic problem that led to the admission favor this lack of importance given to undernutrition as a fundamental clinical data in the patient's evolution.

Among the implications of the present study is the valorization of undernutrition as a factor associated to longer hospital stay, even as a problem that is treatable and that can be improved over hospitalization. This way, planning actions aimed at minimizing hospital undernutrition may in fact help the clinical evolution of a child.

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