The prevalence of malnutrition in a pediatric hospital of Tabriz City, Iran, in 2016

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Original Article

Abstract

BACKGROUND: Malnutrition is a disorder that results from reduction or imbalance in the absorption of food and energy. It leads to prolongation of hospitalization and increased mortality in patients. Screening reduces the costs, complications, and duration of hospitalization. We have tried to evaluate the prevalence of malnutrition in hospitalized children in Tabriz Pediatric Hospital, Tabriz, Iran, and review the validity of the standard questionnaire of Iran Ministry of Health for pediatric malnutrition.

METHODS: In this descriptive cross-sectional study, 400 patients were examined. All patients were screened for malnutrition status in the first 24 hours, using a primary nutritional assessment form. Patients were divided into two categories: no malnutrition or mild malnutrition and moderate to severe malnutrition. SPSS software was used to analyze the data.

RESULTS: Of the 400 admitted and studied patients, 238 patients were in the age range of 1 to 60 months (group I) and 162 patients were in the age range of 5 to 19 years (group II). In group I, 11 patients were diagnosed with moderate acute malnutrition (MAM). Severe acute malnutrition (SAM) is defined as weight for height of less than -3 Z-score, which means that 7 cases of patients (2.9%) had severe malnutrition or severe weight loss. In group II, there were 20 patients (12.3%) among a total of 162 patients who were overweight, and 10 patients (6.2%) were obese.

CONCLUSION: The results of this study differed from previous studies. Therefore, it is recommended that the Ministry of Health questionnaire be reconsidered, and a restudy is necessary.

KEYWORDS: Body Mass Index, Malnutrition, Overeating

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Introduction

Malnutrition is a nutritional disorder that results from reduction or imbalance in the absorption of energy, protein, vitamins, and minerals,[1] which leads to lower quality of life, increased hospital costs due to increased patient care and prolongation of hospitalization period, delay in recovery, and increased mortality in hospitalized patients.[2,3]

Malnutrition in patients especially in hospitalized patients has been known for over 20 years.[4,5] The risk of mortality in children with malnutrition is higher. If children with moderate malnutrition do not receive appropriate treatment support, their disease progresses to severe malnutrition, which is life-threatening. Therefore, malnutrition management is considered a community health priority. In Europe and the United States (US), 40 to 50 percent of hospitalized patients had malnutrition at the onset of admission, and this percentage increased with

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age increasing.[6,7] On the other hand, malnutrition intensifies during the hospitalization period, which is related to the underlying disease or psychosocial factors. Ultimately, it is possible to see anorexia, increased nutritional requirements, difficult swallowing, and nausea and vomiting.[2-9] Lack of proper nutrition screening despite the high prevalence of malnutrition caused that this disease remains unknown and incurable.[5,10-17] The Supplemental Nutrition Assistance Program guidelines mention nutrition screening as the first step in nourishing care during admission.[11] One of the ways to reduce the burden of severe malnutrition is to prevent it in children younger than two years (who are most vulnerable to injury).[14] Early diagnosis and screening of these patients reduces the complications of the disease, duration of hospitalization, and hospital costs.[5,10,12] Screening and rapid nutrition interventions also improve the care quality of treatment group.[10] About 12.6% of 6.9 million deaths of children under the age of 5 years, which includes more than 800000 deaths, are due to malnutrition. Rapid diagnosis of patients using screening methods based on weight condition, weight loss and dietary intake, body mass index (BMI), and eating disorders,[13] and then nutritional interventions such as nutritional counseling, providing educational pamphlets, supplements, and supportive feeding through tubes or intravenously can improve the nutritional status of patients.[15,16] Complete nutrition assessment is very time-consuming and expensive.[1] The goal of nutritional screening is the rapid identification of patients with malnutrition or at risk of malnutrition.[12] In this study, we have tried to evaluate the prevalence of malnutrition in hospitalized children in Tabriz Pediatric Hospital, Tabriz, Iran, and to review the strengths and weaknesses of the standard questionnaire of Iran Ministry of Health for pediatric malnutrition.

Materials and Methods

In this descriptive cross-sectional study, all children and adolescents who were admitted to Tabriz Pediatric Hospital from the start to end of the study (3-month period in 2016) and their samples reached 400, were evaluated under initial nutritional assessment. The criteria for entering were all children and adolescents who were between 1 month and 18 years old and admitted to different wards. Patient exclusion criteria included admission to the emergency department, neonatal ward, and neonatal intensive care unit (NICU), and admission for less than 24 hours in wards. All studied patients were screened for malnutrition status in the first 24 hours after admission using a primary nutritional assessment form, done by an intern medical student who had enough training to evaluate nutritional indicators. All patients' information such as name, gender, date of birth, weight, and height were recorded.

For patients requiring a nutritional expert assessment, specialist assessment and follow-up sheets were considered in the patient's file. Patients' entry criterion for a nutritional expert assessment was responding yes to each of the information collection form questions, and then they were referred to the nutrition expert for advice, by completing the consultation request form. All completed datasheets included initial evaluation sheets, specialized evaluation, and the patient's nutritional status follow-up reports at the end of the study. All patients were examined in the last 24 hours of hospitalization period, and also if the patients were admitted for more than one week, they were re-evaluated for malnutrition status. In the case of re-admission of children during the study or at least for 3 months, the child was not considered as a new patient.

SPSS software (version 24, IBM Corporation, Armonk, NY, USA) was used for data analysis. Descriptive statistics including frequency distribution tables, percent frequency, mean,

standard deviation (SD), and absolute and relative frequency (percent) were used to describe the research variables. Final results were presented after the analysis in the form of tables and charts. A histogram chart was used for quantitative variables and bar charts and pie charts were used for qualitative variables.

Results

Of the 400 admitted and studied patients, 238 patients were in the age range of 1 to 60 months (group I) and 162 patients were in the age of 5 to 19 years (group II). In both age groups, the number of girls and boys was almost equal. The mean age in the group I was 20.91 months and in group II was 8.12 years. Average of height and weight in groups I was 78.89 cm and 10.42 kg, respectively. In group II, the average height was 16.75 cm and the average weight was 12.36 kg. In this study, group I has been hospitalized for on average 6.82 days, while the other age group was admitted for 5.54 days (Table 1).

Malnutrition in patients of 1 to 60 months old: Z-score table of patients' weight-height shows that the weight distribution chart is a chart which has a normal and bell-shape distribution that has the largest number of patients in the Z-score of between -1 and 1, and the Z-score becomes smaller by getting away of it.

Table 1. Weight-height Z-score distribution in the age group of 1 to 60 months (group I)

Z-score	n (%)	Cumulative percentage
0	2 (0.8)	0.8
-3 >	7 (2.9)	3.8
-3 ≤-< -2	11 (4.6)	8.4
-2 ≤-< -1	31 (13.0)	21.4
-1 ≤-< 0	62 (26.1)	47.5
0 ≤,-< 1	65 (27.3)	74.8
1	16 (6.7)	81.5
1 <-≤ 2	33 (13.9)	95.4
2 <	6 (2.5)	97.9
3 <	5 (2.1)	100
Total	238 (100)	

Therefore, the variable has a normal distribution. According to the definitions given in the methodology, 11 patients were diagnosed with moderate acute malnutrition (MAM). Severe acute malnutrition (SAM) (severe weight loss) is defined as weight for height Z-score of less than -3, which means that 7 cases of patients (2.9%) had severe malnutrition or severe weight loss.

Malnutrition in the group of 5 to 19 years old: Table 2 shows the patients' Z-score distribution based on BMI. Based on this table, most of the patients were in the range of -1 to 1 Z-score. According to the Iran Ministry of Health definition which has been presented in the methodology, in the age range of 5 to 19 years, overweight is to have a BMI with a Z-score of more than 1 to 2, and obesity is to have a BMI with a Z-score of more than 2. Based on this and according to the table above, in the present study, there were 20 patients (12.3%) among a total of 162 patients aged 5 to 19 years who were overweight and 10 patients (6.2%) were obese.

Table 2. Body mass index (BMI) Z-score distribution in the age group of 5 to 19 years (group II)

Z-score		n (%)	Cumulative percentage
Valid	-3 >	2 (1.2)	1.2
	-3 ≤-< -2	7 (4.3)	5.6
	-2 ≤-< -1	15 (9.3)	14.8
	-1 ≤-< 0	34 (21.0)	35.8
	0 ≤-< 1	65 (40.1)	75.9
	1	9 (5.6)	81.5
	1 <-≤ 2	20 (12.3)	93.8
	2 <	5 (3.1)	96.9
	3 <	5 (3.1)	100
	Total	162 (100)	

Discussion

Of the 400 admitted and studied patients, 238 patients were in the age range of 1 to 60 months (group I) and 162 patients were in the age range of 5 to 19 years (group II). In group I, 11 patients were diagnosed with

MAM. SAM (severe weight loss) is defined as weight for height Z-score of less than -3, which means that 7 cases of patients (2.9%) had severe malnutrition or severe weight loss. In group II, there were 20 patients (12.3%) among a total of 162 patients who were overweight and 10 patients (6.2%) were obese. In the present study, a total of 400 patients were referred and hospitalized in different departments of Tabriz Pediatrics Hospital for one year. According to our searches in the SID, PubMed, MEDLINE, and Google Scholar databases, a similar topic has not been ever studied in Iran. In a study done by Hendrikse et al. the study was performed on 226 hospitalized children.[18] Also, in another study which has done by Naber et al., 155 hospitalized children were examined for internal and digestive diseases.[3] In the present study, the proportion of males and females has been reported as approximately equal with the relative preference of males. Based on the charts, it seems that with the general increase in age, hospitalization reduced to some extent. Height charts in both groups had a normal distribution. In the term of hospitalization days, patients of group I were hospitalized for 6.82 days on average and those of group II for 5.54 days. Most patients were admitted for 3 days in both groups.

However, the most important indicator in this study was height and weight index based on height, weight, and BMI based on Z-score. Also, 4.62% of patients had Z-scores of more than 2 who were overeating accordingly, which is considered as malnutrition. Accordingly, 13.9% of patients had been malnourished during admission generally. In the study by Naber et al.,[3] 45% of patients were malnourished while admitting and it was shown that malnutrition often was seen in hospitalized patients. Therefore, the prevalence of malnutrition in hospitalized patients was much lower than that estimated in some previous studies based on the

Ministry of Health standard questionnaire. In the case of group II, evaluation was based on BMI. Accordingly, the distribution of patients' Z-scores in the chart shows that a total of 11.73% of patients in this age group was malnourished while admitting. Accordingly, malnutrition statistics while admitting in the group I had no significant difference with malnutrition in group II. Also, 4 patients had a decrease in the Z-score for more than 2 units, which means that they have suffered acquired hospital malnutrition. In further evaluations, all four patients had suffered from nephrotic syndrome which was not among the exclusion criteria of Iran Ministry of Health questionnaire. Therefore, According to the statistical difference between the present study and the previous studies and also the problems of the Ministry of Health questionnaire, it is suggested to carry out more extensive studies after the current questionnaire reforms.

Conclusion

In group I, 11 patients were diagnosed with MAM, which means that 2.9% had severe malnutrition or severe weight loss. In group II, 12.3% were overweight and 6.2% were obese. The results of this study differed from those of the previous studies. Therefore, it is recommended that the Ministry of Health questionnaire be reconsidered, and a restudy is necessary.

Conflict of Interests

Authors have no conflict of interests.

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