Determination of malnutrition status in hospitalized Turkish Republic citizen and refugee children with different diagnoses

Ramazan Dulkadir

Department of Child Health and Diseases, Kırşehir Ahi Evran University Ahi Evran Training and Research Hospital, Kırşehir, Turkey

ABSTRACT

Aims: Malnutrition is defined as changes in the normal body structure due to inadequate nutrition. This study aimed to determine the malnutrition status of Turkish children and refugee children.

Methods: A total of 5528 patients between the ages of 1 month and 18 years who were admitted and followed up in our pediatric health and diseases department between January 2017 and January 2020 were evaluated. The Gomez classification was used to assess malnutrition status. Demographic data, admission diagnoses, and the degree of malnutrition were retrospectively recorded by examining medical records. Both groups were compared in terms of these parameters.

Results: In our study, 5528 patients between the ages between 1 month and 18 years were evaluated. The median age was 4.1 years (min:1 month, max:17 years), with 2274 (41.1%) being female and 3254 (58.9%) being male. Among the cases, 4994 (90.5%) were Turkish, 160 (2.8%) were Afghan, 198 (3.5%) were Iraqi, and 176 (3.2%) were Syrian. According to the Gomez classification, 4379 patients (79.2%) were normal and 1148 patients (20.8%) were malnourished. Among the malnourished patients, 995 (86.7%) were mildly malnourished, 117 (10.2%) were moderately malnourished, and 36 (3.1%) were severely malnourished. 44% (n=16) of severely malnourished patients were under the age of two. The malnutrition rates were 19.7%, 22.5 %, 30.8 %, and 36.4% in Turkish, Afghan, Iraqi, and Syrian patients, respectively. There was a significant difference between Syrian and Turkish patients with mild and moderate malnutrition (P <0.05). A total of 72.3% (n=830) of patients were admitted for reasons related to infections. Malnutrition is more frequently detected in patients with gastrointestinal diseases. None of the patients were admitted solely because of malnutrition.

Conclusion: The rate of malnutrition was significant in both Turkish and refugee children, with higher rates observed among refugee patients admitted to the hospital. Therefore, children admitted to the hospital for any reason should be carefully evaluated for growth and development. Early recognition and appropriate treatment of malnutrition are believed to lead to faster treatment of the underlying diseases causing hospitalization and may help prevent recurrent admissions.

Keywords: Children, Gomez classification, malnutrition, refugee

INTRODUCTION

Malnutrition is a preventable and treatable health problem and is defined as changes in normal body structure due to inadequate nutrition.[1] While malnutrition occurs due to various diseases, trauma or surgical interventions in developed countries,[2,3] the main cause of malnutrition in developing countries is inadequate and irregular nutrition.[4] Malnutrition is a risk factor for sarcopenia, and these two conditions often occur together in children[5] that inadequate protein and energy intake, as well as deficiencies in vitamins and minerals, can contribute to the development and progression of sarcopenia. Moreover, sarcopenia can lead to a decrease in appetite and digestive function, which can further exacerbate malnutrition.

Malnutrition is remarkably high, especially in children aged 0-2, where growth rate is evident.[6-9] Therefore, malnutrition is still an important public health problem for underdeveloped and developing countries. Malnutrition is a condition that occurs when a person's diet does not provide the necessary nutrients for proper growth and development, or when the body is unable to effectively use the nutrients consumed. Anthropometric measures are physical measures of the human body that can be used to assess nutritional status and identify malnutrition.[9-11] Gomez Classification is used in our clinic to determine the malnutrition status in children with protein energy malnutrition. In the classification made by Gomez, malnutrition is according to weight for age; it is classified as light, moderate and severe.

Corresponding Author: Ramazan Dulkadir, ramazan.dulkadir@ahievran.edu.tr

The significant increase in the risk of death due to infectious diseases in the presence of malnutrition shows how important this problem is for public health. It has been reported that malnutrition are high in hospitalized children. Some studies show that the nutritional status of children worsens between 5% and 27% at discharge.[14] If malnutrition is added to gastroenteritis and respiratory tract infections in children, the risk of death increases approximately twice. It varies according to the total duration and severity of nutritional deficiency, nutritional quality, personal factors such as age, presence of infection. While it is easier to diagnose patients with severe malnutrition, patients with moderate and mild malnutrition can often be overlooked.[15] For this reason, the nutrition of hospitalized children should be questioned in detail, if there is a calorie deficiency, it should be determined, and anthropometric measurements and biochemical parameters should be evaluated.[16] The high number of refugee children living in our country and the fact that these children have to live under poor socioeconomic conditions suggest that they are at greater risk in terms of malnutrition. Although there are not many studies investigating the malnutrition status of hospitalized children, there are limited studies on the malnutrition status of refugee children. The aim of this study is to determine the malnutrition status of Turkish and refugee children hospitalized in the pediatric health and diseases service of a training and research hospital in a city center.

METHODS

The study was carried out with the permission of Kırşehir Ahi Evran University Faculty of Medicine Clinical Researches Ethics Committee (Date: 03.11.2020, Decision No: 2020-16/120). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

This is a descriptive study and the population of the study consists of pediatric patients hospitalized in Kırşehir Training and Research Hospital, Pediatric Health and Diseases Service. The sample of the study consists of 5528 pediatric patients aged 1 month to 18 years who were hospitalized and followed up in Kırşehir Training and Research Hospital pediatric health and diseases service between January 2017 and January 2020. Inclusion criteria for the research; hospitalization on the specified dates and exclusion criteria; to have intrauterine growth retardation, to have a history of premature birth, to have a neurometabolic disease, to be syndromic and to have a chronic disease. Patients were divided into groups according to their nationalities and age groups. The age groups were determined as 0-2 years, 3-5 years, 6-12 years and 13-18 years. According to their

nationality; They were divided into four groups as Turkish, Afghan, Iraqi, and Syrian. Hospitalization diagnoses, demographic characteristics and malnutrition status of all cases were recorded retrospectively. Sociodemographic characteristics and hospitalization diagnoses of the children included in the study were obtained from the patient file. The anthropometric measurements of the children were measured by the same health personnel at the same time of the day with the same weight and height meter. Weight and height measurements were evaluated using reference values accepted according to the children of our country. 17 Children with protein-energy malnutrition are generally evaluated according to the Gomez and Waterlow classifications. 18 Those whose weight for age is between 90-110% are normal, those between 75-89% are mildly malnourished (Grade 1), those between 60-74% are moderately malnourished (Grade 2), and those below 60% are severe (Grade 3). were accepted as malnourished.[18] SPPS 25 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) statistical package program was used to evaluate the data. Variables mean±standard deviation and Median (Maximum-Minimum) percentage and frequency values were used. Variables were evaluated after controlling for normality and homogeneity of variances (ShapiroWilk and Levene Test). While performing data analysis, one-way analysis of variance was used for comparison of three or more groups and the Tukey HSD test, which is one of the multiple comparison tests, was not provided by the Kruskal Wallis test and the Bonferroni-Dunn test, which is one of the multiple comparison tests, was used. Categorical data were analyzed with Fisher'sExact Test and Chi-Square test. In cases where the expected frequencies are less than 20%, an evaluation was made with the "Monte Carlo Simulation Method" in order to include these frequencies in the analysis. The values of p<0.05 and p<0.01 were accepted for the significance level of the tests.

RESULTS

In our study, a total of 5528 patients aged 1 month to 18 years were evaluated. The median age was 4.1 years (min: 1 month, max: 17 years), 2274 (41.1%) were girls, 3254 (58.9%) were boys.

The distribution of patients by age and gender is summarized in **Table 1**.

Table 1. Distribution of cases by age and gender		
Gender/age	**Female n (%)**	**Male n (%)**
0-2	1094 (41.5)	1542 (58.5)
3-5	538 (41.8)	748 (58.2)
6-12	485 (38.4)	777 (61.6)
13-18	157 (45.6)	187 (54.4)
Total	2274 (41.1)	3254 (58.9)

47.6% (n: 2636) of the patients were 1 month - 2 years old, 23.2% (n: 1286) were 3-5 years old, 22.8% (n: 1262) were 6-12 years old and 6.2% (n : 344) was observed to be between the ages of 13-18. Of the cases 4994 (90.5%) were Turkish, 160 (2.8%) were Afghans, 198 (3.5%) were Iraqi, and 176 (3.2%) were Syrians (**Table 2**). According to the Gomez classification, 4380 (79.3%) of 5528 patients were normal and 1148 (20.7%) were malnourished. Of the cases, 995 (86.7%) were mildly malnourished, 117 (10.2%) were moderately malnourished and 36 (3.1%) were severely malnourished. The malnutrition degrees of the patients according to age are shown in **Table 3**. 44% of severely malnourished patients were under 2 years of age (**Table 3**).

Table 2. Distribution of the cases according to their nationality and gender

Gender / nationality	Female n (%)	Male n (%)
Afganistan C.	72 (45)	88 (55)
Iraqi C.	90 (45.4)	108 (54.6)
Syrian C.	73 (41.4)	103 (58.6)
Turkish C.	2039 (40.8)	2955 (59.2)
Total	2274 (41.1)	3254 (58.9)
C: Citizen		

Table 3. Distribution of malnutrition degree of cases according to age and Gomez classification

Malnutrition/age	Slight n (%)	Moderate n (%)	Severe n (%)
0-2	503 (87.4)	56 (9.8)	16 (2.8)
3-5	213 (92.2)	17 (7.3)	1 (0.5)
6-12	226 (67.9)	29 (11)	9 (3.4)
13-18	53 (86.6)	15 (19.3)	10 (12.8)
Total	995 (86.6)	117 (10.2)	36 (3.2)

When the malnutrition status of the patients included in the study was examined according to the nationality and Gomez classification, the malnutrition rate was 19.7% in Turkish children, while this rate was 22.5% in Afghan children, 30.8% in Iraqi children, and 36.4% in Syrian children (**Table 4**). In addition, 30.1% (n=161) of malnourished children are refugees (**Table 5**).

Table 4. Distribution of the cases by nationality and malnutrition status

Malnutrition / Nationality	Malnourished n (%)	Normal n (%)
Afganistan C.	36 (22.5)	124 (77.5)
Iraqi C.	61 (30.8)	137 (69.2)
Syrian C.	64 (36.4)	112 (63.6)
Turkish C.	987 (19.7)	4007 (80.3)
Total	1148 (20.7)	4380 (79.3)
C: Citizen		

Table 5. Malnutrition status in refugee patients

Malnutrition	Malnourished n (%)	Normal n (%)
Refugee	161 (30.1)	373(8.5)
Turkish Citizen	987(69.9)	4007(91.5)
Total	1148 (100)	4380 (100)

The degree of malnutrition depending on the nationality and age of the patients who participated in the study was examined and **Table 6** was obtained. Considering the age groups in refugee patients, severely malnourished patients were detected in the 0-2 age group, while severe malnutrition was detected in all age groups in Turkish patients. A significant difference was found in mild and moderate malnutrition between Syrian and Turkish patients (p<0.05) (**Table 6**).

Compared to other refugee patient groups, severe malnutrition has been detected in Syrian patients at advanced ages. This rate was found to be 30.1% for all refugee children (**Table 6**).

Table 6. Evaluation of malnutrition degrees according to nationalities and age groups

		Nationality				Total	p
		Afgan	Iraqi	Syrian	Turkish		
Age							0.054
0-2 years	n	117	143	116	2365	2741	
	%	4.3%	5.2%	4.2%	86.3%	100.0%	
3-5 years	n	29	41	29	1164	1263	
	%	2.3%	3.2%	2.3%	92.2%	100.0%	
6-12 years	n	26	23	27	1169	1245	
	%	2.1%	1.8%	2.2%	93.9%	100.0%	
13 years and over	n	8	8	6	319	341	
	%	2.3%	2.3%	1.8%	93.5%	100.0%	
Malnutrition Percentage							0.035*
Slight	n	36[a,b]	58[a,b]	47[b]	857[a]	998	
	%	3.60%	5.80%	4.70%	85.90%	100.00%	
Moderate	n	6[a,b]	11[a,b]	14[b]	98[a]	129	
	%	4.70%	8.50%	10.90%	76.00%	100.00%	
Severe	n	2[a]	1[a]	2[a]	16[a]	21	
	%	9.50%	4.80%	9.50%	76.20%	100.00%	
p<0,05							

Of the malnourished cases included in the study, 72.3% (n=830) were followed up in the ward for infection-related and 27.7% (n=318) for non-infectious reasons. 19.9% (n=228) of all cases had upper respiratory tract infection (URTI), 17.9% (n=206) had lower respiratory tract infection (LRTI), 26.7% (n=306) had gastrointestinal system diseases (GIS), 7.8% (n=90) urinary system infection (UTI), 27.7% (n=318) of the patients followed in the service with other diagnoses (falling down, intoxication, etc.). Among all infection-related cases, malnutrition was found more frequently in hospitalized patients with the diagnosis of gastrointestinal tract infections (**Table 7**).

Table 7. Distribution of patients with malnutrition according to hospitalization diagnoses

Diagnosis of Hospitalization	n	(%)
Upper Respiratory Tract Infection	228	19.9
Lower Respiratory Tract Infection	206	17.9
Gastrointestinal Tract Infection	306	26.7
Urinary Tract Infection	90	7.8
Other	318	27.7
Total	1148	100

There were no patients hospitalized only for malnutrition.

DISCUSSION

Malnutrition alone is seen as the source of deaths in the world. It is reported that approximately 13 milion children under the age of 5 die every year due to malnutrition. The most severe symptoms of nutritional deficiencies ocur in this age group, where nutritional and energy needs are higher than in other ages. Refugee patients frequently followed up and treated in our hospital. It was concluded that it is necessary to determine the malnutrition status of these patients, especially during the care of patients requiring hospitalization.

Malnutrition has not lost its importance in developing countries. Early diagnosis and treatment are of great importance in order to eliminate its negative effects. The diagonosis of heavy malnutrition patients is much more easier than patients with low or middle malnutrition. However, it is reported that malnutrition rate is high in hospitalized patients. Thats why patients who hospitalize in the European Clinic Nutrition and Metabolism society (ECNM), American Parenteral and Enteral Nutrition society (APEN) and European Pedaitric Gastroenterlogy, Hepatology and Nutrition society (ESPGHAN) are attracting attention. In this way it is stated that both the early treatment of malnutrition related complications and the reduction of hospitalization times can be achieved.

According to our study the prevalance of malnutrition was found to be 20.7% among hospitalized patients over a 3-year period. In a study conducted in Canada with 307 pediatric patients, the rate of malnutrition was found to be 19.5% in children during hospitalization.[19] 1022 Patients who applied to the policlinic of Gül[20] and his collegues was found a malnutrition frequency of 22.3%. In the study conducted by Özer and his collegues the frequency of malnutrition in children aged 1 month to 6 years was found to be 55.1%. In the study conducted by Şahin[21] and his collegeues the frequency of malnutrition was found 44.7%. It is concluded with these studies the rate of malnutrition decreases over the time. However this difference may have arise due to the wider age range of the patients in our study. The fact that almost half of the malnutrate cases are in the first 2 years and 70%

are under the age of 5 may support this. In the sutdy conducted by Mevlitoglu[22] and his collegues in which 500 children participated it was seen that similar rates were reported with the increase in age range. Although the malnutrition rate in our country has decreased over time it is noteworthy that the malnutrition rate is much lower (6-10%) in European countries.

We used in our study the Gomez[11] clasification. In our study with 5528 patients we found malnutrition in 20,7% of those hospitalized according to the Gomez classification. Cases with malnutrition 86.7% were mild, 10.2 moderately and 3.1% was severy. In the study by Geylani[15] and his collegues malnutrition was found in 47.3% of 260 children participating in the study and 83 (32%) of them were mildly malnutrate, 24 (9.2%) moderately, 16 (6.1%) severely malnutrate. In a study by JiaCao[23] and his collegues the percentages of children with severe, moderate and mild malnutrition were found to be 9.1% (121), 43.3% (574) and 47.6%(630), respectively. In a study by Pars[24] and his collegues according to the Gomez[11] malnutrition classification system, moderate and severe malnutrition was found in 17.5% (10% moderate malnutrition; 7.5% severe malnutrition) during hospitalization and 25.1% in middle and severy. The reason for this difference may be that the living conditions are better today.[12] In a pilot study conducted in Greece, the prevalence of malnutrition in refugee children was found to be 13%.[13] It has also been reported that malnutrition is common among Palestinian refugee children living in camps in Jordan.[25] In a study conducted in Lebanon, malnutrition was found to be moderate in Syrian refugee children. We evaluated the malnutrition status of refugee child patients who were hospitalized in our hospital due to the high refugee population in our city. The malnutrition rate in refugee patients was found to be higher than in patients who were citizens of the Republic of Turkey. There was no statistically significant difference between malnutrition status and nationality. This may be due to the high number of children who are citizens of the Republic of Turkey. In addition, when the malnutrition degrees of the children included in the study were examined according to age groups, it was determined that malnutrition was more common in the 0-2 age group in all groups. Considering that hospital admissions in this age group are high due to infectious reasons, malnutrition coexistence should be considered, and therefore it can be said that malnutrition should be evaluated at the time of admission to the hospital. Thus, it is thought that serious health problems that may arise from the combination of malnutrition and infection can be prevented. In studies similar to our study, malnutrition was found to be more common in infancy. Considering the living conditions and nutritional status of refugees, refugee children live in more unfavorable conditions than Turks.

CONCLUSION

In the study it was determined that the malnutritrion rate in Turkish children which is higher in hospitalized refugee children should not to be underestimated. It has been determined that malnutrition is more common in Syrian children than in other refugees. It is recommended to carry out studies in which initiatives are planned to evaluate living conditions and nutritional habits in the whole society, especially in vulnerable groups such as refugees. In the sutdy it was determined that children with malnutrition were mostly hospitalized due to gastrointestinal system diseases. Therefore determining the direction of the relationship between infectious diseases and malnutrition; it is recommended to plan studies that reveal whether infection is a cause or a consequence of malnutrition. Since malnutrition is a preventable health problem, it is recommended that children who are hospitalized should be carefully evaluated in terms of growth and development, and early diagnosis and treatment of malnutrition should be provided. Thus, it is thought that with early recognition and appropriate treatment of malnutrition, faster treatment of diseases that cause hospitalization and therefore prevention of recurrent hospitalizations can be achieved.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Kırşehir Ahi Evran University Faculty of Medicine Clinical Researches Ethics Committee (Date: 03.11.2020, Decision No: 2020-16/120).

Informed consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer reviewed.

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