Nutritional evaluation of non-traumatic patients admitted to the hospital from Emergency Department

Ş. GÜRBÜZ[1], M. EKMEKYAPAR[2], M.A. DURAK[3], H. OĞUZTÜRK[4], M.G. TURTAY[1], N. YÜCEL[1], T.Ö. DEMIR[1], C. ÇOLAK[5]

[1]Department of Emergency Medicine, School of Medicine, Inonu University, Malatya, Turkey
[2]Department of Emergency Medicine, Malatya Education and Research Hospital, Malatya, Turkey
[3]Department of Neurosurgery, School of Medicine, Inonu University, Malatya, Turkey
[4]Department of Emergency Medicine, Gülhane School of Medicine, Ankara City Hospital, Health Sciences University, Ankara, Turkey
[5]Department of Biostatistics, School of Medicine, Inonu University, Malatya, Turkey

Abstract. – OBJECTIVE: Malnutrition is a common condition, especially among hospitalized patients which are overlooked by many clinicians. Malnutrition was found to be associated with increased hospitalization duration, increased admission frequency, increase in infection frequency and severity, bad wound healing, gait disturbances, fallings, and fractures. In this study, we aimed to determine malnutrition frequency in patients who were admitted to the emergency department for non-trauma causes and hospitalized.

PATIENTS AND METHODS: 245 patients were admitted to the Emergency Department for non-trauma causes and hospitalized and 245 control group patients were included in this study. Hospitalized patients were assessed with NRS-2002 (Nutritional Risk Screening) and Mini Nutritional Assessment (MNA). Age, gender, height, weight, body mass index (BMI), malnutrition status, and wards of the patients were screened.

RESULTS: 140 (57.1%) of the hospitalized patients had malnutrition according to NRS-2002 and MNA. There was a statistically significant difference between the control group and the hospitalized patients who were malnourished (Pearson chi-square test; $p<0,001$). There was a significant relation between hospitalized departments and malnutrition ($p<0.05$). There was a significant difference in age and height between hospitalized patients and the control group ($p<0.0001$) whereas no significant difference was found between the height and BMI ($p>0.05$). There was a significant relationship in terms of hospitalization and malnutrition.

CONCLUSIONS: The nutritional state of the patients admitted to the emergency department for non-trauma conditions is an important factor and should not be overlooked.

Key Words:
   Malnutrition, Hospitalized patients, NRS-2002, MNA.

Introduction

Malnutrition is a prevalent morbidity and mortality cause in developing countries. World Health Organization estimates that malnutrition contributes to 55% of the child deaths in the world, directly or indirectly. Prevention of malnutrition, detecting people with malnutrition, and treating them is important for these countries.

Malnutrition is defined as deficiency in nutrient intake,as well asnutrient ingredients absorption causing a decrease in fat and muscle mass in the body[1,2]. Malnutrition is defined according to European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines as body mass index (BMI) below 18.5 kg/m² or, either a low BMI (<20 kg/m² for <70 years or <22 kg/m² for ≥70 years) or low fat-free mass index (FFMI) (FFMI of <15 and <17 in women and men, respectively) with unintentional weight loss (>10% in an indefinite time frame or >5% in the last three months)[3]. Prevalence of malnutrition in the old population was reportedas between 1% and 24.6%[4].

Malnutrition can cause significant problems in the human body. Deficiency in nutrient intake may result in impairment in cellularmetabolism, as well asorgan and system function, such as gastrointestinal smooth muscle atrophy, weakenedimmunity, deterioratedhealing of wounds and anastomoses. These alterations may also cause costs with increased stay time-period and rehospitalizations rates (lengthened healing period, increased healthcare etc)[5].

Malnutrition is a problem seen in 20-50% of hospitalized patients. This condition preexists

in most patients; however, itoccurs during their stay in hospital for some patients[6]. The malnutrition rate is high in intensive care patients with the frequency in the range between 30-50%. It is observed that these patients may have had malnutrition during admission; however, acquired malnutrition during their stay may also be observed in patients with their medical condition[7,8]. It is also reported that malnourished patients have higher mortality and morbidity rates, and their admission durations are longer with more medication requirement[9]. In our study, we investigated the frequency of malnutrition status in patients who were admitted to the Emergency Department for non-trauma causes and hospitalized and the effects of malnutrition on these patients using NRS-2002 (National Risk Screening) and Mini Nutritional Assessment (MNA).

Patients and Methods

Ethical Approval and Patient Selection

The Ethics Committee Approval was obtained from the Inonu University Faculty of Medicine Ethics Committee with the protocol code 2015/194. 490 patients admitted to the Emergency Department were included in the study. 245 of them were hospitalized and 245 of them were not hospitalized. Patients younger than 18 or admitted to the emergency department for trauma and burns were not enrolled. Age, gender, height, weight, body mass index (BMI), malnutrition status, admitted department (intensive care or wards) of the patients were recorded. No additional tests were performed as part of the study.

Study Protocol

NRS-2002 and MNA evaluation tests were performed for hospitalized patients and the control group. Patients who had NRS-2002 total score of ≥3 were defined as malnourished. As per MNA evaluation, the patients were categorized as well-fed (≥24), under risk (17-23) or significant malnutrition (<17), and 23 and below,wereaccepted as malnourished. Hospitalized patients were classified as malnourished and normally nourished according to the nutritional evaluation test results. Demographic characteristics of the patients with malnourishment and normal nutrition were presented.

Statistical Analysis

The data were expressed as mean (standard deviation, SD) or frequency with the percentage depending upon overall variable distribution. Normality was assessed using the Shapiro-Wilk test. Qualitative data were analyzed with Pearson Chi-square test and Fisher's exact test. The groups were compared using an independent samples t-test. $p<0.05$ values were considered as significant. IBM SPSS statistics version 23.0 for Windows (IBM Corp., Armonk, NY, USA) was used for statistical analyses.

Results

490 patients were enrolled in this study, 245 of them being admitted to the emergency department and hospitalized, and 245 of them is not hospitalized.165 of the hospitalized patients were male and 80 of them were female. The mean age, height, and weight values of these patients were 60.96 ± 17.52, 166.79 ± 8.08 cm, and 71.53 ± 14.44 kg, respectively. The mean age of the control group was 49.10 ± 17.93 and the mean height was 169.64 ± 9.7 cm. The difference between the mean weight of the hospitalized patients (71.53 ± 14.44 kg)and the control group(72.22 ± 16.11 kg) was not statistically significant. There was a significant difference in age and height between hospitalized patientsand the control group whereas there was no significant difference in weight and BMI ($p>0.05$). No significant difference was found between the mean BMI of hospitalized patients (25.68 ± 4.83)and the control group (25.01 ± 5.02)(Table I).

140 (57.1%) of the hospitalized patients had malnutrition. 39 (21.8%)the of the control group had malnutrition (Table II). There was a significant difference between malnourished patients who were admitted to the control group (Pearson chi-square test; $p<0.001$). 41 of these patients were admitted to the intensive care unit and 99 were admitted to the wards. There was no significant relation between malnutrition and intensive care or wards admission. 72 (29.4%) of the patients were admitted to the intensive care unit whereas 173 (70.6%) of the patients were admitted to the wards. There was no significant difference between admission to the intensive care unit or the wards in malnourished patients who were hospitalized.The department with the most admission was cardiology with 66 patients (26.9%), pulmonology with 34 patients (13.9%), and neurology with 31 patients (12.7%). There was a significant difference in patients who were admitted to cardiology, medical oncology, and ne-

phrology departments in terms of malnourishment (p<0.05). There was no significant difference in terms of malnourishment in other departments.

The mean age of the malnourished hospitalized patients (50.7 ± 17.6) was significantly lower than the mean age of the hospitalized patients (62.5 ± 18.1). The mean height of the malnourished patients (169.4 ± 9.2 cm)was significantly higher than non-malnourished patients(166.2 ± 8.4 cm). There was a significant difference between the mean weight of the non-malnourished patients (74.1 ± 14.9 kg)and malnourished patients (68.1 ± 15.1 kg) and mean BMI of non-malnourished patients (25.81 ± 5.03)and malnourished patients (24.55 ±4.65) (p<0,001) (Table III). There was no relationship between gender and malnutrition.

Discussion

Malnutrition is characterized by structural deficiencies and functional disorders in organs resulting from deficiencies of macro or micro nutritional factors needed by the tissues.It is one of the most important factors which have negative effects on health, especially in elderly patients[10]. The nutritional status of the patients is an overlooked factor that may affect patient's well-being. Some studies[11,12] suggest that the malnutrition rate ranges between 20-50%. Malnutrition is usually underdiagnosed, especially in hospitalized patients, hence it is untreated. One cause of this is insufficient education and experience of the healthcare professionals about malnutrition[13]. We investigated the malnutrition status of the two groups of the patients in this study; first, the patients who were admitted to the emergency department and hospitalized, and the second, the patients who were discharged from the emergency department (control group). We found a significant statistical difference between patients in the hospitalized group (n = 140, 57.1%) and the control group (n = 39,15.9%).

A previous study[14] that included 234 elderly patients (40.6% female) with a mean age of 83.6 ± 7.6 and investigatedthe malnutrition status of the patients found that the BMI of 41% of the participants was lower than the cut-off value (23 kg/m^{2}) for elders, also 63 (29.6%) of the patients had malnutrition and 109 (46.6) of the patients were under malnutrition risk according to Mini Nutritional Assessment Short-Form (MNA-SF). In our study, the mean age of the 245 patients including 80 female (32.6%) and 165(67.4%) male,

Table I. Demographic characteristics of patients and control group.

	Patient Group	Control Group
	(n = 245)	(n = 245)
Age (years)	60.96 ± 17.52	49.10 ± 17.93
Height (cm)	166.79 ± 8.08	169.64 ± 9.7
Weight (kg)	71.53 ± 14.44	72.22 ± 16.11
BM (kg/m²)	25.68 ± 4.83	25.01 ± 5.02

who were hospitalized was 60.96 ± 17.52. In another study[15] with 592 participants, malnutrition status of the patients was assessed using, MNA and MNA score <17 was defined as malnutrition, 17-23.5 was defined as under malnutrition risk and the rest was defined as normal. 93 (15.7%) of these patients had malnutrition and 306 (51.7%) patients were under malnutrition risk[15]. In our study, there were 140 (57.1%) patients who were malnourished and under malnutrition risk in the hospitalized group and this was lower than the literature. We think that the reason for this is that while studies on malnutrition mostly include elderly patients, we included patients aged 18 and over in our study.

In a study with 102 hospitalized patients, BMI of the patients were assessed, and it was found that 93 patients had normal BMI, 5 had a mild decrease and 4 had a moderate decrease in BMI[6]. In our study, mean BMI of hospitalized patients (25.68 ± 4.83)and control group (25.01 ± 5.02) was not significantly different. However, in hospitalized patients' group, mean BMI of the malnourished patients (24.55 ± 4.65) was significantly lower than patients without malnutrition (25.81 ± 5.03).

Malnutrition in the hospitalized patients is a widespread problem that may cause increased hospital stay duration, healthcare expenses and mortality rates. Also, patients with malnutrition may suffer from serious clinical problems, such as delays in wound healing, immune suppression and decrease in functional capacity[16]. In a study investigating malnutrition status of 50 patients who underwent open heart surgery, nutrition status was assessed using NRS-2002 and BMI, weight, and height, and comorbidities of the patients were interrogated. 35 (70%) of these patients were male and 15 (30%) were femalewith mean height, weight and BMI values as 165.42±9.00, 75.22±13.83 and 27.61±5.01, respectively[17]. In our study, 165(67.4%) of hospitalized patients were male and 80 (32.6%) were female and mean age was 60.96±17.52. Their mean height was 166.79±8.08, mean weight was 71.53±14.44 and

Table II. Malnutrition rates in patient and control groups.

	Patient Group		Control Group	
	n	%	n	%
Malnourished	140	57.1	39	15.9
No malnutrition	105	42.9	206	84.1
Total	245	100	245	100

the mean BMI of the patients was 25.68±4.83. Gender ratio, age, height, weight and BMI values of the patients were similar to other data in the literature[17].

Malnutrition screening is an important step towards identifying malnutrition risk or diagnosis[18]. However, screening often cannot be completed due to time and resource restrictions[19,20]. MNA is a nutrition screening on clinical nutrition and hydration recommended by ESPEN[18,21]. It also takes physical and mental function disorders which regularly contributes to malnutrition development into account, hence, it covers malnutrition risk[18,22]. In a study including 353 patient, 209 (59.2%) of which were female with a mean age of 79.6±7.0, MSA-SF method was used to categorize patients over 65 who were admitted to the emergency department, and it was found that 27 (7.6%) of them had malnutrition and 99 (28%) of them were under risk of malnutrition[23].

Although malnutrition is a condition frequently seen in cancer patients, it varies depending on the type, location and stage of the cancer. It is known that there are nutritional disorders in 50% of the patients with lung cancer, one of the most widespread cancers types[24]. In a study by Zhang et al[25], malnutrition status of 103 patients with lung cancer was assessed using MNA and MNA-SF. It was demonstrated that 12.6% of these patients had malnutrition while 31.3% had risk of malnutrition and 56.3% had sufficient nutritional state. In our study, there was a significant difference between the patients admitted into oncology department who had malnutrition or

not. It is clear that nutrition is an important issue in cancer patients as well as many other patients. These results suggestthat early diagnosis and treatment of malnutrition may increase treatment success and improve quality of life, increase survival, and decrease hospital stays and mortality.

Insufficient nutrition is one of the leading conditions seen in the elderly. There are several factors affecting aging, and nutrition is an important factor among them. Although insufficient nutrition is a natural factor of aging, elderly people are under the risk of malnutrition depending on physiological, psychological and social variables[26]. As a result of malnutrition of elderly people, the need for health and social services increases, causing them to apply to more health centers and need more care. Hence, early diagnosis and treatment for malnutrition in the elderly population is important[27,28]. In a study investigating malnutrition status of 330 people aged over 65 and staying in a nursing home, it was found that 51 (15.5%) had malnutrition (MNA<17) and 116 (35.1%) were under the risk of malnutrition (MNA = 17-23.5)[29]. In our study, 140 (57.1%) of 245 hospitalized patients had malnutrition (MNA ≤23). Treating malnutrition in these patients will significantly contribute to a healthier life and decrease the costs in the health system.

In many Western countries, healthcare professionals encourage consuming healthy food while decreasing energy amount whereas morbidity and mortality rates are directly related to protein and energy malnutrition in the developing countries. Also, assessing economic principles and inspecting cost effects on healthcare based on these assessments is well established nowadays[30].

Conclusions

Assessing malnutrition status of the patients and providing nutritional support if necessary is an important factor to consider. Providing required

Table III. Relationship of malnutrition and demographic characteristics of the hospitalized patients.

	Malnourished patient group	Non-malnourished patient group
	(n=140) (57.1%)	(n=105) (42.9%)
Age (years)	62.5 ± 18.1	50.7 ± 17.6
Height (cm)	166.2 ± 8.4	169.4 ± 9.2
Weight (kg)	68.1 ± 15.1	74.1 ± 14.9
BM (kg/m²)	24.55 ± 4.65	25.81 ± 5.03

nutrition support could improve quality of life of the patients and improve their survival by increasing treatment success rates and provide economical gains on healthcare system by decreasing the hospital stay duration and healthcare costs. The malnutrition status of the patients who is admitted to the emergency department is often overlooked in favor of their other medical problems, however, it should be kept in mind as one of the most important factors in decision making for hospitalization.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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This research did not receive any financial support.

Ethical Approval

We obtained the Ethical Committee Approval with 2015/194 protocol code from Inonu University Faculty of Medicine Ethical Committee, Malatya, Turkey.

All procedures performed in studies involving human participants were done in accordancewith the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all participants included in the study.

ORCID ID

ŞG: 0000-0003-2616-0304.
ME:0000-0001-7008-2695.
MAD:0000-0003-0827-2708.
HO: 0000-0002-9800-1428.
MGT: 0000-0002-1728-8237.
NY: 0000-0001-5845-2614.
TÖD: 0000-0002-4668-0545.
CÇ: 0000-0001-5406-098X.

Authors' Contribution

Şükrü Gürbüz: Concept and design of study or acquisition of data or analysis and interpretation of data, drafting the article or revising it critically for important intellectual content, final approval of the version to be published.
Muhammed Ekmekyapar: Concept and design of study or acquisition of data or analysis and interpretation of data, drafting the article or revising it critically for important intellectual content, final approval of the version to be published.
M. Akif Durak: Drafting the article or revising it critically for important intellectual content, final approval of the version to be published

Hakan Oğuztürk: Drafting the article or revising it critically for important intellectual content, final approval of the version to be published.
Muhammet Gökhan Turtay: Drafting the article or revising it critically for important intellectual content, final approval of the version to be published.
Neslihan Yücel: Drafting the article or revising it critically for important intellectual content, final approval of the version to be published.
Tuba Öztürk Demir: Drafting the article or revising it critically for important intellectual content, final approval of the version to be published.
Cemil Çolak: Concept and design of study or acquisition of data or analysis and interpretation of data, drafting the article or revising it critically for important intellectual content, final approval of the version to be published.

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