Evaluation of Malnutrition Status in Patients admitted to Shahid Rajaee Hospital in Gachsaran City in 2016

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Abstract

Introduction: Malnutrition is an acute or chronic nutritional status resulting from an imbalance in the intake that is associated with overdose and inadequate intake, leading to changes in the composition or reduced function of the body. Bio-social conditions, and acute and chronic diseases are the most important factors affecting nutrition and can cause malnutrition. Knowing the prevalence and severity of malnutrition in hospitalized patients can be used by managers to understand the causes, health care needs and health plans.

Method: In this descriptive cross-sectional study, the samples were selected as unpredictable and objective based on the population of patients admitted to all departments of ShahidRajaee Hospital in Gachsaran during three months. For each patient, forms containing demographic data, anthropometric indices (weight using a patient's scales), height (use of patient records or non-elastic meter, or ulnar bone length), BMI (weight divided by squared of the Height), the Mid-Arm Circumference(MAC) (in meters), waist circumference (in meters), skin thickness of the triceps muscle (with caliper) and the amount of fatty muscle (using the formula), and the assessment form for all Individual Subjective Global Assessment(SGA) was completed by project implementers (Nutrition Experts). Data were analyzed using SPSS 19 software and descriptive statistics, charts, combined tables and Chi2 test were used.

Findings: Of the 600 patients (306 were women and 294 men) with a mean age of 19 ± 47.9 and an average BMI of 5.1 ± 25.0, the data were collected from the study population. The subjects were classified into 14 groups according to the main diagnosis. The prevalence of malnutrition (underweight, overweight and obesity) was 49.3% in the hospitalized patients with the BMI index and the findings as follows: low prevalence 6.6% (mild 4.3%, moderate 1.0% and severe 1.3 %), the prevalence of overweight and obesity was 42.8% (overweight 26.2%, obesity 16.6% (mild obesity 12.2%, moderate obesity 3.2% and severe obesity 1.2%)). Therefore, it was found that the prevalence of obesity and overweight in these patients was approximately 6.5 times more than underweight. The malnutrition outbreak rate was 29.2% by using the SGA tool and was as follows: 425 people have good nutrition or no malnutrition (70.8%), 138 patients with mild to moderate malnutrition (23.0 %) and 37 patients with severe malnutrition (6.2%). Also among 575 patients, 289 had an acute illness and 286 had chronic illness.12.5% suffered from malnutrition and acute illness (75 cases) and 15.2% suffered from malnutrition and chronic disease (91 cases). 1.5% of the subjects were malnourished and in the group of both diseases.

Conclusion: In this study, the prevalence of malnutrition was estimated to be 29.2%, with an index of body mass index of 49.3%, and it was found that overweight and obesity malnutrition among hospitalized patients was much higher than malnutrition due to Lack of weight in the hospital of this city. It was also found that nutrition assessment was not conducted in hospital patients except in special cases. Therefore, considering that hospitalization time can provide an opportunity to identify malnutrition in vulnerable patients, it is suggested that by assessing the nutritional status of patients, at least when they arrive at the provincial hospitals, appropriate nutritional support in malnourished patients, nutritional deficiencies and educational interventions and counseling for

overweight and obesity malnourished patients and chronic illnesses associated with health professionals and nutrition experts and nutritionists should be taken into account.

Key words: malnutrition, Gachsaran City, Iran

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Introduction

Malnutrition is an acute or chronic nutritional status resulting from an imbalance in receptivity that occurs in two situations, such as those found in developed societies and the lack of information that is often found in developing countries and hospitals, leading to changes in the composition or loss of function of the body (1-3).

Bio-social condition, acute and chronic diseases are some of the most important factors affecting nutrition and can cause malnutrition. Among the diseases that cause malnutrition can be chronic diseases such as cancer, kidney failure, chronic liver disease, chronic obstructive pulmonary disease, cardiovascular disease and acute illnesses such as burns, infections, and trauma (5). Food screening as early as possible in early childhood nutritional care allows early intervention and ease of treatment, but often doctors and nurses do not have enough time and information to calculate nutrition status indicators and screening; therefore, programming for the nutritional status of children and their nutritional needs in the hospital can be effective in reducing the prevalence of malnutrition (1,3,5,6).

In routine screening and appropriate nutrition support, some of the most trusted tools, are SGA, Mini Nutritional Assessment (MNA), Malnutrition Universal Screening Tool (MUST) (1, 7). The methodology and tools used by the researchers can provide different results from the epidemiology of malnutrition in hospitalized patients (3, 8). So far, studies have reported the prevalence of malnutrition in hospitalized patients between 20% and 50%, and in some parts of Iran's hospitals, malnutrition rates are reported to be around 45 %. However, there are no accurate data on the prevalence of malnutrition in Iranian patients. Regarding the severity of malnutrition, in a study in Ayatollah Taleghani Hospital in Tehran, mild malnutrition was reported as 14%, moderate 10%, and severe as 28% (3, 9-17).

Pirlich et al. (2006) conducted a study titled "German hospital malnutrition study". The nutritional status was assessed by SGA and measured by anthropometric indices such as weight, BMI, MAUC (Mid-Upper Arm Circumference), and triceps skin with caliper, AMA (arm muscle area) and AFA (area fat arm) In 1886, admitted patients were evaluated in 13 hospitals. Malnutrition according to SGA was found in 27.4% of patients. The low AMA was 11.3% and the low AFA was 17.1%.

43% of patients were 70 years of age compared with only 7.8% of patients under 30 years with malnutrition. The highest prevalence of malnutrition was in the elderly (56.2%), cancer (37.6%), gastrointestinal (32.6%). The result is that in hospitals in Germany, out of every four, one person has malnutrition and malnutrition is associated with an increase in length of stay in the hospital (18).

A descriptive study was conducted by Hosseinpour Niazi et al. In 2011 with the title and purpose of studying breastfeeding in Iran, 446 admitted patients had Body Mass Index (BMI), Triceps Skinfold (TSF), and Mid-Arm Muscle Circumference (MAMC) measured. According to the results of nutritional studies in the hospital, Ayatollah Taleghani Tehran, (52%) had mild, moderate and severe in order of 14%, 10% and 28% respectively. The highest prevalence of malnutrition was in the gastrointestinal tract (64%). In the malnourished group, the prevalence of MAMC, MAC, and TSF was significantly less than 5 times, more than that of adequate nutrition. Increasing the body mass reduced the likelihood of malnutrition by 17% (3). Considering that knowledge about the prevalence and severity of malnutrition in hospitalized patients can be considered in this plan for the purpose of knowing its causes, health care needs to include planning health services, and managing this problem by the managers. Anthropometric indicators individual assessment tool (SGA), which assesses the latest incidence of deficits and over-nutritional benefits that appear in clinical practice and physics needs to be used. Regarding the status of nutrition, the status of malnutrition and its severity in patients admitted to the hospital of Shahid Rajaee, Gachsaran, we did not find a study on the prevalence of malnutrition in patients admitted to hospitals in the province, to achieve these goals. It should be noted that the purpose of this project is not to assess the prevalence of malnutrition caused by hospitalization, but also to determine the status of malnutrition in hospitalized patients, mainly due to the underlying condition of the individual and the initial course of the illness or bio-social condition of a person.

Materials and methods

A cross-sectional descriptive study was conducted. Sample collection was performed in all three cohorts of all patients referring to Shahid Rajaee Hospital in Gachsaran, who entered the study in a three-month period and the number of samples reached over 554 (600).

For each patient, forms of demographic information, anthropometric indices, and individualized assessment (SGA) were completed by project implementers (nutrition experts). In this plan, two different tools were used to examine malnutrition. One SGA form and one anthropometric index. The SGA form determined most downstream patients with malnutrition such as atrophy, weight loss, cachexia, marasmus, and more. But the second instrument, the anthropometric indices, showed both malnutrition and weight gain and obesity. In patients with a SGA form in the malnourished group (A), there may have been overweight malnutrition, in which case anthropometric indices such as body mass index, waist circumference and the amount of fat and muscle mass was reported for overweight malnutrition.

In order to minimize the measurement changes, all project executives were measured by a trained specialist and the indicators for each patient were measured twice by the two administrators.

Different definitions of malnutrition and proportional to them ,there were various indicators for measuring malnutrition that were used in this design.

Subjective Global Assessment: Designed by Detsky and colleagues. Based on the physical symptoms of malnutrition (loss of subcutaneous fat or muscle mass, edema, ascites), history of weight loss, dietary intake, gastrointestinal symptoms, functional capacity and diseases, and their relationship with nutritional needs (18, 20).

Each patient with SGA was placed in one of the following three groups:
SGA A: Proper nutrition or malnutrition
SGA B: Mild to moderate malnutrition
SGA C: Severe malnutrition

Validation of SGA to identify malnutrition and its consequences have been considered in several studies (22-20).

Anthropometric Indicators:
Weight (with a SGA scale or use of patient records), height (use of patient records, instrumental meter or bone marrow length), BMI (weight divided by height squared), middle arm (MAC) (with non-elastic meter instrument from arm Non-volatile person), waist circumference (with non-elastic meter instrumentation), thickness of the skin of the triceps muscle (TSF) (using a caliper tool between the acromion tip and the non-volatile olecranon appendage), the fat arm area (AFA) and muscle area (AMA) were calculated using the following formulas (23):

AA = (3.14 ÷ 4) × (MAC ÷ 3.14) 2
AMA = ((MAC - 3.14 × TSF) 2) ÷ (4 × 3.14)
AFA = AA - AMA

Patients with AMA or AFA below the 10th percentile were considered to be malnourished according to Frisancho's tables. Although one of the limitations of this method is that patients with severe changes in body composition and hydration may not be identified (18, 23).

Findings

In this study, 600 patients with inclusion criteria were sampled with informed consent from the patient or their companion. Information obtained from patients for reason of admission were as the Table opposite:

Considering that the patient could have multiple diseases at the same time, according to the designer's view, the most important disease of the person that could affect their nutritional status was considered as the main diagnosis. The main diagnosis of patients was classified into 14 generic groups. Some groups have several different diseases, for example, a group of autoimmune diseases included lupus, scleroderma, multiple sclerosis, rheumatoid arthritis and type 1 diabetes, and infectious diseases included pneumonia, urinary tract infections, wound infections and other cases.

Different information is obtained from the table above. In this table, different groups are classified according to the number of people in each group from top to bottom (from high to low). The highest number of hospitalized patients was due to surgery (156) and the lowest rate was for burns (12). The highest mean age group was in patients with chronic renal failure (19.1 ± 63.2) and the lowest mean age group was in patients with thalassemia major (4.1 ± 24.8). In the sex, the number of women and men with each disease is presented separately.

Among the patients in different groups, the highest mean BMI was found in patients with metabolic diseases (5.3 ±28.4) and the least of them was in patients with thalassemia major (3.1 ± 20.6). Therefore, the added importance ofweight and obesity are known to cause chronic diseases such as diabetes, high blood pressure, abnormal lipids and fatty liver.

The prevalence of malnutrition in general (underweight, overweight and obesity) was calculated as 49.3% in patients admitted using BMI.

The underweight prevalence was 6.6%, which was divided into 3 groups.

The prevalence of mild weight loss (17.0 ≤ BMI ≤ 18.49) was 4.3%, moderate weight loss (16.0 ≤ BMI ≤ 16.99) was 1%, and severe prevalence of weight loss (BMI <16) was 1.3%.

The prevalence of overweight and obesity was 42.8%, which is divided into 4 groups.

The prevalence of overweight (25.0 ≤ BMI ≤ 29.99) was 26.2% and the prevalence of obesity in general (30.0 ≤ BMI) was 16.6%. The prevalence of class 1 or mild obesity (30.0 ≤ BMI ≤ 34.99) was 12.2%, the prevalence of class 2 or moderate obesity (35.0 ≤ BMI ≤ 39.99) and 3.2%, and prevalence of grade 3 or severe obesity (40.0 ≤ BMI) was 1.2%.

Table

The main diagnosis	n	AGE	SEX	BMI (Kg/m²)	Malnutrition (SGA B+C) outbreaks
Surgery	156	42.6 ± 16.7	75 / 81	26.1 ± 4.8	18.6%
Metabolic disorders (type 2 diabetes, high blood pressure, blood lipids, fatty liver)	75	55.5 ± 13.7	24 / 51	28.4 ± 5.3	13.3%
Renal Failure (ESRD) (hemodialysis)	54	54.3 ± 15.9	31 / 23	24.2 ± 4.9	27.8%
Bacterial infections	54	50.2 ± 19.4	26 / 28	23.9 ± 4.7	27.8%
Thalassemia	50	24.8 ± 4.1	18 / 32	20.6 ± 3.1	24.0%
Traumatic injury	42	41.0 ± 16.8	32 / 10	23.9 ± 4.6	35.7%
Respiratory disorders (asthma, COPD)	27	57.4 ± 21.3	16 / 11	25.1 ± 6.0	37.0%
Neurological diseases	25	55.3 ± 21.5	10 / 15	25.7 ± 4.9	48.0%
Cancers	21	60.9 ± 16.8	10 / 11	21.5 ± 5.1	100%
Cardiovascular disease	20	61.7 ± 15.6	8 / 12	26.7 ± 5.7	35.0%
Autoimmune diseases	20	44.2 ± 15.3	7 / 13	26.1 ± 4.4	25.0%
Chronic Kidney Failure (CKD)	19	63.2 ± 19.1	10 / 9	24.2 ± 3.6	57.9%
Burn	12	44.2 ± 15.1	9 / 3	24.1 ± 3.5	33.3%
Others	25	50.2 ± 21.5	18 / 7	24.6 ± 4.2	36.0%
Total	**600**	**47.9 ± 19.0**	**294 / 306**	**25.0 ± 5.1**	**29.2%**

As it is known, the prevalence of obesity and overweight in these patients was approximately 6.5 times higher than the prevalence of underweight.

Nutrition Status and Main Diagnosis:
The highest prevalence of malnutrition with SGA instrument in the different groups of primary diagnosis was as follows (Figures - next page):

Cancer category> Chronic kidney failure> Neurological diseases> Respiratory diseases (COPD and asthma)> Traumatic injury> Cardiovascular disease> Burn> Infectious diseases> Hemodialysis (ESRD)> Autoimmune diseases> Thalassemia major> Surgery > Metabolic diseases .

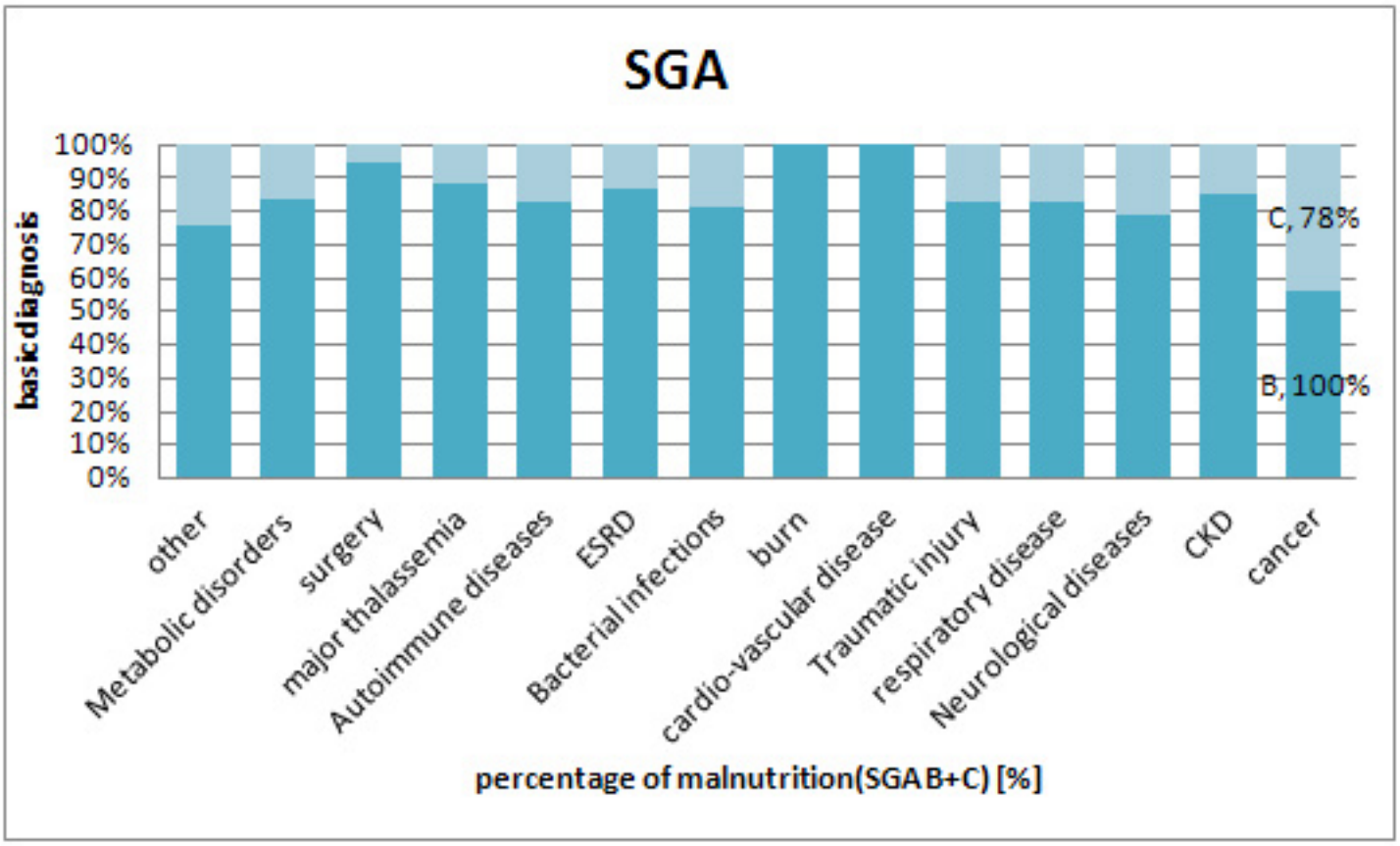
Relationship between nutrition status and age and gender:

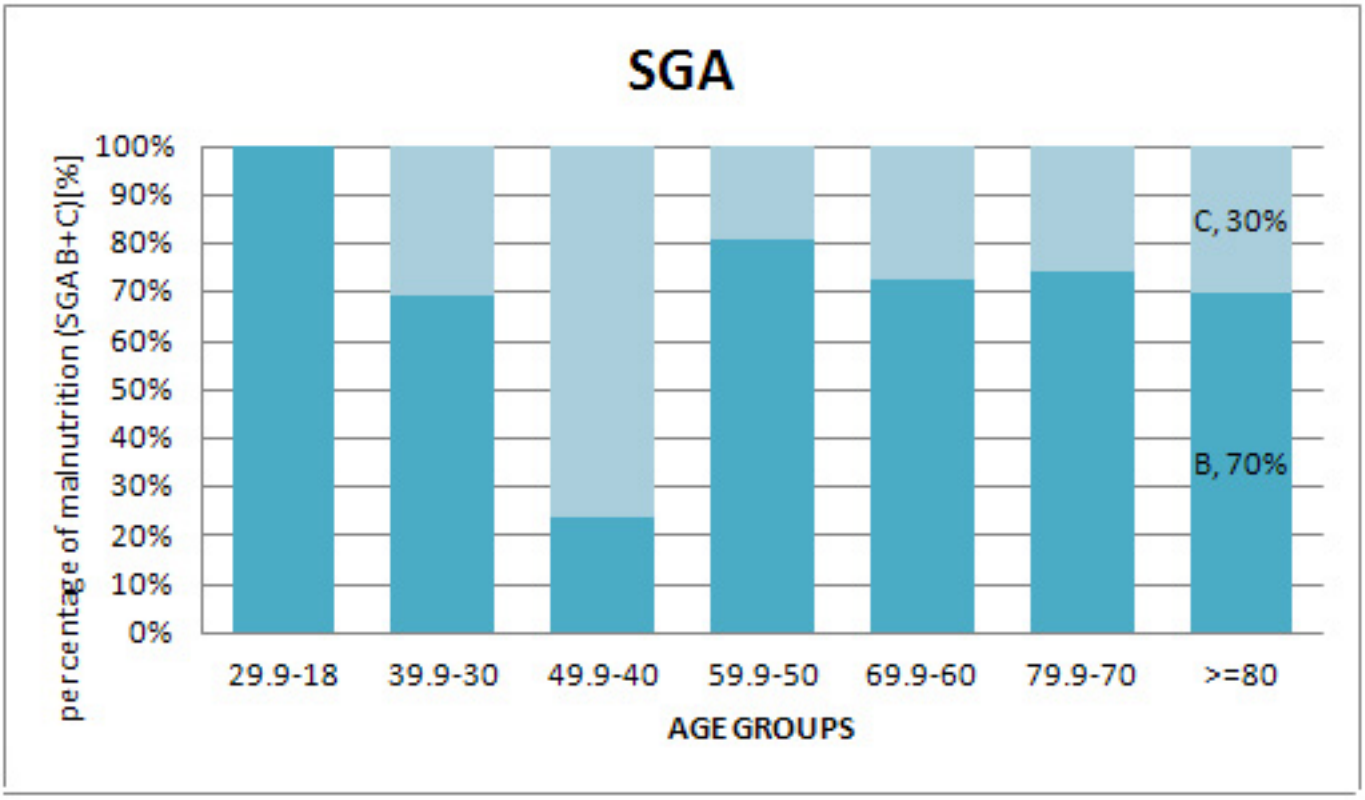
Using Independent t-test, there was a significant increase in the overall malnutrition outcomes (SGA B + C) with increasing age, with a significant decrease in malnutrition with F = 18.623 and df = 273.285 ($p < 0.05$).

In addition, using Independent t-test between the small age variable and the two groups SGA B and SGA C from the full-scale individual assessment variable, with F = 7.385 and df = 70.554, the severity of malnutrition increased with age ($P < 0.05$).

For example, in the age group of over 80, over 60% of all patients with malnutrition and over 20% had severe malnutrition (SGA C).

Chi2 test was performed between two variables grouped by sex and having or not having malnutrition, the number of men with malnutrition (105, 35.7%) was significantly higher than women with malnutrition (70, 22.9%), and this difference was significant ($P < 0.050$).


SGA
basic diagnosis
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
C, 78%
B, 100%
other
Metabolic disorders
surgery
major thalassemia
Autoimmune diseases
ESRD
Bacterial infections
burn
cardio-vascular disease
Traumatic injury
respiratory disease
Neurological diseases
CKD
cancer
percentage of malnutrition(SGA B+C) [%]


SGA
percentage of malnutrition (SGA B+C)[%]
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
C, 30%
B, 70%
29.9-18
39.9-30
49.9-40
59.9-50
69.9-60
79.9-70
>=80
AGE GROUPS

Discussion and Conclusion

In this study, we evaluated the nutritional status of 600 patients hospitalized in Shahid Rajaee hospital in Gachsaran city with a wide range of diseases and hospitalization causes. Different tools were used to evaluate the nutritional status of patients, with different results.

In past studies, the prevalence of malnutrition has been reported in hospitals both overseas and in different cities of Iran. Some of these studies have examined the prevalence of malnutrition in all parts of the hospital (35, 3, 7, 18, 24, 25) and some have studied some of the malnutrition in specific areas or in specific patients (18, 20, 23, 32, 33)., Some of the statistical results given in these studies are similar and some are different. Due to differences in the prevalence of malnutrition in patients, it is possible to use different definitions for malnutrition as well as the use of different diagnostic tools for malnutrition and a variety of different diseases (3, 8, 18). For example, in a study of 155 patients, there were 4 different malnutrition categories, due to differences in the use of various diagnostic tools (28).

In our study, a comprehensive self-assessment tool (SGA) was used to assess nutritional status. This tool is based on the physical symptoms of malnutrition (loss of subcutaneous fat or muscle mass, edema, ascites), history of weight loss, dietary intake, digestive tract symptoms, functional capacity, and diseases, and their association with Nutritional needs assess the nutritional status of patients, and is an efficient, fast, and reliable tool for assessing nutritional status and has high predictive power in clinical settings and age groups. Therefore, E.S.P.E.N clinical guidelines suggest regular use to detect malnutrition in hospitalized patients (18, 20, 21, 29).

In our study, according to this tool, 70.8% of the patients had a good nutritional status and the prevalence of malnutrition was 29.2%, of which 23% had mild to moderate malnutrition and 6.2% had severe malnutrition.

It was also found that the most malnutrition was in cancer patients, all of whom had malnutrition and over 70% had severe malnutrition. While in the evaluation of nutritional status in 416 patients with cancer in Tehran, by Khoshnevis and his colleagues, the prevalence of malnutrition was 53% by using the PG-SGA tool (33). In a study by Movahed and his colleagues using MUST, 48.8% of the cancer patients were at low risk and 12.56% were at risk of malnutrition and 38.5% of them were seriously endangered (19).

Assessment of Nutrition in Pirlich et al's study in patients hospitalized in German hospitals using the SGA tool, they estimated the prevalence of malnutrition was 27.4% and the highest malnutrition was reported in the elderly and cancer patients (19). In the study of Fuad al-Dini and colleagues in adult patients admitted to Birjand hospitals, the prevalence of malnutrition was 58.8% using MUST in these patients (3).

Another tool used in our study to assess malnutrition was the BMI index. For example, the BMI index and its classifications, based on the WHO criteria, estimated the overall malnutrition outcomes of both underweight and overweight and obesity to be 49.3%. Of this amount, the prevalence was 6.6%, weight gain 26.2%, and obesity 16.6%. As a result, it was found that the prevalence of malnutrition due to overweight and obesity was 6.5 times the prevalence of malnutrition.

According to this index, the highest levels of malnutrition are overweight and obesity in the group of patients with metabolic diseases such as type 2 diabetes, high blood pressure, fatty blood and fatty liver, and then in the group of patients with cardiovascular disease. On the other hand, the prevalence of malnutrition due to weight loss was in patients with thalassemia major and then in cancer patients, respectively.

For example, in a study by Pirlich and colleagues, malnutrition was found to be underweight in 4.1% of patients and malnutrition due to overweight in 36.5% and Obesity malnutrition was reported in 15.4% of patients (19). Hosseinpour Niyazi and colleagues at Ayatollah Taleghani Hospital in Tehran determined the prevalence of malnutrition in hospitalized patients with BMI and arm circumference and skin thickness of 52%, with the highest prevalence of malnutrition in the gastrointestinal tract (35). In a study done by Rasmussen and colleagues in Danish hospitals using the BMI and dietary intake and weight loss survey, it was found that 39.9% of patients were malnourished and had the highest incidence was in patients of gastrointestinal surgery(24).

Another outcome of the plan was the relationship between aging and the prevalence of malnutrition. In many studies, aging has been introduced as a very powerful factor in malnutrition and suggests that adolescent patients are prone to nutritional deficiencies (3, 30, 31). In our study, as the age increased, the overall prevalence of malnutrition increased, and the severity of malnutrition increased. For example, in the study with SGA, the highest prevalence of malnutrition in people over 80 years old (was more than 60%) and the prevalence of severe infections in these individuals was more than 20%. Various reasons have been made in various studies for the prevalence of malnutrition in the elderly: the underlying diseases such as infection and depression disorders and the problems of biting in the elderly have been noted as factors, as well as nutritional deficiencies caused by the physical and economic characteristics of these people who were not able to access necessary food items (3, 32-34).

Also, in our study on gender and malnutrition, the highest prevalence of malnutrition was seen in male sex, which was similar to that of Fuad al-Dini and Hosseinpour Niyazi and contradicted by Pirlich's study findings (35, 4, 18).

References

1. Barker LA, Gout BS, Crowe TC. Hospital malnutrition: prevalence, identification and impact on patients and the healthcare system. International journal of environmental research and public health. 2011;8(2):514-27.
2. Mueller C, Compher C, Ellen DM. ASPEN clinical guidelines nutrition screening, assessment, and intervention in adults. Journal of Parenteral and Enteral Nutrition. 2011;35(1):16-24.
3. Fuad al-Dini M, Raghebi S, Farhadian A , SharifzadehGH. Prevalence of Malnutrition in adults admitted to hospitals affiliated to Birjand University of Medical Sciences in 2011. Journal of Birjand University of Medical Sciences. 2014; 21 (2): 219-27.
4. Norman K, Pichard C, Lochs H, Pirlich M. Prognostic impact of disease-related malnutrition. Clinical nutrition. 20.08;27(1):5-15.
5.Shayeteh F, Pudineh S, Mohammadzadeh M, Pour YazdanpanahKermani M, Ayyubi S, Norouzi A. Nutritional assessment of patients admitted to adult care units of Ghaem Hospital. Journal of Mashhad University of Medical Sciences. 2015; 58 (4): 217-24.
6. Kruizenga H, Seidell J, De Vet H, Wierdsma N. Development and validation of a hospital screening tool for malnutrition: the short nutritional assessment questionnaire (SNAQ©). Clinical Nutrition. 2005;24(1):75-82.
7. Edington J, Boorman J, Durrant E, Perkins A, Giffin C, James R, et al. Prevalence of malnutrition on admission to four hospitals in England. Clinical Nutrition. 2000;19(3):191-5.
8. Penié JB, Malnutrition CGftSoH. State of malnutrition in Cuban hospitals. Nutrition. 2005;21(4):487-97.
9. Daneshazad A, Azadbakht L, Naamani F, Abbasi S, Shirani F, Adibi P. Nutritional assessment of patients admitted to the intensive care unit of al-Zahra hospital in 2011. Journal of Research in Health Systems. 2013; 10 (4): 655-68.
10. Correia MIT, Perman MI, Waitzberg DL. Hospital malnutrition in Latin America: A systematic review. Clinical Nutrition. 2016.
11.Pirlich M, Schütz T, Kemps M, Luhman N, Burmester G-R, Baumann G, et al. Prevalence of malnutrition in hospitalized medical patients: impact of underlying disease. Digestive diseases. 2003;21(3):245-51.
12. Corish CA, Kennedy NP. Protein–energy undernutrition in hospital in-patients. British Journal of Nutrition. 2000;83(06):575-91.
13. Fernández AC, Casariego AV, Rodríguez IC, Pomar D. Malnutrition in hospitalized patients receiving nutritionally complete menus: prevalence and outcomes. Nutr Hosp. 2014;30(6):1344-9
14. Chakravarty C, Hazarika B, Goswami L, Ramasubban S. Prevalence of malnutrition in a tertiary care hospital in India. Indian Journal of Critical Care Medicine. 2013;17(3):170.
15. Agarwal E, Ferguson M, Banks M, Bauer J, Capra S, Isenring E. Nutritional status and dietary intake of acute care patients: results from the Nutrition Care Day Survey 2010. Clinical nutrition. 2012;31(1):41-7.
16. Kelly I, Tessier S, Cahill A, Morris S, Crumley A, McLaughlin D, et al. Still hungry in hospital: identifying malnutrition in acute hospital admissions. Qjm. 2000;93(2):93-8.
17. Hejazi N, Mazloom Z, Zand F, Rezaianzadeh A, Amini A. Nutritional Assessment in Critically Ill Patients. Iranian journal of medical sciences. 2016;41(3):171.
18. Pirlich M, Schütz T, Norman K, Gastell S, Lübke HJ, Bischoff SC, et al. The German hospital malnutrition study. Clinical nutrition. 2006;25(4):563-72.
19. MovahedS, Musavi N, Mozaffari V, Makhdumi Y, Zeraati A, Firoozabadi J, et al. Evaluation of Nutritional Status of Cancer Patients Referring to the Outpatient Cancer Radiotherapy Clinic in Mashhad. Journal of Mashhad University of Medical Sciences. 2015; 58 (1): 49-55.
20. Fontes D, de Vasconcelos Generoso S, Correia MITD. Subjective global assessment: a reliable nutritional assessment tool to predict outcomes in critically ill patients. Clinical Nutrition. 2014;33(2):291-5.
21. Makhija S, Baker J. The Subjective Global Assessment: A Review of Its Use in Clinical Practice. Nutrition in Clinical Practice. 2008;23(4):405-9.
22. Sacks GS, Dearman K, Replogle WH, Cora VL, Meeks M, Canada T. Use of subjective global assessment to identify nutrition-associated complications and death in geriatric long-term care facility residents. Journal of the American college of nutrition. 2000;19(5):570-7.
23. Frisancho AR. New norms of upper limb fat and muscle areas for assessment of nutritional status. The American journal of clinical nutrition. 1981;34(11):2540-5.
24.Rasmussen HH, Kondrup J, Staun M, Ladefoged K, Kristensen H, Wengler A. Prevalence of patients at nutritional risk in Danish hospitals. Clinical Nutrition. 2004;23(5):1009-15.
25.Waitzberg DL, Caiaffa WT, Correia MIT. Hospital malnutrition: the Brazilian national survey (IBRANUTRI): a study of 4000 patients. Nutrition. 2001;17(7):573-80.
26.Mardani M, Seifi F, Ebrahimzadeh F. Evaluation of nutritional status of patients admitted to the orthopedic ward of the Khorram Abad mosque's educational center during hospitalization and discharge. Journal of Lorestan University of Medical Sciences. 2013; 15 (1): 5-12.
27.Khoshnevis N, Ahmadizar F, Alizadeh M, Akbari ME. Nutritional assessment of cancer patients in Tehran, Iran. Asian Pacific journal of cancer prevention : APJCP. 2012;13(4):1621-6.
28.Naber TH, Schermer T, de Bree A, Nusteling K, Eggink L, Kruimel JW, et al. Prevalence of malnutrition in nonsurgical hospitalized patients and its association with disease complications. The American journal of clinical nutrition. 1997;66(5):1232-9.
29.Kondrup J, Allison SP, Elia M, Vellas B, Plauth M. ESPEN guidelines for nutrition screening 2002. Clinical nutrition. 2003;22(4):415-21.
30.Pirlich M, Lochs H. Nutrition in the elderly. Best Practice & Research Clinical Gastroenterology. 2001;15(6):869-84.
31.Guyonnet S, Rolland Y. Screening for malnutrition in older people. Clinics in geriatric medicine. 2015;31(3):429-37.
32.Fanian H, Pahlavansabagh A, Azarman N, Nahid A. Prevalence of Malnutrition in Orthopedic Patients in Al-Zahra Hospital, Isfahan, Iran. Journal of Research in Medical Sciences. 2004;9(2):102.
33.Lopez-Jornet P, Saura-Perez M, Llevat-Espinosa N. Effect of oral health dental state and risk of malnutrition in elderly people. Geriatrics & gerontology international. 2013;13(1):43-9.
34.Donini LM, Scardella P, Piombo L, Neri B, Asprino R, Proietti A, et al. Malnutrition in elderly: social and economic determinants. The journal of nutrition, health & aging. 2013:1-7.
35.Pirlich M, Schütz T, Kemps M, Luhman N, Burmester G-R, Baumann G, et al. Prevalence of malnutrition in hospitalized medical patients: impact of underlying disease. Digestive diseases. 2003;21(3):245-51.