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ORIGINAL ARTICLE

Evaluation of nutritional risk according to screening (NRS.2002) in multiple trauma patients admitted to ICU of Alzahra Hospital in Isfahan in 2018

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ABSTRACT

Introduction: Undernutrition of patients is one of the most important and effective issues in response to treatment and mortality rate. The prevalence of undernutrition in hospitalized patients is 22 to 50%. Little attention has been paid to this issue due to lack of a proper nutritional screening system. Nutrition of the patients admitted to ICU and maintaining their homeostasis requires proper and scientific management. Early nutritional support reduces the severity of disease, complications, and length of hospital stay in the intensive care unit. The aim of present study was to use the Nutritional Screening System (NRS 2002) in multiple trauma patients admitted to ICU.

Methods: The present study was conducted on 100 multiple trauma patients admitted to the ICU of Al-Zahra Hospital in Isfahan in 2018. The required information form was completed for each patient. In this nutritional system, the severity of disease and level of undernutrition of patients are divided into three categories: mild, moderate and severe. In the NRS 2002 system, the final score varies from 0 to 7. The nutrition care program starts with a final score of ≤ 3.

Results: In the present study, the results showed that weight loss in the last three months was 32%, and the level of nutrients received during the last week was 30%. Also, 42% of patients were severely ill and 45% needed nutritional support. Also, 68% of patients did not have undernutrition problems. Based on the independent t-test, weight loss during the last three months, reduction of calorie intake and severity of previous disease were effective in the type of treatment.

Conclusion: The NRS 2002 method is very valuable and reliable due to the rapid and easy identification of undernutrition patients based on items that are readily available and its applicability if the reporter is not a nutritionist.

Keywords: Nutritional Screening, Nutrition Risk, Intensive Care Unit, Multiple Trauma

INTRODUCTION

Undernutrition is caused due to a reduction or imbalance in the intake of energy, protein, minerals, or vitamins [1]. The prevalence of undernutrition according to global statistics is about 22 to 50% among hospitalized patients [2]. The consequences of undernutrition reduce quality of life and increase hospital costs [3]. Increased length of hospital stay, reduced response to pharmacological treatments, reducing body mass, reduced respiratory muscle strength, reduced absorption of nutrients such as calcium, bedsores, delayed wound healing, heart and kidney dysfunction and dysfunction in other organs, increased risk of thromboembolism and increased chance of infection are consequences of undernutrition [2, 4]. As the conditions of hospitalized patients are worsened, they will experience more metabolic stress, resulting in a systemic inflammatory response.

As a result, the body's metabolism increases, and if the necessary energy and protein are not provided timely, it can result in increased metabolism of fat and protein in the body, which reduces fat storage and muscle mass [5]. Loss of body mass and undernutrition result in increased mortality. For example, by reducing body mass by 10, 20, 30, and 40 %, the mortality rate can increase by 10, 30, 50, and 100 %, respectively [6]. Although undernutrition is common, it is still not treated, since there is no proper nutrition screening. The purpose of nutritional screening is early detection of undernutrition patients or people who are at a risk of undernutrition [7]. Nutrition in ICU patients and maintaining their homeostasis is one of the main components of care and it requires proper and scientific management. Early nutrition support and, if not possible, receiving oral nutrition preferably starting from the antral pathway is a preventive treatment strategy that reduces the severity of disease, complications, and length of hospital stay in the intensive care unit [8]. The aim of present study was to use a Nutritional Risk Screening System (NRS 2002) in multiple trauma patients admitted to ICU, where patients are scored based on nutritional needs to make good decisions for patient's future condition.

METHODS

The present study was a cross-sectional observational study conducted on 98 multiple trauma patients admitted to ICU of Al-Zahra Hospital in 2018 after obtaining the code of ethics of IR.MUI.MED.REC.1398.533 from the ethics committee of Isfahan University of Medical Sciences. The required number of samples was estimated based on previous studies and statistical methods. Demographic and information form such as current weight and previous

weight, height, gender, age, weight loss in the last three months, reduction in food intake in the last week, previous disease and its severity and the person's current problem was completed for the trauma patients admitted to the ICU on their arrival. Then, the Nutritional Risk Screening 2002 (NRS 2002) tool, which has been psychoanalyzed and translated into Persian and has been frequently used in Iran to assess nutritional risk in hospitalized patients, was used to assess the status of trauma patients admitted to the ICU. The study conducted by Mirmiran et al. (2009) approved the validity and reliability of this tool and showed a sensitivity of 83.7% and a specificity of 84.6% and positive and negative predictive values of this tool in assessing nutritional risk in admitted patients were shown (Mirmiran 2009). In this tool, severity of the disease and the level of undernutrition of patients are divided into three categories of mild, moderate and severe. A score between 1 and 3 is given to each. Based on this tool, in people aged over 70 years, a score of 1 is added to the total score and the final score is obtained by summing up of total score of disease severity, undernutrition and patient age, and the final score varies from 0 to 7. A score of 3 or higher will be required to start a nutritional care program.

RESULTS

In the present study, target population included 98 multiple trauma patients admitted to the ICU of Al-Zahra Hospital in Isfahan in 2018. Inclusion criteria of the study included patients aged above 18 years with multiple and severe trauma in need of hospitalization in the intensive care unit (ICU) and obtaining their written consent, if they were conscious, or consent of their legal guardian, after explaining the objectives of the project. Exclusion criteria also included the patients with uncontrolled diseases, history of malignancies, pregnancy and unwillingness to participate in the study. To select the samples, the complete enumeration method of the patients admitted to the ICU who met the inclusion criteria in a one-year period was used. Since complete enumeration method was used with excluding the subjects with exclusion criteria, there was no need to determine the sample size. Patients admitted to the ICU were assessed on arrival by a researcher and nutritionist trained in this area.

Table 1- Descriptive statistics of measured variables of patients

Variable		Frequency	Percentage of frequency
Gender	female	35	35%
	male	65	65%
Weight lost during the last three months	yes	32	32%
	no	68	68%
Reduction in the amount of calorie uptake during a week	yes	30	30%
	no	70	70%
Severity of the person's disease	severe	42	42%
	moderate	0	0%
	mild	58	58%
Final scoring	Less than 3	55	55%
	Equal or higher than 3	45	45%
Patients' BMI	Mean	SD	
	25.43	5.05	

Demographic information of patients was extracted using descriptive statistics and is given in Table 1.

Using independent t-test, the effect of BMI, weight loss during the last three months, reduction of calorie intake during one week and severity of the person's previous disease were evaluated to determine the type of treatment, the results of which are shown in Table 2.

Table 2- Evaluation of the effect of BMI, weight loss during the last three months, reduction of calorie intake during one week during one week and severity of the person's previous disease to determine the type of treatment.

	T	df	sig
BMI	0.657	96	0.513
weight loss during the last three months	7.392	96	0.000
reduction of calorie intake	5.949	96	0.000
severity of the person's disease	23.000	96	0.000

As shown in Table 2, considering the significance level ($p = 0.513 > 0.05$), only BMI had no significant effect on the need for nutritional support in the present study. Weight loss during the last three months, reduced calorie intake and disease severity with a significant level of less than 0.05 showed that they were effective in determining nutritional risk and assessing the need for nutritional support ($p < 0.05$).

The severity of undernutrition in these patients is also shown in the table below. As shown, 68% of patients did not have undernutrition.

Table 3- Severity of undernutrition in patients

Severe undernutrition	%
No nutrition problem	68
Mild	15
Moderate	13
Severe	4
Total	100

DISCUSSION

The aim of present study was to evaluate the need of trauma patients admitted to ICU for nutritional support and early detection of undernutrition and its risk using NRS-2002 tool. The results of this study showed that a small percentage of patients were at risk of severe undernutrition and needed nutritional support. Also, weight loss during the last three months, reduction in calorie intake and patient's disease severity were effective factors in nutritional support.

Undernutrition affects clinical outcomes: A small percentage of patients in the present study suffered severe undernutrition and needed nutritional support. Since the target population of the study was trauma patients admitted to ICU, and considering the mean age of these patients, who were mostly in the young age group, these results can be justified. In the used tool, score 1 is added for patients aged over 70 years, which will increase the risk. A large percentage of patients also did not report weight loss three months before the trauma. This issue can be justified due to high number of traffic accidents and involvement of most young people in Iran [10]. These people may not have the underlying disease that results in weight loss, so lack of weight loss before an accident would be reasonable and justifiable. Research conducted by Avenell et al. showed that up to 55% of elderly hospitalized patients and 58% of patients with pelvic fractures suffered undernutrition and weight loss during hospitalization [9]. Another study

reported a 30% prevalence of undernutrition in hospitalized patients [11].

In the present study, a reduction in calorie intake was reported in one-third of the patients, which could be related to the patient's condition, multiple traumas in various parts of the body, surgery, undergoing ventilation, and other cases of hospitalizations and the resulting stressors. The study conducted by Cheatham et al. also showed that patients in the intensive care unit lost 1-2 kg of body protein in 10 days, which is equivalent to 10-15% of the total protein content. This condition occurred in patients who were even in a normal state of nutrition [12]. In the study conducted by Kreymann et al., 113 patients with severe sepsis in the intensive care unit showed a severe reduction in body protein with a negative nitrogen balance over a 10-day observation period [13]. NRS has been developed as a valid screening tool in Europe. NRS has been officially recommended as a screening tool since 2003. NRS is a validation tool that is easily used for nutrition screening or mandatory prerequisites for surgeons [14, 15]. This method is very valuable and reliable since it can be implemented based on what is easily available and does not necessarily require a nutritionist reporter [16]. Based on a study that examined nutritional intake in the main meals of intensive care unit patients, energy intake in more than one-third of participants was less than 42% of the amount given to patients on a standard hospital regimen [17]. In a study, it was found that about 30% of hospitals rarely or never evaluate patients' nutritional status before surgery [14].

Jay et al. showed that preoperative nutritional support for patients with a NRS-2002 score of 5 or higher was associated with a reduction in complications. However, the use of NRS in European countries is very limited. Although it is claimed that this system can be used simply, time constraints are a factor in not using the NRS-2002. Another disadvantage of this system is its relative complexity (several components of the score have been defined vaguely) [18], which were completely resolved in later versions. Another study also reported difficulty of diagnosing the severity of disease as a disadvantage of this screening method [19]. In our study, to solve this problem, only patients who were admitted with multiple trauma complaints were examined. It should be noted that the extent of lesions and injuries is one of the problems of treatment team in dealing with a multiple trauma patient, which causes the treatment team to spend much time to detect the patient's problems and possibly ignore some problems such as undernutrition due to treatment priorities and not considering them important. The use of this screening system provides an opportunity to pay more attention to these patients and meet their nutritional needs. It will reduce the cost of treatment for the family and the community.

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