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Differences in Nutritional Risk in Hospitalized Patients versus Primary Care Patients.

Short Communication

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Abstract

Introduction: Nutritional status is a determining factor in the progress of diseases. There are different methods for its evaluation, but they generally require many resources. However, the laboratory nutritional risk assessment CONUT, or Control Nutritional (Nutritional Control), is a widely validated, effective alternative. Hospitalized patients have different pathologies than primary care outpatients and these pathologies may be aggravated by nutritional status. Therefore, this work aims to determine differences in the nutritional risk of hospitalized patients versus primary care outpatients as measured by the CONUT method.

Method: From July 1 to December 31, 2019, nutritional risk was estimated using the CONUT method in all patients admitted to the hospital and patients who had an initial consultation in primary care in Ronda, Spain. The sample was analyzed as a whole and in groups according to origin (hospitalization vs. primary care) and sex.

Results: Of the 7,741 patients studied, 59% were women and 41% men. In regard to origin, 61.7% were primary care patients and 38.3% were hospitalized patients. In the total study population, 90.6% of patients had no nutritional risk, 2.2% had severe risk, 7% moderate risk, and 0.2% mild risk. Significant differences were found in the nutritional risk profiles of hospitalized patients versus primary care patients as well as according to sex.

Conclusions: There are differences in nutritional risk between hospitalized and primary care patients and between men and women. Use of the CONUT method in these populations allows for corrective measures to be taken according to the patient type.

Keywords: Nutritional status; Inpatients; Outpatients; Laboratory.

Introduction

Nutritional status is an important aspect in patient care not only because it is a problem in and of itself but also because it can further complicate the progress of a patient's disease [1-3]. It is estimated that more than 32% of patients are malnourished [4]. This is a highly relevant measure as it indicates that malnutrition will condition the progress of nearly one third of hospitalized patients [5, 6]. The prevalence of malnutrition in primary care patients

has been estimated to be more than 10%. In both settings, malnutrition is an aspect that warrants attention both due to the status itself and the implications it has [7].

Given the importance of the problem, different tools for calculating malnutrition and methods for determining nutritional status have been developed. The majority are widely validated questionnaires or scales such as the Malnutrition Universal Screening Tool (MUST), Nutritional Risk Screening (NRS 2002), or the Mini Nutritional Assessment (MNA), among others. The MUST is a five-step screening tool designed to identify adults who are malnourished, at risk of malnutrition (undernutrition), or obese [8, 9]. It is mainly used in hospitals, outpatient clinics, and other healthcare settings and can be administered by all healthcare professionals. The NRS 2002 is a table for uploading data on different aspects of the patient obtained through observation and anthropometric measurements [10, 11]. The MNA is another measurement for estimating nutritional status that combines questions, observations, and scales [12, 13].

These instruments are currently administered in different healthcare settings, but drawbacks to their use include the time required in order to conduct them and the fact that a certain amount of training is necessary in order to avoid interobserver variability. A lack of time to administer them in healthcare settings with high workloads and a lack of availability of trained personnel to correctly complete them are the main limitations that may restrict their widespread use.

However, there is a widely validated nutritional risk evaluation system that avoids these two limitations: the CONUT, or Nutritional Control, tool. Based on a conventional blood test, the CONUT method analyses the serum albumin value, total lymphocyte count, and total serum cholesterol level in order to determine nutritional risk [14-17].

In light of the ramifications of malnutrition and the opportunity to easily and reliable screen for this condition using the CONUT tool, this work aims to describe differences in nutritional risk in a population of hospitalized and primary care patients as measured using the CONUT tool.

Materials and Methods

This work is a non-randomized, non-interventional, prospective, observational study. The study population included all patients admitted to the Serranía de Ronda Hospital and all patients who had an initial consultation in the two primary care health centers in Ronda, Málaga Province, Spain. The study period was from July 1, 2019 to December 31, 2019.

According to the hospital protocol, the CONUT nutritional risk evaluation based on laboratory values was conducted in all patients admitted to the Serranía de Ronda Hospital (Table 1). This practice was implemented more than seven years ago. An algorithm has been configured to calculate the CONUT nutritional risk score based on the total cholesterol, total lymphocytes, and albumin values measured on the first routine blood test upon admission. This algorithm was initially included in the laboratory information system (LIS) for hospitalized patients in order to calculate risk immediately and automatically. The LIS was later configured to measure this dimension in primary care patients as well. The nutritional risk estimation appears alongside all the other results on the laboratory report.

Table 1: Nutritional risk evaluation (CONUT).

	NO RISK	MILD RISK	MODERATE RISK	SEVERE RISK
Albumin (g/dL)	>3.5 0 points	3-3.49 2 points	2.5-2.99 4 points	<2.5 6 points
Cholesterol (mg/dL)	>180 0 points	140-179 1 points	100-139 2 points	<100 3 points
Lymphocytes (cells/ µL)	>1600 0 points	1200-1599 1 points	800-1199 2 points	<800 3 points
SCORE	0-1	2-4	5-8	9-12

In order conduct this study, this same protocol was used in patients who came to an initial consultation at either of the two healthcare centers in Ronda (Málaga). Even though this assessment is a habitual practice, these patients were verbally informed and their consent was noted on the medical record.

The statistical analysis consisted of a descriptive study of the variables. The hypothesis was corroborated by means of the chi-square test. Statistical significance was established as $p < .005$.

Results

During the study period, 7,741 patients were analyzed. Of them, 4,776 (61.7%) were primary care patients and 2,965 (38.3%) were hospitalized patients (Table 2). Of the total study population, 4,287 (61.1%) were women and 2,724 (38.9%) were men (Table 3). Mild nutritional risk was detected in 14 cases (0.2%), moderate nutritional risk in 542 cases (7%), severe nutritional risk in 174 cases (2.2%), and no nutritional risk in 7,011 cases (90.6%) (Table 4).

Table 2: Distribution of patients by origin.

ORIGIN	NUMBER	%
Primary Care	4776	61.7
Hospitalization	2965	38.3
Total	7741	100.0

Table 3: Distribution of patients by sex.

SEX	NUMBER	%
Female	4287	61.1
Male	2724	38.9
Total	7741	100.0

Table 4: Distribution of patients by nutritional risk

NUTRITIONAL RISK	NUMBER	%
Mild risk	14	0.2
Moderate risk	542	7.0
Severe risk	174	2.2
No risk	7011	90.6
Total	7741	100.0

The total population was then classified into groups according to sex, origin, and nutritional risk. Significant differences were observed ($p < .005$) when comparing the distribution of patients according to sex (Table 5). Significant differences were also found when comparing distribution according to origin that is either primary care or hospitalization (Table 6). When classified according to origin, significant differences were noted in the distribution by sex and by nutritional risk in hospitalized patients. In primary care patients, the differences found according to sex were not significant whereas the differences according to nutritional risk were significant. Lastly, significant differences were noted in the different stages of malnutrition.

When analyzing patients according to origin (hospitalized patients or primary care patients), it was found that in primary care, 3,070 patients were women (64.3%) and 1,706 were men (35.7%). No patients had mild nutritional risk, 117 had moderate nutritional risk (2.4%), nine had severe nutritional risk (0.2%), and 4,776 had no nutritional risk (97.4%) (Table 7). Of the hospitalized patients, 1,563 patients were women (52.7%) and 1,402 patients were men (47.3%). In terms of nutritional risk, 14 patients had mild nutritional risk (0.5%), 425 patients had moderate nutritional risk (14.3%), 15 patients had severe nutritional risk (5.6%), and 2,361 patients had no nutritional risk (79.6%) (Table 8).

Table 5: Distribution of patients by sex and nutritional risk.

	MILD RISK	MODERATE RISK	SEVERE RISK	NO RISK	%
Female	7 (0.2%)	266 (5.7%)	73 (1.6%)	4287 (92.5%)	100.0
Male	7 (0.2%)	276 (8.9%)	101 (3.2%)	2724 (87.6%)	100.0
Total	14 (0.2%)	542 (7.0%)	174 (2.2%)	7011 (90.6%)	100.0

$p < .005$ for all

Table 6: Distribution of patients by origin and nutritional risk.

	MILD RISK	MODERATE RISK	SEVERE RISK	NO RISK	%
Primary Care	0 (0%)	117 (2.4%)	9 (0.2%)	4650 (97.4%)	100.0
Hospitalization	14 (0.5%)	425 (14.3%)	165 (5.6%)	2361 (79.6%)	100.0
Total	14 (0.2%)	542 (7.0%)	174 (2.2%)	7011 (90.6%)	100.0

$p < .005$ for all

Table 7: Distribution of primary care patients by sex and nutritional risk.

	MILD RISK	MODERATE RISK	SEVERE RISK	NO RISK	%
Female	0 (0%)	71 (2.3%)	5 (0.2%)	2994 (97.5%)	100.0
Male	0 (0%)	46 (2.7%)	4 (0.2%)	1656 (97.1%)	100.0
Total	0 (0%)	117 (2.4%)	9 (0.2%)	4650 (97.4%)	100.0

$p < .005$ for all

Table 8: Distribution of hospitalized patients by sex and nutritional risk.

	MILD RISK	MODERATE RISK	SEVERE RISK	NO RISK	%
Female	7 (0.4%)	195 (12.5%)	68 (4.4%)	1293 (82.7%)	100.0
Male	7 (0.5%)	230 (16.4%)	97 (6.9%)	1068 (76.2%)	100.0
Total	14 (0.5%)	425 (14.3%)	165 (5.6%)	2361 (79.6%)	100.0

$p < .005$ for all

Discussion

The aim of this study was to demonstrate that there are differences in risk of malnutrition between two groups of patients: hospitalized patients and primary care patients, given that nutritional risk is a status that arises from the patient's disease as well as the treatment they receive. In order to do so, the CONUT method, a widely validated tool that is useful, quick, and reliable, was used in order to calculate nutritional risk in our study population. The results found in this work confirm the hypothesis: a higher proportion of hospitalized patients had moderate or severe malnutrition compared to primary care patients [18-20].

As is logical, there were more primary care outpatients (61.7%) whereas a third of the study sample was hospitalized patients (38.3%). In the total study population, there were similar percentages of men and women. In the population as a whole, less than 10% of patients presented

with some type of nutritional risk. However, when the data are broken down by patient origin, the results differ [21-23]. Hospitalized patients, who have more acute clinical conditions, had a more severe nutritional risk profile than outpatients, whose diseases did not require special measures. Nearly 80% of hospitalized patients and 97.4% of outpatients did not have nutritional risk. A more in-depth analysis also shows that more patients with moderate and severe risk of malnutrition were detected in the hospital setting: 19.9% of hospitalized patients and just 2.6% of cases in the primary care group.

When the two groups were analyzed individually, different patterns were observed [24-26]. Women were the majority in the outpatient group and they accounted for a greater number of cases of abnormal nutritional risk compared to male patients. However, these differences were not significant. In the group of hospitalized patients, the distribution according to sex was more homogeneous and male patients presented with greater risk of moderate and severe malnutrition, which was detected in 23% of men and 16% of women. In this case, the differences were significant.

In conclusion, this study affirms that patients present with different nutritional risk patterns according to the healthcare setting where they are treated and their sex. These findings serve to allow physicians to anticipate therapeutic measures aimed at correcting this situation.

Author Contributions

All authors contributed equally to this work.

Conflict of Interest

The authors of this work declare no conflicts of interest.

Ethics

Due to its retrospective nature, ethics committee approval was not necessary for the conduct of this study. All subjects provided their informed consent

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