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Original Article

Mini Nutritional Assessment for Hospitalized Patients in King Khalid Hospital at Hail city in Saudi Arabia

Rafia Bano[1*], Wedad Mudhi Eisa Alshammari[1]

[1.] Department of Clinical Nutrition, University of Hail, Hail, KSA

A B S T R A C T

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Introduction: The Mini Nutritional Assessment (MNA) has been developed to assess malnutrition in elderly and to filter those who might get benefited from early diagnosis and treatment. The objective of the present study was to examine the nutritional profile of old age hospitalized individuals through the use of the MNA in King Khalid hospital at Hail city of Saudi Arabia.

Methods: Demographic data was gathered through a questionnaire and a modified version of MNA, which was translated into Arabic and applied to 100 elderly females aged ≥ 45 years to assess their nutritional status. The MNA version modified by Nestle and translated into Arabic was used to evaluate the patients for this study. The descriptive analysis of variables is shown as the average ± one standard deviation.

Results: Mean age of the participants was 61.12 ± 12.4 years ranging from 45 to 92 years. The mean body mass index of total population was found to be 26.9 ± 5.2 ranging from 18.3 to 46.5 kg/m^2. The assessment scores and total malnutrition score was found to be decreasing with increasing age, showing a significant inverse correlation ($p < 0.01$). Furthermore, the difference in the screening scores according to the age was found to be statistically insignificant.

Conclusion: Because of the high prevalence of elderly patients that were malnourished or at risk of malnutrition, a more detailed evaluation of nutritional status, along with a regular follow up and dietary intervention to reverse the situation, of these patients is recommended.

Keywords: Aging, Malnutrition, Nutritional Status, Nutritional Assessment, Geriatric Assessment

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Introduction

The Mini Nutritional Assessment (MNA) is often used as a reliable tool for nutritional assessment and screening due to its ease and reputability in elderly population (1). Although this screening technique has been applied and validated for about two decades, the MNA has attained new contemplation recently and has been well appraised in order to proliferate the practice of a systematic nutritional screening on a broad spectrum of the geriatric patient (2). By looking at the demographic trends over years, the ratio of elderly people over 65 years is substantially growing, especially in the past ten years from 18 to 20% of total population (from 2 to 3% for those > 85 years old) and also mean lifetime has increased 2 years in both genders (3). Nutritional disorders are found to be commonly occurring among elderly. It is also a well know fact that increasing age is linked with a gradual reduction in muscle mass and more precisely with a decrease in metabolically active constituents of the body. Due to this the total functionality of the person reduces and also other forms of adverse outcomes are reported. The various forms of nutritional risk in the old age appears to be multi factorial, therefore, MNA

[*] **Corresponding Author:** Department of Clinical Nutrition, College of Applied Medical Sciences, University of Hail, Hail, KSA.
Email address: rafiazafar78@gmail.com

has been validated as a very helpful tool for screening the patients.

MNA has been developed and documented to give a quick and easy determination of nutritional status of elderly both in outpatient as well as inpatient clinics (2, 3). It has made a prompt screening easy for the patients who are either at risk of malnutrition or already malnourished, so that interventions could be measured.

MNA is comprised of eighteen questions; it consists of anthropometry (Body Mass Index (BMI), mid arm and calf circumferences, and assessment of weight loss), questions on dietary intake and habits (number of meals consumed, intake of fluids, and mode of feeding), general assessment (including medication history, and mobility), and self-assessment (perception of one's own health). The evaluated time needed to complete the MNA is approximately 10 minutes. The proposed scoring values are given as well-nourished, at-risk, and malnourished categories (4). After completing the whole questionnaire, the total score (a maximum of 30 points) allows grouping the nutritional status according to clearly defined verges: scores above 24, is defined as good status; scores 17-23.5, which means at risk of malnutrition; scores below 17, is defined as malnourished. The main privileges of MNA are the reliability, the effluent application, the speed of administration and the ease of accessibility by the patient (5).

MNA was first published in 1994, and has been adequately used afterwards all over the world (5). It provides a rapid assessment of the elderly person's nutritional status. Most of the documented research depicts that MNA is fairly sensitive and precise and also provides appropriate indication for mortality, hospital admission and other adverse outcomes (6, 7). The aim of the present study was to evaluate the clinical value of MNA in all in hospital admitted patients. This scale has been successfully used over time in the elderly population to access the physical and mental complications as a result of malnutrition. Because of the wide range of co-morbidities among patients and the growing number of older ones, as well as considering the ease of MNA administration, the present study was undertaken to find out the nutritional status of a group of elderly patients.

Methods

Participants and procedures

In the present cross sectional study, 100 elderly females aged ≥ 45 years who were admitted in the king Khalid hospital, at Hail, Saudi Arabia in Jan – Feb 2016, were interviewed for the assessment of nutritional status.

Instrument

Nutritional assessment: A modified version of MNA produced by Nestle Nutrition Institute (8, 9) and translated into Arabic was used to evaluate the patients. This version contains questions that are equal to the original version and includes two stages. The first stage was screening and the second stage was total assessment of the final scores. A total of 14 points was assigned to the first stage, and scores equal or greater than 12 indicated that the individual had a normal nutrition status and is not required to go through the second part of assessment. Although in the present study for research purpose, full test was applied to all participants irrespective of their screening score. Scores equal or less than 11 indicated that the individual was at risk for malnutrition. At the end of the assessment, results showing the scores below 17 point indicated malnutrition and values between 17 and 23.5 points was specified as at risk for malnutrition (9). The selected elderly individuals were evaluated through the MNA according to the instructions in the MNA manual (10).

At the King Khalid hospital, all the admitted patients were interviewed to fulfill the MNA questionnaire in the presence of a nutritionist. The MNA was conducted by the principal researcher. Some criteria were established for the interviews with the patients:

1) The patient diagnosed with a severe disease that would make it impossible or too uncomfortable and also the patients with cognitive impairment were excluded.
2) In the cases in which it was not possible to have an interview with the patient (e.g., patients who had some cognitive problems), the interview was conducted with the patient's caregiver.
3) Skin injuries or bedsores were evaluated by a physical examination done by the researcher.
4) Only the elderly people who agreed to participate in the research were included in this study.

Anthropometric measurements

The anthropometry included evaluation of weight and height. BMI was calculated and the measurements of arm circumference and calf circumference were also taken. The weight for all of the subjects was measured by the same person, and patients were required to stand barefoot, wearing minimal clothes while being weighed using the same instrument. In case where the patient was unable to stand, the hospital records were assessed. Height was measured without shoes using a stadiometer (height gauge). If the patient was bedridden, demi-span, half arm-span, or knee height was used to measure the height (11). BMI was measured as weight (kg) divided by squared estimated height (m).

The arm circumference was measured with the help of flexible inextensible tape. To determine the place where the tape should be fixed, an average point was marked between the acromion bone and the olecranon bone with the arm at a 90° angle. The measurement of calf circumference was also done with the same tape while the left leg formed a 90° angle with the knee, at the largest diameter of the calf, without compressing the calf.

Ethical consideration

The present study has been approved by the department of Clinical Nutrition, University of Hail, Saudi Arabia. Prior permission was taken from the administrative authorities of King Khalid hospital. All the participants were given informant consent before they were given the questionnaire for study.

Data analysis

The data were analyzed using the SPSS 17.0 software. The descriptive analysis of variables is presented as the average ± one standard deviation. Analysis of variance, multiple regression analysis and Pearson's correlation coefficient were used to describe the association between different variables. Significance level of 5% was adopted.

Results

A total of one hundred elderly females admitted at the King Khalid hospital completed the questionnaire. Participants were aged 61.12 ± 12.4 years ranging from 45 to 92 years. The stipulated quality criteria data and the data obtained in the first part of the MNA (screening questions) were compiled, and reported as percent. (Table 1)

Our results show that only 2% had BMI less than 19 kg/m^2, whereas a very little population (21%) was found with a healthy BMI. On the other hand, 77% of the study population had their BMIs more than 23 kg/m^2. The mean BMI of total population was found to be 26.9 ± 5.2 with a vast range of 18.3 to 46.5 kg/m^2. (Table 1)

Results of the study showed that 14% and 47% of the study group had severe and moderate decline in the food intake over the past 3 months, respectively; whereas 39% had no change. Forty seven percent of the population experienced a weight loss of about 1-3 kgs or more, and 20% had no change in their weight; whereas 33% of the subjects did not have any knowledge about their weight. (Table 1)

We also found that 18% of the population had mobility restrictions, and 73% were able to get out of their bed. It was also revealed that 28% of the participants were diagnosed with some or the other neuropsychological problems, whereas 72% did not report such problems.

Table 2 shows the distribution of the study participants according to the second part of the assessment questions of MNA. Among the hospitalized patients it was found that 73% took more than three prescription drugs per day. Results also showed that only 57% of the study population took three full meals, and 10% took only one meal per day. Beans and legumes intake were consumed only in 54% of the subjects. On the other hand, majority of the subjects (82%) consumed 2 or more servings of fruits and vegetables.

Table 1. Characteristics of study participants

Screening questions	Rubrics	Number
Age group	45–54	40
	55–64	26
	65–74	13
	75 and above	21
Mean age	61.12 ± 12.4	Range (45–92)
BMI	Less than 19 kg/m^2	2
	19 to less than 21	1
	21 to less than 23	20
	23 or more	77
Mean BMI	26.9 ± 5.2	Range (18.3-46.5)
Food decline over the past 3 months	Severe	14
	Moderate	47
	No decline	39
Weight loss during past 3 months	Greater than 3 kg	19
	1-3 kg	28
	No weight loss	20
	Do not know	33
Mobility	Bed or chair bound	18
	Able to get out of bed	73
	Goes out	9
Neuropsychological problems	Severe dementia or depression	1
	Mild dementia	27
	No problem	72

The fluid intake was found to be inappropriate, with only 19% consuming the proper amount. Results from table 2 also concluded that 66% of the subjects were fed by themselves without any difficulty and 9% were unable to feed without assistance.

Table 3 shows the participants' characteristics and malnutrition scores according to their ages. It was found from the results that height, weight and BMI were not significantly different as the age increased ($p > 0.05$). Whereas, the assessment scores and total malnutrition score was found to be decreasing with increasing age, showing a significant inverse correlation ($p < 0.01$). Furthermore, the difference in the screening scores according to the age was found to be non-significant.

Table 4 shows the comparison of different means of the anthropometric variables and malnutrition scores according to the malnutrition indicators as suggested by the analysis of variance. All the values except height were significantly correlated with the malnutrition status. The weight and BMI were inversely correlated with malnutrition. The mean age of the malnourished patients was also higher than normal patients. The screening and assessment scores as well as total malnutrition scores gradually decreased with increasing degree of malnutrition.

Table 5 shows the frequency distribution for the malnutrition scores in the study population. In the first part of the MNA, it was found that 18% were nutritionally normal, 68% were at risk for malnutrition and 14% were already malnourished. Further assessment indicated that 24% were severely malnourished, 64% were at risk for malnutrition and just 12% were normal.

Table 2. Frequency distribution for the assessment questions of MNA

Assessment questions	Rubrics	Percentage
Takes more than 3 prescription drugs	Yes	73
	No	27
How many full meals per day	1	10
	2	34
	3	56
Consumption of proteins(dairy/legumes/meat, fish)	0 or only 1(milk)	6
	2 (milk and meat)	40
	All three (milk, meat and legumes)	54
Consumes 2 or more servings of fruits/vegetables	Yes	82
	No	18
Fluid intake	Less than 3 cups	50
	3–5 cups	31
	More than 5 cups	19
Mode of feeding	Unable to eat without assistance	9
	Self-fed with some difficulty	25
	Self-fed without any problem	66

Table 3. Anthropometric variables and malnutrition scores according to participant's age

Anthropometric measurements	Age				p (ANOVA)
	45 - 54	55 - 64	65 - 74	75 - above	
Height	162.6 ± 4.6	163.2 ± 4.2	162.7 ± 4.4	161.7 ± 6.5	0.77
Weight	71.1 ± 15.2	73.7 ± 12.7	72.7 ± 14.7	67.9 ± 15.2	0.58
BMI	26.9 ± 5.6	27.6 ± 4.3	27.4 ± 4.8	25.9 ± 5.5	0.731
Screening score	10.1 ± 1.6	9.5 ± 1.95	9.1 ± 2.8	8.5 ± 3.2	0.109
Assessment score	10.4 ± 1.7	9.5 ± 1.8	9.3 ± 3.4	8.2 ± 2.9	0.005
Total score (Malnutrition)	20.2 ± 3.1	18.7 ± 3.7	15.5 ± 5.5	16.8 ± 5.7	0.02

Table 4. Participant's characteristics according to their malnutrition status

Anthropometric measurements	Malnutrition indicators			p (ANOVA)
	Normal	At risk	Malnourished	
Age	58.6 ± 10.9	59.2 ± 11.8	67.5 ± 12.9	0.013**
Height	162.2 ± 3.5	162.6 ± 4.8	162.6 ± 5.9	0.958
Weight	83.6 ± 19.9	71.5 ± 13.5	64.7 ± 9.3	0.001**
BMI	31.6 ± 6.9	26.9 ± 4.6	24.5 ± 3.8	0.000***
Screening score	12.9 ± 0.7	9.9 ± 1.2	6.7 ± 2.4	0.000***
Assessment score	11.9 ± 0.7	10.1 ± 1.4	6.06 ± 2.1	0.000***
Total score (Malnutrition)	23.8±3.6	19.8 ± 2.2	13.3 ± 3.8	0.000***

Table 5. Distribution of study subjects according to malnutrition scores

MNA scores	Scores	Indicators	Percentage
Screening score	12–14	Normal	18
	8–11	At risk	68
	0–7	Malnourished	14
Total assessment score	24-30	Normal	12
	17–23.5	At risk	64
	Less than 17	Malnourished	24

Discussion

The nutritional status of the elderly persons is related to general health conditions. Nutritional diagnosis is important in this age group so that nutritional risk conditions in old age can be verified and the dietary interventions could be made.

The MNA is a nutritional estimation tool used in Europe and North America for frail, institutionalized or hospitalized, elderly people (12). When applied to communities in which malnutrition is prevalent, malnutrition was found to occur at rates of 0% - 6% in elderly people in the common population, 2% - 27% in hospitalized elderly people, and 10% - 30% in institutionalized elderly people (12). In studies performed in several countries on elderly people from different regions, the sensibility and the specificity of MNA have been compared to objective nutritional status evaluation methods, such as anthropometric, biochemical and dietary recall methods (13, 14). These parameters have also been compared to nutritional screening methods and have been found to be in accordance with these results (15, 16).

Some researchers have documented an association between a decreased MNA score and increased chances of disease, increased hospital mortality, greater number of hospital or nursing home institutionalizations and delayed stays (17). Some studies reported that MNA scores above 27 could be considered an indicator of successful and healthy aging (18). Present study shows the prevalence of malnutrition as 24% in hospitalized patients. Previous research done in Europe depicted that the risk of malnutrition for the elderly in the community is between 0% and 6% (19).

In the United Kingdom, 10% of elderly people living in the society were found to be malnourished, and this value could be increasing depending on the geographical region (20). In another research done in Brazil, the malnourished elderly people and those at risk for malnutrition constituted 15.38% and 35.9% of the total population, respectively. In another institution of the same study, a high percentage of malnourished elderly women was documented (42.5%), and 25% of the patients were at risk for malnutrition (10).

Present study showed a high percentage of at risk patients (64%), and a moderate number of malnourished population (24%). These results are in agreement with another study done in Portugal which demonstrated that the prevalence of malnutrition is high in hospitalized or institutionalized elderly individuals between 30% and 60% (21). In a research conducted in Finland on 178 hospitalized elderly individuals, 3% were found to be malnourished, 48% were found to be at risk of malnutrition and 49% were having a normal nutritional status (17). Another study (22) estimated the nutritional risk of 37 elderly population in a long-term institution in the Federal District using different nutritional evaluation instruments, along with the MNA. Their results revealed that 50.0% of the women and 40.0% of the men were at risk for malnutrition.

Conclusion

The MNA, is a validated nutritional evaluation tool for elderly who live in a community, are institutionalized, or hospitalized. The early diagnosis and treatment of malnutrition is mandatory so that early and timely intervention could be taken. Due to the high percentage of elderly people that are malnourished and are at risk for malnutrition in long term institutions or in referral services for the elderly, it is important to have a more detailed evaluation of the nutritional status and more regular evaluations, in addition to dietary intervention to reverse the morbidity symptoms. The rigorous validation of nutrition screening and assessment instruments are very important.

Study limitations

The main drawback of the study was that it was performed on a small and only female sample of population. Comparative study could be done if both genders are involved in the study. Also in elderly patients that are in the malnourishment condition and at risk of malnutrition, it is important to perform a periodic nutritional evaluation, including anthropometric, biochemical and dietary intake, to identify the appearance or worsening the health condition and to begin dietary intervention as soon as possible.

Conflict of interest

No conflict of interest was found for the present study.

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