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The use of the Mini Nutritional Assessment to assess the Nutritional Status of Elderly Subjects Living in The Riyadh Nursing Home

استخدام التقييم الغذائي المختصر لتقييم الحالة الغذائية للمسنين المقيمين في دار رعاية المسنين بالرياض

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Abstract: All elderly residents (total number 74) in the Riyadh nursing home were included in this study. Body mass index (BMI), mid-arm circumference (MAC) and calf circumference (CC) were measured. The Mini Nutritional Assessment (MAA), specifically designed for elderly subjects, was used in the study to determine the nutritional status. are; 27% and 43% of elderly subjects were found to be malnourished and at risk of being malnourished, respectively. Results: The means the (BMI), (MAC) and (CC) were about 24 kg/m2, 26 cm and 29.5 cm, respectively. Elderly people, who were classified as malnourished, according to the (MNA), had the lowest (BMI), (MAC) and (CC). When the score of the (MNA) was based on the diagnosis of the elderly, the results show that elderly subjects with more than one main diagnosis had the lowest score. Based on the score of the (MNA) test, more than 1/4 of the subjects were malnourished. Most of the subjects were consuming three whole meals and more than two serving of fruit and vegetables per day. It seems that food intake, in the nursing home, was satisfactory, among the subjects. Despite that, the percentage of malnourished subjects reached 27%. The results of the (MNA) test indicated the necessity of performing national nutritional assessment for this vulnerable group of people in other nursing homes and in the community.

Keywords: Nutritional status, mini-nutritional assessment, nursing home, body mass index, elderly.

المستخلص: أجريت هذه الدراسة على جميع المسنين (العدد 74) المقيمين في دار رعاية المسنين بالرياض. تم قياس مؤشر كتلة الجسم (BMI) و محيط منتصف الذراع (MAC) و محيط الساق (CC). كذلك استخدم الاختبار المختصر (MAA) لتقييم الحالة الغذائية (MAA)، و المصمم خصيصا لتقييم الحالة الغذائية للمسنين. أوضحت نتائج الدراسة بأن (27%) و (43%) من المسنين مصابين بسوء التغذية، و خطورة الإصابة بسوء التغذية على التوالي. وقد كان متوسط مؤشر كتلة الجسم (BMI) و محيط منتصف الذراع (MAC) و محيط الساق (CC) 24 (كجم/م^2) و 26 سم و 29.5 سم، على التوالي. ووجد بأن المسنين المصابون بسوء التغذية، حصلوا على أدنى القيم في مؤشر كتلة الجسم و محيط منتصف الذراع و محيط الساق. كما حصل المسنون الذين لديهم أكثر من تشخيص مرضي على أقل نتيجة في التقييم المستخدم بطريقة الاختبار المختصر (MAA). استنادا إلى نتيجة التقييم في هذه الدراسة، نجد أن أكثر من ربع المسنين مصابون بسوء التغذية. هذا وقد وجد أن معظم المسنين يتناولون ثلاث وجبات كاملة و أكثر من حصتين من الفواكه و الخضروات في اليوم. مما يشير إلى أن الطعام الذي يتناوله المسنون في الدار كاف و جيد. وعلى الرغم من ذلك، وصلت نسبة المصابين بسوء التغذية إلى (27%). عليه تستدعي النتائج إلى ضرورة عمل تقييم غذائي لهذه المجموعة الحساسة في دور رعاية المسنين الأخرى و في المجتمع.

كلمات مدخلية: الحالة الغذائية، التقييم الغذائي المختصر، دار رعاية المسنين، الرياض، السعودية.

Introduction

The proportion of people who are 60 years of age and older in the Saudi population is 4%, which is quite similar to that for other Gulf countries (Hafez *et al.*, 2000). The proportion of elderly subjects is expected to increase due to the fact that the government of Saudi Arabia is paying a lot of attention to improving medical and health services. Nutrition status plays an important role in the quality of health of elderly people.

Poor nutritional status is one of the major factors associated with mortality in older persons (Morley, 2000). Malnutrition impairs immunity, decreases resistance to infection and reduces the antioxidant-defence mechanisms of the body (Chandra, 1993). Most studies, from many developed and developing countries, indicates that malnutrition is common in nursing homes. The prevalence of malnutrition in nursing-home residents ranges from 23%-85% (Seiler, 2001); (Silver *et al.*, 1988) and (Shaver *et al.*, 1980). The increased risk of malnutrition in the elderly population could be due to:

- ★ Inadequate food intake.
- ★ Reduced physical ability to eat.
- ★ Reduced desire to eat (e.g. depression, chronic pain).
- ★ Decline in food digestion or absorption.
- ★ Compromised metabolic pathways.
- ★ Poor dental hygiene.
- ★ Chronic diseases that are commonly found in the elderly.

(Johnson *et al.*, 1995), (Cederholm *et al.*, 1993).

The nursing home in Riyadh, Kingdom of Saudi Arabia, is under the management of the Ministry of Social Affairs. Almost all elderly the residents are without family, or financial support. The nursing home provides health, rehabilitative care and financial support to the residents.

The purpose of the study is to assess the nutritional status of elderly subjects living in the Riyadh nursing home using the Mini-nutritional assessment (MNA), specifically designed for elderly subjects.

Subjects and Method

All Elderly subjects, male and female, living in the Riyadh nursing home were included in the study (n=74), 29 (39%) were women. The (MNA) was used to determine the nutritional status of elderly subjects (Guigoz *et al.* 1994). The (MNA) is specifically designed and validated for assessing the nutritional status of elderly subjects in outpatient clinics, nursing homes and hospitals (Schneider & Hebuterne, 2000); Vellas *et al.* 1999). The (MNA) test is composed of 18 simple point-weighted questions. The (MNA) is composed of anthropometric measurements.

- ★ 4 questions to determine Body Mass Index (BMI).
- ★ Mid-Arm Circumference (MAC).
- ★ Calf Circumference (CC).
- ★ Weight loss during last 3 months.
- ★ Global Assessment (6 questions related to lifestyle, medication, and mobility).
- ★ Dietary Questionnaires (6 questions, related to number of meals food and fluid intake, and autonomy of feeding).
- ★ Subjective assessment (2 questions related to self-perception of health and nutrition).

(Vellas *et al.* 1999). Depending on the score of the test, elderly subjects involved in the study were classified in the following categories:

(I) Well-Nourished (MNA points 24-30)
(II) At risk of malnutrition (MNA points 17-23.5)
(III) Malnourished (MNA- 17 points).

Two well-trained personnel collected all anthropometric measurements. Measurements of weight (to the nearest 0.1 kg) and height (to the nearest 0.1 cm) were made using a portable scale and a portable stadiometer, respectively. Knee height was used to estimate the stature of a person who could not stand, or for a person with an obvious spinal curvature. The following equation was used to estimate the stature from knee height;

Stature for elderly subjects = [(2.02 knee height) - (0.24 age)]

(Chumlea *et al.*, 1987). (BMI) was calculated by dividing the weight in kilograms by the square of the stature in meters (kg/m2). (MAC) was taken on the front of the non-dominant upper arm by measuring the halfway distance between the inferior aspect of the acromion and the olecranon. (MAC) was measured to the nearest 0.1 cm using a flexible non-elastic tape. (CC) was taken while the elderly subject was lying supine, and the left knee and ankle were bent to a (900 angle). (CC) measurement was taken with an insertion measuring tape. The loop of the tape is moved up and down the calf to locate the largest diameter, and the measurement was recorded to the nearest (0.1 cm).

Table 1 Body mass index, mid-arm circumference and calf circumference in the three mini-nutritional assessment (MNA) categories.

Anthropometric measurements	Malnourished MNA 17 points	At risk of malnutrition MNA 17-23.5 points	Well-Nourished MNA 24 points	one-way ANOVA p-value
(BMI) (kg/m2)	19.2 7.1 a	24.7 8.9 b	26.6 4.1 b	P=0.005
(MAC) (cm)	21.6 4.0 a	26.8 5.1 b	28.0 3.9 b	P=0.000
(CC) (cm)	25.3 4.9 a	29.7 5.0 b	33.1 4.4 c	P=0.000

(BMI): Body Mass Index, (MAC): Mid-Arm Circumference, (CC): Calf Circumference. Results are presented as mean ± (SD). Means within each row having different letter superscripts following the number differ significantly ($p < 0.05$).

Statistical Analysis

Results were expressed as mean values ± standard deviation (SD) and in number and percentage. The mean values, in (See, table 1), were compared using one-way analysis of variance (one-way ANOVA). Differences in mean values with $p < 0.05$ were considered significant. Where significant effects were found, differences between groups were examined using unpaired Student's test with a significant level of $p < 0.05$.

Results

(**1**) The mean age of the elderly residents is 71.8 ± 7.6 years (range 60-94 years). The nutritional status of investigated elderly is presented in (table 2). Twenty seven percent of subjects were malnourished, 43% of subjects were at risk of malnutrition and the remaining subjects were considered to be well-nourished according to the (MNA) test. The mean (MNA) values were 14.4, 20.9 and 25.4 points for the malnourished, at risk of being malnourished and the well-nourished elderly subjects, respectively (See, table 2).

Table 2. The mini-nutritional assessment (MNA) points, the number and the percentage of elderly subjects in the three MNA categories.

MNA categories	Values	N	%
Malnourished MNA < 17 points	14.4 ± 1.7	20	27
At risk of malnutrition MNA ≤17-23.5 points	20.9 ± 2.0	32	43
Well-Nourished MNA ≥24 points	25.4 ± 1.2	22	30

Results are presented as mean ± SD or number and percentage of subjects

(**2**) The average (BMI), (MAC) and (CC) values for the elderly residents was 23.8 kg/m², 25.8 cm and 29.5 cm, respectively (Table 3).

Table 3 Anthropometric measurements of elderly residents.

Anthropometric measurements	Values
BMI (kg/m²)	23.8 ± 7.76
MAC (cm)	25.8 ± 5.16
CC (cm)	29.5 ± 5.6

(BMI), Body Mass Index. (MAC), Mid-Arm Circumference, (CC), Calf Circumference. Results are presented as mean ± SD.

(**3**) Elderly people who were classified as malnourished according to the (MNA) test, had the lowest (BMI), (MAC) and (CC) (See, table 1). The elderly people who were classfied as at risk of being malnourished had a lower (CC) compared with the well-nourished. No significant difference in the (BMI) and (MAC) values was observed between those who were classified as at risk of being malnorished and the well- nourished subjects.

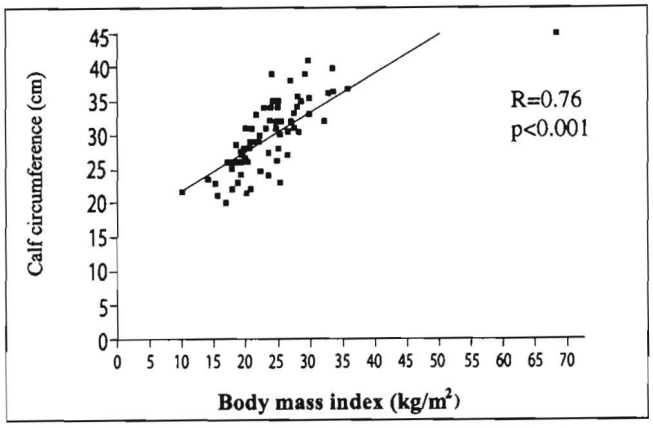

Figure 1. Correlation between Body Mass Index and (MAC) Mid-Arm Circumference in elderly residents.

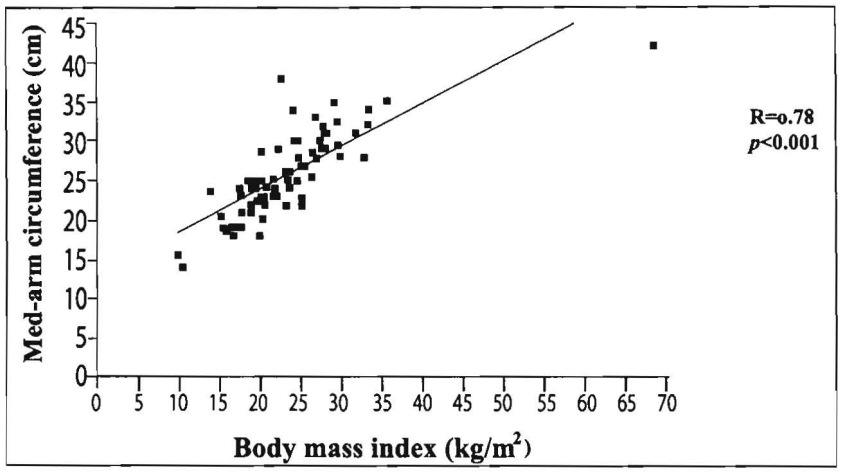

Figure 2. Correlation between (BMI) Body Mass Index and (CC) Calf Circumference, in elderly residents.

(4) The (MAC) and (CC) were found to be significantly correlated with (BMI) (Figure 1 & 2).
(5) Table (4) shows the score of the (MNA) according to the diagnosis of the elderly (neuro-psychiatric diseases were excluded, since almost all elderly residents suffer, to differing degrees, from neuro-psychiatric diseases). Approximately 15% (Total No. 11) out of all elderly residents were diabetic. One subject out of the 15% (11) diabetic subjects was classified as malnourished (MNA<17).

and malnourished reached 70%. (Saletti *et. al* 1999) found that 64% of elderly receiving nursing home care were either at risk of malnutrition or malnourished using the (MNA) test, but in their results, the large proportion of subjects were at the zone of malnutrition (Saletti *et al.*, 1999). In Sweden, 71% of elderly living in nursing homes were found to be malnourished (MNA < 17) (Saletti *et al.*, 2000).

It has been suggested that (BMI) ranges of between 24 and 29 is more appropriate for the elderly population (Beck & Ovesen, 2002). The mean (BMI) value in our study was near the suggested appropriate value (See, table 3).

None of the elderly subjects suffering from any of the chronic diseases listed in table 4 reached a score of 24 in the (MNA), which is the score that an elderly subject has to reach to be considered well-nourished. Diabetes compromised about 15% or (11) of the total subjects, not unexpectedly, as it is a prevalent chronic metabolic disorder in the Saudi population (Warsy & el-Hazmi, 1999).

Table 4 The Mini-Nutritional Assessment (MNA) points in the elderly according to the diagnosis*".

Diagnosis group (Nos) (No) or (SD)	(Nos)	(Nos) (MNA) points ≥ 24	(Nos) (MNA) points ≥17-23.5	(Nos) (MNA) points < 17	MNA score
Diabetes	11	5	5	1	22.2 ± 3.8
Heart/lung diseases	4	1	3	0	22.4 ± 2.0
Hepatitis B and C	4	2	1	1	21.9 ± 6.1
Hypertension	3	1	1	1	20.5 ± 6.7
> 1 main diagnosis	6	0	4	2	18.7 ± 4.2

* Data are presented as number of subjects (N) or Mean SD.
* Diagnosis was divided into chronic diseases (neuro-psychiatric diseases were excluded).
* None of the other diagnostic groups compromised more than (2) subjects.

The elderly subjects with more than one main diagnosis had the lowest (MNA) score (mean=18.7).

Discussion

The study was performed to assess the nutritional status of the elderly living in the Riyadh-nursing home using the (MNA). The study showed that more than one fourth of the subjects were malnourished. The percentage of elderly subjects classified as at borderline of being malnourished

According to the (MNA) questionnaire, most of the subjects were consuming three whole meals per day (90.5%), the remaining ate two meals, and no one ate less than two meals. Most elderly residents (82.4%) were taking more than two serving of fruit and vegetables per day. It seems that food intake in the nursing home was satisfactory among the subjects. The reason behind this satisfaction is due to the good food services and due to the encouragement of the care personnel during each mealtime. We noticed that the caregivers were

insisting and encouraging the residents to try to finish all their meals. Despite the fact that most of the subjects eating three whole meals/day and none of the residents consumed less that two meals/day, the percentage of malnourished subjects reached 27%. Low (BMI) is common among old home-care clients and nursing home residents in many countries, in spite of an apparent sufficient intake of energy (Beck & Ovesen, 2002); (Gamez *et al.*, 1998). About three quarters of the elderly drank more than 5 cups of fluid per day. Saudi food habits of drinking tea and Arabic coffee and the serving of hot drinks in the nursing home most day time could play a significant role of drinking this reasonable amount of fluid.

The (MNA) test is a quick and easy test to be used to identify persons with undernutrition in which persons, identified as "at risk of being malnuorished" or "malnuorished" on the (MNA) test, would receive additional nutritional assessment in an attempt to pinpoint the specific nutrient deficiencies of the elderly to do the necessary medical and nutritional interventions.

In conclusion, although the numbers of subjects involved in the study were small, the results of the (MNA) indicated the necessity of performing national nutritional assessment for elderly subjects in other nursing homes and in the community. More attention needs to be paid to this vulnerable group of people.

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