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Research Article

### PREVALENCE AND PREDICTORS OF MALNOURISHMENT OF ELDERLY IN SAUDI ARABIA USING MNA-SF

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**Abstract:**

*A cross-sectional study was done to find the prevalence and the predictors of elderly malnutrition in Saudi Arabia during the period from 1 January to 31 March 2020. The MNA®-SF is a screening tool to help identify elderly patients who are malnourished or at risk of malnutrition. The MNA-SF was used in our study to assess the malnutrition among elderly as it is validated and recommended for use to grade and screen malnutrition as it fulfills many criteria for screening as well as diagnostic measures. Data were compiled and analyzed using the Statistical Package for the Social Sciences (SPSS, version 23) and results were analyzed with frequencies, Chi-square, and ANOVA tests. P-value was considered significant if <0.05. The study included 408 participants, aged 50 years and higher. Mean age ± SD was 63.9 ± 9.2, and 59.8% were females. Mean BMI (± SD) was 27.9 ± 4.8. Among all, 13.7% were suffering malnutrition, and 36.8% were at risk of malnutrition.*

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**INTRODUCTION:**

Life expectancy has increased in parallel to the improvements in the quality of life and the decrease in the birth rates worldwide, and this has resulted in a gradual increase in the elderly population. According to the expectations of the World Health Organization, it is estimated that there will be approximately 1.2 billion elderly people in 2025, and this figure will reach two billion by 2050, with 80% of the elderly population in the world living in developing countries [1].

Chronic diseases become increasingly common with age and are often considered an inevitable part of aging. Chronic diseases such as chronic obstructive pulmonary disease, cardiovascular disease (CVD), type 2 diabetes, cognitive decline, dementia, and cancer, all of which have high associated costs of diagnosis, treatment, and care [2, 3].

Diet and lifestyle, coupled with the maintenance of healthy body weight are important in the maintenance of health for all age groups but are crucial for healthy aging. Maintaining a good nutritional status has significant implications for health and wellbeing, delaying, and reducing the risk of developing a disease, maintaining functional independence, and thus promoting continued independent living [4].

Nutritional problems, such as malnutrition, dehydration, and electrolyte imbalance, are multifaceted and complex issues for older adults. Nutritional problems and increased risk of malnutrition, contribute to frailty via the culmination of sociologic, biological, and cognitive issues [5].

Changes in food consumption occur as people advance in age. In the elderly, inadequate food consumption due to a loss of appetite results in a decrease in muscle and fat mass and the development of malnutrition [6].

Malnutrition means 'poor nutrition' when energy and nutrients are deficient in the diet that causes a measurable clinical outcome or impact on body composition or function. Malnutrition can refer to people who are overweight but the term is more often used to apply to underweight people. Malnutrition can have a profound detrimental impact on disease risk, progression, and prognosis, as well as increasing complications after injury and delaying recovery from illness [7].

Management involves treating pathological causes such as poor dentition and optimizing the

management of chronic diseases. Patients with physical or cognitive impairment require special care and attention. Several medications have been used to stimulate appetite, but they should not be considered first-line treatment [8].

A Cross-sectional study conducted in Outpatient Clinics at King Abdul-Aziz Medical City between April and December 2013. A total of 363 participants were included (198 men and 165 women) aged 65 years or older. The nutritional status of participants was assessed using body mass index (BMI) and the Mini-Nutritional Assessment (MNA) tool. The prevalence of malnutrition among elderly outpatient was found to be 9.6% and 27.5% were at risk of malnutrition with no difference between males and females. MNA total score was significantly lower with increasing age in both genders. The prevalence of overweight and obesity was 30.9% and 27% respectively. Obesity was significantly higher among females than males. Nutritional problems are highly prevalent among elderly outpatient, reaching 36.6% (obesity = 27%, malnutrition = 9.6%). Therefore, the nutritional status of the elderly needs to be assessed routinely for prevention, early identification, and treatment [9].

**Objective:**

This study is conducted to identify the predictors of poor nutrition in elderly patients in Saudi Arabia using the MNA-SF.

**Specific Objective:**

1. To evaluate the prevalence of malnutrition among the elderly.
2. To determine the nutritional status and its association with sociodemographic characteristics and health complaints of older persons presenting at primary health care centers.

**Participants and Methods**

A cross-sectional study was conducted in KSA during the period from 1 January to 31 March 2020, using the MNA®-SF. The MNA®-SF is a screening tool to help identify elderly patients who are malnourished or at risk of malnutrition. The MNA®-SF provides a simple and quick method of identifying elderly persons who are at risk for malnutrition, or who are already malnourished. It identifies the risk of malnutrition before severe changes in weight or serum protein levels occur.

The MNA®-SF was developed by Nestlé and leading international geriatricians and it remains one of the few validated screening tools for the elderly. It has been well validated in international studies in a variety of settings and correlates with morbidity and mortality.

In 2009 the MNA®-SF was validated as a standalone screening tool, based on the full MNA®.8 The MNA®-SF may be completed at regular intervals in the community and the hospital or long-term care setting. It is recommended to be done annually in the community, and every 3 months in the hospital or long-term care or whenever a change in clinical condition occurs.

**Sample size:** We calculated our sample size using standard online tools through the following formula ( $N=(Z\alpha)^2 \times [p(1-p)]/d^2$ )

Where:

n = estimated sample size.

Z $\alpha$  at 5% level of significance = 1.96

d = level of precision and is estimated to be 0.05

p = High awareness levels in two previous studies (30%).

Actual sample size = (Primary sample size  $\times$  design effect (estimated to be 1.5))

The expected response rate was estimated to be 80%.

**Statistical analysis:** Data was compiled and analyzed using statistical package for the social sciences (SPSS, version 16) and results were analyzed with frequencies, Chi-square, and ANOVA tests as appropriate. P-value was considered significant if  $<0.05$ .

**Ethical consideration:** The questionnaire contains a brief introduction to explain the aim of the study to the participant mothers. Participants were informed that participation is completely voluntary. No names were recorded on the questionnaires. All questionnaires were kept safe.

### RESULTS:

It is shown in table (1) that participants aged 50 years and higher, mean age  $\pm$  SD was  $63.9 \pm 9.2$ , and 59.8% were females. The majority of participants aged 60 - 69 years. Mean BMI ( $\pm$  SD) was  $27.9 \pm 4.8$ . Among all, 13.7% were suffering malnutrition, and 36.8% were at risk of malnutrition.

Table (2) shows the relationship between the screening score and sex, age, and BMI. Sex was not a significant predictor for malnutrition, whereas age and BMI were highly associated. The mean age for the malnourished group was 70.1 ( $\pm$  12.8). In the group of malnutrition risk, and the group with normal nutritional status, the mean age was 65.1 ( $\pm$  8.2), and 61.3 ( $\pm$  7.6), respectively.

The mean BMI ( $\pm$  SD) of the malnutrition group was 24.0 ( $\pm$  3.8), whereas the group at risk of malnutrition had a mean of 28.4 ( $\pm$  5.2).

Figure (1) illustrates the relationship between age (means) and screening score groups.

**Table (1): Characteristics of the participants (N=408).**

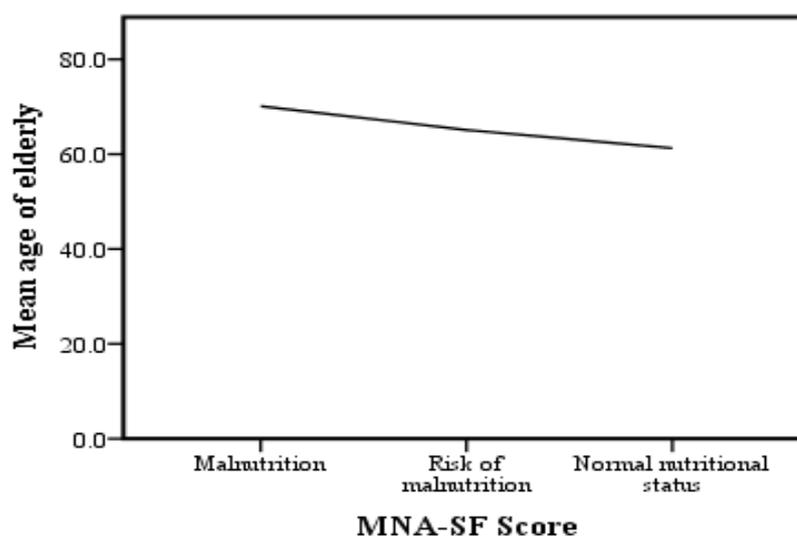
Variables	Frequency (N=408)	Percent
<b>Sex</b>		
Male •	164	40.2
Female •	244	59.8
<b>Age groups</b>		
<b>Mean <math>\pm</math> SD</b>	63.9 $\pm$ 9.2	
50 – 59 years •	112	27.5
60 – 69 years •	198	48.5
70 – 79 years •	66	16.2
80 years or more •	32	7.8
<b>Body Mass Index</b>		
<b>Mean <math>\pm</math> SD</b>	27.9 $\pm$ 4.8	
Underweight •	4	1.0
Normal •	130	31.9
Overweight •	140	34.3
Obese •	132	32.4
<b>Screening score</b>		
Malnourished •	56	13.7
At risk of malnutrition •	150	36.8
Normal nutritional status •	202	49.5

Table (2): The relationship between the screening score and sex, age, and BMI (N=408).

Parameters		Screening score			Total	P-value*
		Malnutrition	At risk of malnutrition	Normal nutritional status		
Sex	Male •	26 15.9%	52 31.7%	86 52.4%	164 100.0%	0.193
	Female •	30 12.3%	98 40.2%	116 47.5%	244 100.0%	
Age Groups	Mean ± SD •	70.1 ± 12.8	65.1 ± 8.2	61.3 ± 7.6	63.9 ± 9.2	0.000
	50 – 59 years •	10 8.9%	30 26.8%	72 64.3%	112 100.0%	
	60 – 69 years •	20 10.1%	72 36.4%	106 53.5%	198 100.0%	
	70 – 79 years •	10 15.2%	40 60.6%	16 24.2%	66 100.0%	
	80 years or more •	16 50.0%	8 25.0%	8 25.0%	32 100.0%	
BMI	Mean ± SD •	24.0 ± 3.8	28.4 ± 5.2	28.59 ± 4.2	27.9 ± 4.8	0.000
	Underweight •	4 100.0%	0 0.0%	0 0.0%	4 100.0%	
		Normal •	32 24.6%	50 38.5%	48 36.9%	
	Overweight •		16 11.4%	46 32.9%	78 55.7%	
		Obese •	4 3.0%	54 40.9%	74 56.1%	

\*Chi-square & ANOVA tests was used.

Figure (1): Relationship between MNA-SF score and age of elderly, KSA, 2020



**DISCUSSION:**

MNA-SF is used in our study to assess the malnutrition among elderly as it is recommended by the European Society of Parenteral and Enteral Nutrition guidelines to grade and screen malnutrition as it fulfills many criteria for screening as well as diagnostic measures [10]. With this background, the tool was used to assess malnutrition in elderly people in Saudi Arabia and to find the association with sex, age groups, and BMI. The present study has 408 participants, 40.2% of whom are males. Screening score shows that 13.7% are malnourished and 36.8% are at risk of malnutrition.

Comparing our results to other studies using the MNA-SF tool, the percentage of malnourished people in our study is considered low compared to an institution-based study conducted in West Bengal, India, where the malnourished participants constituted 31.2% of all population [11]. A study conducted in the Netherlands on elderly visiting geriatric outpatient departments found that 17% of the elderly were malnourished [12], whereas other studies show lower levels of malnourished individuals. A study run on 773 elderly who live in nursing homes in Turkey showed that the overall malnourished elderly constituted 8.4% [13]. Another study conducted in India included 360 elderly, among which 15% were reported malnourished. In contrast to our results, a study conducted in Australia using the MNA-SF to perform a nutritional screening on 225 participants found that only 1 individual (0.4%) was malnourished [14]. Another study of 250 participants in Australian home care services classified only 4% as malnourished [15].

Our study shows that 36.8% of participants are at risk of malnutrition. These findings are consistent with those of Alzahrani et al., whose study included 152 elderly visiting geriatric outpatient clinic of King Abdul Aziz University Hospital, Jeddah, KSA and found that 32.9% were at risk of malnutrition, and 5.3% were classified as malnourished using the MNA tool [16]. Another cross-sectional study conducted in Al Madinah Al Munawarah area, Saudi Arabia found that 3.5% of 114 elderly were malnourished, and 28.9% were at risk of malnutrition [17].

A significant relationship was found between the screening score and age groups ( $P=0.000$ ). The mean age ( $\pm$  SD) appeared to be proportionate with the level of malnutrition. The mean age for the malnourished group was 70.1 ( $\pm$  12.8), and it decreased to 65.1 ( $\pm$  8.2), and 61.3 ( $\pm$  7.6) in the group of malnutrition risk, and the group with normal nutritional status, respectively. Another

predictor was BMI ( $P=0.000$ ). The group with malnutrition had a mean BMI ( $\pm$  SD) of 24.0 ( $\pm$  3.8), whereas the group at risk of malnutrition had a mean of 28.4 ( $\pm$  5.2), and the group with normal nutritional status had a mean BMI of 28.6 ( $\pm$  4.2).

**CONCLUSION:**

Among a random sample of elderly in Saudi Arabia, 13.7% were suffering malnutrition, and 36.8% were at risk of malnutrition. Using MNA-SF, age, and BMI were found to be significant predictors of malnutrition.

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