

RELATION TO FUNCTIONAL AND NUTRITIONAL STATUS AMONG HOSPITALIZED ELDERLIES

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Primljen/Received 19. 03. 2018. god.

Prihvaćen/Accepted 10. 06. 2018. god.

Abstract: Introduction: Adding years to life is a great achievement when this is accompanied by a good level of health and well-being and independence. Major indicators for prediction mortality risk in older adults are the nutrition status and physical functional ability. The aim of this study is to present the nutritive and functional status among institutionalized elderlies and the relatedness with certain risk factors. **Material and methods:** Cross-sectional study has been conducted at certain nursing homes with participation of individuals over 60 years old. As for the research Scale of Daily Living Activities (ADL) has been used to present the functional capacity of the elderly and MNA has been used to detect the nutrition status. **Results:** The results from the research conducted among elderlies have shown the following socio-demographic characteristics: out of 127 participants, most of them were females- 77% and 69% at the age between 75 and 84. Most of the elderlies (in 68%) have completed secondary education. The results from MNA have shown that 69,2% are well-nourished, 27,6% are at risk for malnutrition and 3,2% are malnourished. There is a relatedness of the nutrition status with the gender ($p < 0,001$) and the level of education ($p < 0,001$). ADL scale among 127 elderly participants has shown that 37% are independent, 45% are with a moderate impairment and 18% are with severe functional impairment. In comparison with the females, the males show higher level of functional ability in all ADL components except the continence. **Conclusion:** The results from the research have shown that the nutrition status among elderlies is satisfactory, emphasizing the factors such as gender, education level and functional ability as key points for the level of nutrition status at the elderlies.

Key words: malnutrition, functional capacity, elderly.

INTRODUCTION

Aging among population worldwide is quite present regardless of its level of development. Even though the progression is higher in the developed countries yet the population aging includes those countries where the young people is present as well (1). In Macedonia the presence of people over 60 years in 2012 expressed in percentage is 17,5% and those over the age of 80 is 2,3% from the total number of population.

Adding years to life is a great achievement when this is accompanied by a good level of health and well-being and independence. Nevertheless ageing increases the dependence of other people due to reduction of the level of functional independence (2). Major indicators for prediction mortality risk in older adults are the nutrition status and physical functional ability (3). A decline in functional status is a profound predictor of mortality (4). The death rate increases from 8 % in individuals with no disability, to 15% with one or more Instrumental Activities of Daily Living (IADL) disabilities, to 21% in persons with one or two ADL dependencies, and up to 37% in those with five or six ADL dependencies during a 2-year period (5). Many studies have shown that malnutrition among elderly increases the death rate opposite to elderly with good nutrition status (5-10).

Nursing homes are the ones offering proper care for elderly of 80 years and above (11). The inability to live at home is intensifying the necessity of institutional care of elderly offered by the nursing homes (12). Nursing homes across Europe provide care for 2 to 10% of the elderly (13, 14). Several studies have shown that the institutionalized female elderly register higher prevalence of malnutrition in terms of elderly people in general (15-18).

Mini Nutritional Assessment (MNA) is a method used for identification of malnutrition risk among elderly. The MNA is a simple, low cost and noninvasive method that can be done at bedside (19). Added MNA scores allow one to screen the elderly who have an adequate nutritional status, those who are at risk of malnutrition and those who are malnourished.

The aim of this study is to present the nutritive and functional status among institutionalized elderly and the relatedness with certain risk factors.

MATERIAL AND METHODS

Cross-sectional study has been conducted at certain nursing homes in R. Macedonia with participation of individuals over 60 years old. Before the start of the research, the author has provided consent from the relevant authorities of the institutions. Each participant was explained in details about the aim of the research as well as the anonymity and the voluntary aspect of this study. Before the beginning of the anonymous questionnaire a verbal and official /signed consent has been provided by each participant (addition 1). Out of 148 elderly the research

has been conducted to 127 as of the absence or inability to participate due to mental disorder.

Nutritional Status

MNA (addition 2) has been used to detect the nutrition status, which is composed of 18 items such as: anthropometry: body mass index (weight in kilograms / Height in Meters x Height in Meters), calf circumference (measuring the calf at the widest part) and arm circumference (the distance between the acromial surface of the scapula (bony protrusion surface of upper shoulder) and the olecranon process of the elbow (bony point of the elbow) on the back of the arm.), dietary (number of meals, autonomy to feed, water and food ingestion), and global assessment (medicines, residence, mobility, dementia, stress, how does the patient consider his/her health status and nutritional status). The interpretation of the results is done based on the total score such as: 24 and above are considered as adequate nourished, 17 to 23,5 are considered as individuals at risk of malnutrition and 17 and below are considered to be malnourished (7).

| | |
|--|-----------|
| Addition 1 | |
| Consent form for participants | |
| 1. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. | |
| 2. I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any publications | |
| _____ | _____ |
| Patients name | Signature |

Table 1. Variable associated with functional activities, gender and BMI

| ANOVA | | | | | | |
|---------------------|-------|----|----------|----------|-----------------|----------|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 253.5 | 2 | 126.75 | 6.019789 | 0.021899 | 4.256495 |
| Within Groups | 189.5 | 9 | 21.05556 | | | |
| Total | 443 | 11 | | | | |

Table 2. Factors linked with the nutrition status among hospitalized elderly in R. Macedonia

| | N | Risks with malnutrition and with malnutrition | Well nourished | P value |
|----------------------------------|-----|---|----------------|-----------------|
| Registered illnesses less than 3 | 121 | 31 (35%) | 14 (32%) | 0,216 |
| Registered illnesses more than 3 | | 46 (65%) | 30 (68%) | |
| Moderate physical activity | 105 | 38 (54,2%) | 21 (60%) | 0,689 |
| Physical inactivity | | 32 (45,8) | 14 (40%) | |
| Dependent and partly dependent | 127 | 45 (52,9%) | 5 (11,9%) | < 0,0001 |
| Independent | | 40 (47,1%) | 32 (88,1%) | |

Mini Nutritional Assessment

MNA[®]

Nestlé
Nutrition Institute

| | | | | |
|------------|------|-------------|-------------|-------|
| Last name: | | First name: | | |
| Sex: | Age: | Weight, kg: | Height, cm: | Date: |

Complete the screen by filling in the boxes with the appropriate numbers.

Add the numbers for the screen. If score is 11 or less, continue with the assessment to gain a Malnutrition Indicator Score.

| Screening | |
|---|---|
| A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties? 0 = severe decrease in food intake 1 = moderate decrease in food intake 2 = no decrease in food intake | <input type="checkbox"/> |
| B Weight loss during the last 3 months 0 = weight loss greater than 3kg (6.6lbs) 1 = does not know 2 = weight loss between 1 and 3kg (2.2 and 6.6 lbs) 3 = no weight loss | <input type="checkbox"/> |
| C Mobility 0 = bed or chair bound 1 = able to get out of bed / chair but does not go out 2 = goes out | <input type="checkbox"/> |
| D Has suffered psychological stress or acute disease in the past 3 months? 0 = yes 2 = no | <input type="checkbox"/> |
| E Neuropsychological problems 0 = severe dementia or depression 1 = mild dementia 2 = no psychological problems | <input type="checkbox"/> |
| F Body Mass Index (BMI) (weight in kg) / (height in m²) 0 = BMI less than 19 1 = BMI 19 to less than 21 2 = BMI 21 to less than 23 3 = BMI 23 or greater | <input type="checkbox"/> |
| Screening score (subtotal max. 14 points) | <input type="checkbox"/> <input type="checkbox"/> |
| 12-14 points: Normal nutritional status | |
| 8-11 points: At risk of malnutrition | |
| 0-7 points: Malnourished | |
| For a more in-depth assessment, continue with questions G-R | |

| Assessment | |
|---|--------------------------|
| G Lives independently (not in nursing home or hospital) 1 = yes 0 = no | <input type="checkbox"/> |
| H Takes more than 3 prescription drugs per day 0 = yes 1 = no | <input type="checkbox"/> |
| I Pressure sores or skin ulcers 0 = yes 1 = no | <input type="checkbox"/> |

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For more information: www.mna-elderly.com

| | |
|---|--|
| J How many full meals does the patient eat daily? 0 = 1 meal 1 = 2 meals 2 = 3 meals | <input type="checkbox"/> |
| K Selected consumption markers for protein intake | |
| • At least one serving of dairy products (milk, cheese, yoghurt) per day | yes <input type="checkbox"/> no <input type="checkbox"/> |
| • Two or more servings of legumes or eggs per week | yes <input type="checkbox"/> no <input type="checkbox"/> |
| • Meat, fish or poultry every day | yes <input type="checkbox"/> no <input type="checkbox"/> |
| 0.0 = if 0 or 1 yes 0.5 = if 2 yes 1.0 = if 3 yes | <input type="checkbox"/> <input type="checkbox"/> |
| L Consumes two or more servings of fruit or vegetables per day? 0 = no 1 = yes | <input type="checkbox"/> |
| M How much fluid (water, juice, coffee, tea, milk...) is consumed per day? 0.0 = less than 3 cups 0.5 = 3 to 5 cups 1.0 = more than 5 cups | <input type="checkbox"/> <input type="checkbox"/> |
| N Mode of feeding 0 = unable to eat without assistance 1 = self-fed with some difficulty 2 = self-fed without any problem | <input type="checkbox"/> |
| O Self view of nutritional status 0 = views self as being malnourished 1 = is uncertain of nutritional state 2 = views self as having no nutritional problem | <input type="checkbox"/> |
| P In comparison with other people of the same age, how does the patient consider his / her health status? 0.0 = not as good 0.5 = does not know 1.0 = as good 2.0 = better | <input type="checkbox"/> <input type="checkbox"/> |
| Q Mid-arm circumference (MAC) in cm 0.0 = MAC less than 21 0.5 = MAC 21 to 22 1.0 = MAC 22 or greater | <input type="checkbox"/> <input type="checkbox"/> |
| R Calf circumference (CC) in cm 0 = CC less than 31 1 = CC 31 or greater | <input type="checkbox"/> |
| Assessment (max. 16 points) | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| Screening score | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| Total Assessment (max. 30 points) | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |

Malnutrition Indicator Score

| | | |
|---------------------|--------------------------|---------------------------|
| 24 to 30 points | <input type="checkbox"/> | Normal nutritional status |
| 17 to 23.5 points | <input type="checkbox"/> | At risk of malnutrition |
| Less than 17 points | <input type="checkbox"/> | Malnourished |

Functional capacity

As for the research Scale of Daily Living Activities (ADL) has been used to present the functional capacity of the elderly. It is consisted of activities demonstrating daily living independency. The scale is assessed with values 1- for independent and 0- for dependence. The score of 6 indicated complete independence, score 4 indicated moderate impairment and 2 and below indicate severe functional impairment (20, 21).

Data were analyzed with the Statistical Package for Social Science (SPSS), version 19.0. The analysis involved elderly with malnutrition and risk of it, using Pearson correlation coefficient with significance level of 5%. Poisson regression has been performed, presenting the reasons for raw and adjusted prevalence and their respective confidence intervals at 95% (CI 95%). Variables that were associated with significance level ($p < 0.10$) were included in the model.

RESULTS

The results from the research conducted among elderlies have shown the following socio-demographic characteristics: out of 127 participants, most of them were females- 77% and 69% at the age between 75 and 84. Most of the elderlies (in 68%) have completed secondary education.

As for the estimation of their own health condition, most of the participants (in 47%) have stated that their health is good and 41% of the elderlies estimated their health condition as poor. 76% of them use more than 3 medications a day and 17% of them use less than 3 medications a day. As of the results at 61% of the participants less than 3 diseases has been registered as presents and 34% reported more than 3 diseases.

According to BMI 19% are with low wight, 33% are with a normal weight, 31% are overweight and 17% are obese. Mid value of BMI is 22,3 with statistical significance between males and females ($p < 0.001$).

The results from MNA have shown that 69, 2 % are well- nourished, 27,6% are at risk for malnutrition and 3,2% are malnourished. There is a relatedness of the nutrition status with the gender ($p < 0,001$) and the level of education ($p < 0,001$).

ADL scale among 127 elderly participants has shown that 37% are independent, 45% are with a moderate impairment and 18% are with severe functional impairment. In comparison with the females, the males show higher level of functional ability in all ADL components except the continence. From the results of the chosen items (functional activates, BMI and gender) represented in the table no 1 we have: independent (37%), moderate impairment (45%) and severe functi-

onal impairment (23%). According to the represented results we have significant differences between the groups ($p < 0,05$).

Regarding the variables related to elderly health, it has been found that presence of more than 3 diseases, physical inactivity and functional capacity for ADLs was associated to nutritional status. Table 2 presents PR (Prevalence Ratios) of independent variables and their confidence intervals. It was observe as a result of the multivariate analysis, that only the variable functional capacity for ADL was statistically significant.

DISCUSSION

This research presents the socio- demographic characteristics, health, nutritive status, activity daily living among institutionalized elderlies. As for the study most of the participants expressed in percentage were females at the age between 75 and 84. Most of the participants have completed secondary education. The participants that were mostly included in this research estimate their own health condition as good and most of them use more than 3 medications a day, and for most of them less than 3 diseases are registered.

Self-evaluating research among elderlies in Korea has shown that 78% of the people have registered an illness that is related with the estimation of their own health (22).

The morbidity in this research can be explained with the fact that the institutionalizing of the elderlies is mostly a result of the presence of illness and inability for different types of care to this population.

According MNA scores 27,6% from the participants were at risk of malnutrition and 3.2% were registered as malnourished. Those results were with a lower range than most of the international studies, whereas the results from 32 multinational studies including 6,821 institutionalized elders indicated that the prevalence of malnutrition and its risk were 5-71% and 27-70% respectively (17). A study conducted at a nursing homes in Spain presented a prevalence of 2,8% of participants are with malnutrition and 37,3% are at risk of malnutrition. (23).

The nutrition status among participants is most probably registered as good due to the exclusion of the severely ill and elderlies suffering with dementia, during the conduct of this research.

In this study the nutrition status has shown relatedness also with the gender and the level of education among hospitalized elderlies.

A research conducted in Brazil has shown that the nutritional status was associated with gender, education, where elderly men had a greater potential for malnutrition and malnutrition risk (24).

High proportion of elderly with low weight mostly man was found in the research done by Menezes and Marucci (25). As for the education and nutritional status a relatedness was identified in a other studies conducted in Brazil (26). As for this study along with the aforementioned studies conducted in Brazil most of the examined are registered with a low level of education. This result may be related to low socioeconomic status and poor access to information. Barreto et al. also suggests that low education is a risk factor for low weight, explained by lower income in old age (27).

The results of ADL scale have shown that most of the participants are able to perform their basic daily activities, comparing that males show higher percentage of independence in all components of ADL except the continence, than females.

Similar results were shown with the study conducted at nursing homes in Lebanon where the males have shown higher level of functional ability compared to the females (28).

This study has also shown relatedness of the nutrition status and presence of more than 3 diseases among participants which is confirmed with the results of the research of Stratton RJ whereas the results shown that Somatic diseases may also increase the risk of malnutrition (29).

Participants included in this research show moderate physical activity and physical inactivity in the hospitalized elderly. Study conducted by Walid Kamal M. Abdelbasset approved beneficial effects of physical activity on depression status and pain in elderly people (30).

The results have shown a relation with the nutrition status and the functional capacity of ADL same as

the research conducted in Brazil where it has been observed that dependent or partially dependent individuals for performing ADLs are approximately 1.6 times more malnourished or at risk of malnutrition than independent individuals (24).

Nutrition status among institutionalized elderly affects the impaired functional capacity, appearing whether as a cause of a consequence. It is possible that nutritional status is an important factor in maintaining functional capacity, due to some aspects such as the lowest level of physical activity and muscle atrophy (31).

CONCLUSION

The results from the research have shown that the nutrition status among elderlies is satisfactory, emphasizing the factors such as gender, education level and functional ability as key points for the level of nutrition status at the elderlies.

MNA and ADL are both simple and noninvasive scales that can easily be administered among hospitalized elderlies. Simple applying can be effective and economic manner of identification of persons that are in need of intervention.

DECLARATION OF INTEREST

The authors declare that there are no conflicts of interests.

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Sažetak

ODNOS FUNKCIONALNOG I NUTRITIVNOG STATUSA KOD STARIH

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Uvod: Starenje je izrazito uspešno kada je praćeno dobrim nivoom zdravlja, blagostanja i nezavisnosti. Glavni indikator za predviđanje rizika mortaliteta kod starijih ljudi je nutritivni status i funkcionalna fizička sposobnost. **Cilj** ove studije bio je da se predstavi nutritivni i funkcionalni status među institucionalizovanih starih osoba u korelaciji sa određenim faktorima rizika. **Materijal i metode:** studija slučajeva i kontrola je sprovedena u određenim staračkim domovima sa učešćem pojedinaca koji su imali preko 60 godina. Za analizu je uzeta Merna skala dnevnih aktivnosti (ADL) koja je prezentovala funkcionalni kapacitet starih lica

kao i MNA koja je određivala nutritivni status. **Rezultati:** Rezultati ove studije pokazali su sledeće demografske karakteristike: od 127 pacijenta, većina je bila ženskog pola – 77% i 69% između 75-84 godine. Većina starih (68%) je imala srednju stručnu spremu. Rezultati MNA pokazali su da je 69,2% ispitanika bilo dobro hranjeno, 27,6% je bilo pod rizikom od malnutricije i 3,2% je bilo pothranjeno. Postoji povezanost između nutritivnog statusa i pola ($p < 0,001$) i nivoa obrazovanja ($p < 0,001$). ADL skala je od 127 ispitanika pokazala da je 37% nezavisno, 45% sa srednjim oštećenjima, kao i 18% sa ozbiljnim funkcionalnim

oštećenjima. U poređenju sa ženama, muškarci su pokazali viši nivo funkcionalne sposobnosti u svim ADL komponentama, osim kontinencije.

Zaključak: Rezultati ove studije pokazali su da je nutritivni status među starim licima zadovoljavajući i

da skreće pažnju na pol, nivo obrazovanja i funkcionalne sposobnosti kao ključne tačke u nutritivnom statusu starih.

Ključne reči: malnutricija, funkcionalni kapacitet, stari.

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