· Advances in Medical Sciences · Vol. 55(2) · 2010 · pp 172-178 · DOI: 10.2478/v10039-010-0041-4

A mini-nutritional assessment of older Poles in relation to the food intake model and food intake variety

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Received 08.04.2010
Accepted 22.07.2010
Advances in Medical Sciences
Vol. 55(2) · 2010 · pp 172-178
DOI: 10.2478/v10039-010-0041-4

ABSTRACT

Purpose: The aim of the research was to conduct a mini-nutritional assessment in relation to the food intake model and food intake variety for Polish older persons.

Material and Methods: The research included 420 people aged 65+. Using the food consumption frequency method (by a FIVeQ questionnaire), the weekly intake of 63 groups of products was assessed (yes, no). Food intake variety was assessed with the use of food intake variety index (FIVeI), which was calculated as the total number of products eaten per week in the amounts exceeding trace quantities. Four models of food intake were established: "ordinary" (S1), "rich varied" (S2), "ordinary with a tendency to vary" (S3) and "moderate connoisseur" (S4). The risk of malnutrition or the incidence of malnutrition was determined based on the questionnaire of the mini nutritional assessment (MNA).

Results: The good nutritional status of Polish older persons was affected by better results obtained in three parts of the questionnaire: "global evaluation" (MNA-2), "assessment of dietetic habits" (MNA-3) and "subjective assessment of self-perceived quality of health and nutrition" (MNA-4). It confirms the significance of those parts of the questionnaire in detecting malnutrition or the risk of malnutrition in older persons and suggests a lower share of the MNA-1 part which concerns anthropometric indicators. It was found that S2 and S3 persons were characterized by a greater food intake variety index (the median of 36 and 34 products eaten per week, respectively) and more often by a good nutritional status (88% and 79%, respectively) in comparison to S4 and S1 persons, who had a lower food intake variety index (the median of 4 and 30 products eaten per week, respectively) and more often occurring malnutrition (17% and 1% respectively) or a risk of malnutrition (17% and 30%, respectively).

Conclusion: To conclude, a larger variety of food intake favoured better nutritional status of older persons, while a lower food intake variety increased the risk of malnutrition.

Key words: older persons, mini nutritional assessment, malnutrition, food intake models, food intake variety

INTRODUCTION

The MNA (the Mini-Nutritional Assessment) questionnaire is recommended by numerous medical and research centres as a simple and non-invasive tool [1-5]. The MNA allows to assess the risk of malnutrition among healthy and/or sick respondents, who lead independent lives or are in institutions such as hospitals [6-10]. Validation research conducted in Europe and in the USA demonstrated high sensitivity and specificity of the questionnaire [2,11-17]. Additionally, the MNA is highly correlated with BMI and biomarkers, e.g. the level of albumins, cholesterol and vitamins [1-4,18].

Proper nutrition is one of the prerequisites for maintaining good health of older persons. It favours well-being, supports treatment and reduces the risk of mortality [19-23]. The more varied the diet, the higher the possibility that it contains all necessary nutrients and is properly balanced. It has been demonstrated that a single food product does not play a significant role in maintaining good health and preventing nutrition-related diseases. The effects of food on health depend on many interrelated features. Therefore, it is more useful to conduct an analysis concerning consumption of multiple food

Table 1. **Characteristics of food intake models.**

Cluster	Model name	Model characteristics	N	%N	FIVeI	
					Me	QD
S1	Ordinary	The most respondents characterized by an average intake of all groups of products.	163	39	30[a]	10
S2	Rich varied	More persons consuming domestic fruit and vegetables, butter, cream, organic meat and pork-butcher's products, lean fish and quality cured meat.	114	27	36[b]	8
S3	Ordinary with a tendency to vary	More persons consuming tropical and dry fruit, citrus fruits, fat fish, margarine, leaf vegetables.	124	30	34[c]	9
S4	Moderate connoisseur	Most persons consuming all products and more people consuming such products as: crustaceans, mussels and molluscs, fungi.	19	4	4[d]	22
Total			420	100	31	11

N – population size; %N – sample percentage; FIVeI – food intake variation index; Me – median; QD – interquartile range; a, …, d – various letters indicate significant differences in rows at $p \leq 0.05$

products. One possible solution is to select and describe food intake models. Food intake models provide a broader view on the type and the amount of food consumed, as well as enable multifaceted analyses of the interrelations between diet, nutritional status, diseases and mortality risk [21,24,25].

The aim of the research was to conduct a mini-nutritional assessment in relation to the food intake model and food intake variety for older Poles.

MATERIAL AND METHODS

The research included 420 persons (204 men and 216 women) aged 65+, living in five selected regions of Poland, i.e. in the Mazovia, Silesia, Warmia and Mazury and Wielkopolska Provinces. The sample for the research was selected by the quota method, assuming a total size of 400 persons and the same size of each of the 8 subgroups (50 persons each). The selection criteria included: sex, age (65÷74 or 75+) and family status (living alone and with other persons). During recruitment, the researchers tried to reach older persons of various educational levels, income, place of inhabitation, etc. so that the examined sample reflected differentiation in the national population of older persons aged 65+. The interview and measurements were conducted by well-trained interviewers from the Public Opinion Research Center (CBOS) in Warsaw.

Food intake was established using the food consumption frequency method, applying a validated Food Intake Variety Questionnaire (FIVeQ) [26]. Respondents were asked about consumption of 63 groups of products in the given amounts during the last seven days (yes, no). In this way the data was obtained on whether a given product was consumed in the amount exceeding trace quantities. Food intake variety was expressed by the food intake variety index (FIVeI), which was calculated as the number of product groups consumed per week (max 63) in the amount of more than trace quantities.

By using multidimensional exploration techniques, i.e. factor analysis (by the principle components analysis) and cluster analysis (by the k-average method) four typical clusters were selected from the total sample [27,28]. Those food intake models were named as follows: "ordinary" (S1, 39% of the sample), "rich varied" (S2, 27%), "ordinary with a tendency to vary" (S3, 30%), "moderate connoisseur" (S4, 4%). The characteristics of food intake models are included in *tab. 1.*

The occurrence of the malnutrition risk or of malnutrition was determined on the basis of a mini-nutritional assessment (MNA), which was composed of four parts as following [5]:

- "anthropometric measurements" (MNA-1; from 0 to 8 points),
- "global evaluation" (MNA-2; from 0 to 8 points),
- "assessment of dietetic habits" (MNA-3; from 0 to 9 points),
- "subjective assessment of self-perceived quality of health and nutrition" (MNA-4; from 0 to 4 points).

All answers or value ranges (for anthropometric parameters) were assigned an appropriate number of points according to the algorithm and afterwards a final total score was calculated (from 0 to 29 points). The respondents were then classified to one of three groups: a well-nourished person (≥24 points), a person at risk of malnutrition (17–24 points), a malnourished person (<17 points).

The measurements of body weight and height, arm and calf circumferences were carried out according to the guidelines of the MNA questionnaire and general principles applied in anthropometry [29]. Body weight measurements were taken for 392 persons (93% of the total sample), and the body height for 100 persons (24% of the total sample), to an accuracy of 0.1 kg and 0.1 cm, respectively. Missing data concerning the body height were completed for 320 persons. The calculations used the body height declared by respondents and multiple regression equations, separately for men and women, since sex has a significant effect on body size [30]. The regression equations can be found in *tab. 2.* On the basis of the measured body weight and body height (measured or calculated from regression equations), a BMI index was calculated for 392 persons. Arm circumference was measured for 399 persons