Association Between Nutritional Status According To Mini Nutritional Assessment And Body Mass Index For Community Dwelling Elderly Women In Kolkata, India

Home Science

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ABSTRACT

Objectives: The study intends to observe nutritional status of the community dwelling elderly women using Mini Nutritional Assessment (MNA) Questionnaire and its association with Body Mass Index (BMI). Design: A cross sectional study was conducted between the months of November, 2013 to September, 2014. Participants: 169 community dwelling elderly women (≥ 60 years). Measurements: Nutritional status was assessed by Mini Nutritional Assessment (MNA *) Questionnaire and Body Mass Index (BMI). Results: Based on the MNA scores, 54.4% and 17.2% of the elderly women were at risk of malnutrition and malnourished, respectively, while 28.4% of them had normal nutritional status. Both MNA scores and BMI were found to decrease significantly with age. Average BMI was found to 25.56± 5.8 Kg/m2. Although significant positive association was found between MNA scores and BMI but overweight is common in all MNA groups. 66.3% of the participants had BMI > 22.9 kg/m2. Conclusion: Despite having high BMI, poor nutritional status as per MNA was observed among the participants, indicating BMI alone might not be a good index for the assessment of nutritional status for the elderly.

Introduction:

Protein energy malnutrition is one of the major problems in elderly (1-4). While prevalence and risk for malnutrition vary greatly with socio-economic conditions, geography and even on the condition of living (1,2,5). Malnutrition in elderly is multifactorial (1,6) and age is one of the important risk factors for malnutrition (7,8,9).

Mini Nutritional Assessment is a comprehensive geriatric tool for the assessment of nutritional status in elderly (10). It is validated with high sensitivity (96%) and specificity (98%) for the assessment of nutritional status in older persons (11,12).

Body mass index (BMI) is a commonly used index of weight-for-height and is used to classify overweight, normal body weight and underweight (13). WHO expert committee has taken special attention on the cut off points of BMI for the Asian and for them BMI has different association with body fat percentage than the European counterparts. Asian's have lower cut-off points of BMI for obesity (14).

Some studies have found that healthy ageing population with good BMI have high risk for malnutrition (5,15).

Therefore the present paper aims to assess the nutritional status of the elderly women of Kolkata, India using MNA and Body mass index (BMI) and to find out the association between MNA and BMI.

Material and Methods

Participants: One hundred and sixty nine (169) elderly women living in the community of Kolkata, India were randomly selected for this study. The study was explained to them and written consent was taken. Their participation was completely voluntary.

Inclusion and criterion: Non institutionalized elderly women aged 60 years and above living in the community of the Kolkata, India participated in this study.

Exclusion criterion: Women who were suffering from severe cognitive impairment or physically unfit or unable to stand up or too fatigue to meet new persons or unwilling to participate in the survey were excluded from the study.

Ethical Considerations: We got ethical clearance for this study from Bioethics Committee for Animal and Human Research Studies, University of Calcutta (No. BEHR/ 1099/2304).

Study Design: A cross-sectional study was conducted between the months of November,2013 to September, 2014. Some data were collected from Help age India's mobile medical unit of Kolkata and some data were collected from door to door survey.

Nutritional Status assessment: Mini Nutritional Assessment is a tool for the assessment of nutritional status in old age. The long version of Mini Nutritional Assessment (MNA- *) was used for the assessment of nutritional status. It is divided into five components: a) anthropometric assessment (BMI, mid arm circumference, calf- circumference), b) functionality (mobility, autonomy of eating, independent living), c) diet information (protein intake, fluid intake, portion of milk, fruits and vegetable intake), d) general assessment, e) subjective assessment. Depending on the scores of MNA, nutritional status can be classified as normal nutritional status (24-30 points), at risk of malnutrition (17- 23.5) and malnourished (< 17 points) (11).

BMI assessment: For the assessment of BMI height and weight were taken and then BMI was calculated using standard formula. Height was measured to nearest centimeter by using anthropometric rod. Elderly women who were found to have degenerative changes in their spinal cord, height was calculated from half demi –span (distance from the midline at

the sternal notch to the web between the middle and ring fingers along outstretched arm) measurement using the formula: height in cm = [1.35 x demi- span in cm] + 60.1(16).

Weight was taken to nearest 0.1 Kg with a portable digital weighing machine. Standard cut-off points of World Health Organization for the Asian were used for the assessment of their

weight-for-height according to BMI (< 18.5 Kg/m²: underweight, 18.5 – 22.9: normal body weight, >22.9 Kg/m²: overweight) (13).

Data Analysis

Data were entered in Microsoft excel worksheet (Microsoft, Redwoods, WA, USA). Categorical data were expressed in proportions, while continuous data were expressed in mean and standard deviation. For qualitative data, significance of association between the attributes was analyzed using Pearson's chi-square (χ^2) test. Scoring for MNA belongs to ordinal scale, thus difference between mean values were tested by Kruskal Wallis test. Kolmogorov-Smirnov test was performed to check the normality distribution of continuous variables like BMI. Significant P value confirmed the distribution as skewed. So Kruskal Wallis test was performed for difference of mean values of BMI as they were skewed in distribution. Degree and direction of relationship between two variables were computed by Pearson's r (between age and BMI) and Spearman's rho (between age and MNA score) correlation. P value ≤ 0.05 was considered as statistically significant. All the statistical analysis was done in SPSS software, version 19.0 (Statistical Package for the Social Sciences Inc, Chicago, IL, USA).

Results

Nutritional Status: Mean age of the study population was 66.9 ± 6.9 years. Based on the MNA scores, nutritional status of the elderly women was categorized as normal (28.4%), at risk of malnutrition (54.4%) and malnourished (17.2%). Mean MNA score was 21.07 ±4.3. Mean BMI was found as 25.56 ± 5.8 Kg/m². Both, MNA score and body mass index (BMI) were found to decrease with increase in age and this negative correlation was found to be statistically significant. (Table1).

From BMI index normal body weight, underweight and overweight were found in 23%, 10.7% and 66.3% of the elderly women respectively. Proportion of overweight was high among all MNA groups. However, no underweight women were found in the normal nutritional group. Average BMI of the malnourished and at risk of malnutrition groups was 22.3 Kg/m² and 25.1 Kg/m². A statistically significant association was found between MNA score and BMI by Pearson's chi-square test (Table 2).

Table 1: Age, MNA and BMI of the elderly women (N=169)

Age (years)	MNA Score Mean ± SD	Body Mass Index Mean ± SD
60- 69	21.78 ± 4.3	26.4±5.8
70- 79	20.27 ± 3.8	24.4± 5.8
≥ 80	17.26 ± 2.3	22.0±4.4
Correlation coefficient [Pearson's ⁎ / Spearman's (rho)]	Rho= - 0.266 P = 0.000	r = - 0.185 P = 0.016
Kruskal Wallis	Kruskal Wallis chi-square (χ^2)= 17.96 P = 0.000	Kruskal Wallis chi-square(χ^2)= 7.144 P = 0.028

Table 2: Distribution of the elderly women according to BMI with respect to their MNA scores (N=169)

MNA	BMI (Kg/m²)		
	Under weight(< 18.5 Kg/m²) No (%)	Normal body weight(18.5-22.9 Kg/m²) No (%)	Over weight (> 22.9 Kg/m²) No (%)
Normal nutritional status (n=48, 28.4%)	-	3 (6.3)	45 (93.7)
At risk of malnutrition (n=92, 54.4%)	12 (13)	23(25)	57(62)
Malnourished (n=29, 17.2%)	6(20.7)	13(44.8)	10(34.5)
Pearson's Chi-square (χ^2)		Pearson's chi-square(χ^2) =30.48, p= 0.000	

Discussion

The study revealed that age is a risk factor for poor nutritional status of the participants as both MNA scores and BMI significantly decreased with age (Table:1). Prevalence of poor nutritional status is high (at risk of malnutrition 54.4% and malnutrition 17.2%). 71.6% of the elderly women were either suffering from malnutrition or at risk of malnutrition (Table:2).

Mean BMI was found 25.56± 5.8Kg/m² which falls in the overweight range according to WHO's cut-off values for the Asian (13) and 93.7% overweight women were found in the normal nutritional status group. Low MNA score with high BMI was also observed in other two groups. 62% overweight was found in the 'at risk' group and 34.5% overweight was found in the malnourished group, although a positive significant association was found between MNA scores and BMI (Table: 2).

This is the first study that thoroughly determined the association between MNA scores and BMI among the elderly in Kolkata, India. Some researchers in other countries also observed that well ageing population with average BMI of 25 kg/m² had poor nutritional status (5,15), which corroborates with our observation.

BMI has some limitations. Its value depends on various factors. In old age it has been found that adiposity increases with age (17) that may be a major cause of increasing BMI. Sarcopanic obesity is another concept that may be related to BMI, where loss of muscle mass (sarcopenia) is combined with obesity (5). Therefore BMI may not give the right picture of nutritional status of the elderly and nutritional status should be assessed by using MNA.

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