ORIGINAL ARTICLE

ASSESSMENT OF NUTRITIONAL STATUS AND FUNCTIONAL CAPACITY OF RURAL ELDERLY POPULATION IN CHATTOGRAM, BANGLADESH

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Abstract

Background: *Bangladesh, like many developing countries, is experiencing population ageing. There is inadequate information regarding the prevalence of malnutrition and functional dependency in community-living rural senior residents in this country. The study aims to determine the nutritional status and functional capacity of the rural elderly population of Chattogram District of Bangladesh and to search for its associated factors.* **Methods:** *This community-based cross-sectional study included 213 subjects aged 60 years and over from two Upazilla of Chattogram district by a multistage random sampling technique. Sociodemographic and clinical data were collected using a structured questionnaire, nutritional status was assessed with the Mini Nutritional Assessment-Short Form (MNA-SF) tool and functional assessment was done using the Modified Barthel self-care index (BSI).* **Results:** *The participants' mean age was 66.1 ± 6.5 years and 51.6 % was female. More than half of the participants (45.4%) were illiterate. The majority of them were living in a joint family with their spouse. About 70% of the participants were from lower socioeconomic classes, 82.2% were not engaged in any vocational activity, 74.6% were entirely dependent economically on others, and 110 (51.6%) had multi- morbidity. The prevalence of malnutrition and risk of malnutrition were 29.9% and 56.8% of the study sample, respectively. About 44% of the participants need help to perform their daily activities. Poor nutritional status was significantly more frequent in elderly subjects aged more than 70 years, in respondents living without a partner, and in older people with multi-morbidity.* **Conclusion:** *Poor nutritional status was commonly observed among older adults living in rural areas in Chattogram. The associated factors should be further considered for targeting particularly vulnerable individuals.*

Keywords: *Malnutrition, Older population, Mini nutritional assessment, Modified Barthel self-care index, Bangladesh.*

Introduction:

Like the world population aging scenario, the average life expectancy of the people of Bangladesh rose to 72.6 years in 2019, according to a report by the Bangladesh Bureau of Statistics (BBS).[1,2] Over the past decades, Bangladesh's health program and policies have focused on population stabilization, maternal and child health, and disease control.[3,4] However, current statistics for older people in Bangladesh give an idea of a new challenge of medical, social, and economic problems that may arise.[5] Hence, it is essential to organize our health system so that it will face problems due to the senior population load.

Nutritional disorders are serious and common findings in the elderly population.[5-8] Malnutrition is linked to decreased muscle mass, higher infection rates, poor

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health outcomes, and impaired quality of life.[9] In a study conducted among elderly patients visiting the emergency department, malnutrition was shown to be the strongest independent risk factor of short-term mortality.[10]

As a critical factor for healthy aging, nutritional status information will be a significant public health concern, mainly because of the growing elderly population.[11] Studies conducted in different countries, including Bangladesh, reveal a high prevalence of poor nutritional status and impaired functional ability among the elderly population.[5-8,12,13] To our knowledge, nutrition and functional status in the community-dwelling elderly Bangladeshi population living in rural areas in the Chattogram district remains unexplored. In addition, the relative impact of the factors contributing to nutritional status may differ from one population to another, depending on the cultural background. Present study aimed to evaluate the nutritional status and functional capacity of the geriatric population of selected rural areas of Chattogram District of Bangladesh.

Methods:

The Department of Medicine, Chittagong Medical College Hospital, conducted a community-based cross-sectional study in some selected rural areas of the Chattogram District of Bangladesh from October 2018 to September 2019. As referred by the United Nations, people aged 60 years or more were considered an older population,[14] and respondents of that age group living in two villages of Chattogram District were the study population.

Through a multistage sampling method, two hundred and fifty households were selected from two villages of Chattogram. Now, from within all the selected households, all older adults were enrolled as study participants by arranging a medical camp in the nearest suitable place with the help of trained volunteers. Finally, it was possible to include 213 older adults in this study. Seriously ill persons, persons having malignancy, and bedridden persons were excluded.

A pretested semi-structured questionnaire used in the face to face interviews for data collection. The questionnaire had two parts; questions related to sociodemographic characteristics and questions related to economic status. Two tools were used, one is Mini Nutritional Assessment (MNA) Scale to obtain nutritional status and another one is modified Barthel Self Care Index (BSI) for functional assessment.

Socioeconomic status class was categorized as upper, upper middle, lower middle, upper lower, and lower class according to modified Kuppuswamy's Socioeconomic scale.[15] Morbidity was defined as the self reported and diagnosed previously by any registered physician. Multi morbidity was defined as the co-occurrence of two or more chronic health conditions in one person. The nutritional status assessment was done by using the MNA-SF scale, where four screening questions and three assessments (i.e., height, weight, calf circumference) were taken into consideration. The scores assigned for individual responses were according to the MNA-SF questionnaire.[16,17] The total score was 14, and 0 to <7 was categorized as malnourished, 8 to 11 as at risk of malnutrition, and 12 to 14 as well-nourished.[16,17] Functional capacity was assessed as per the Modified BSI of Activities of Daily Living (ADL).[18] This index provides information using a standardized, validated scale to assess a patient's ability to perform simple tasks relating to personal care. The scale has good validity and inter-rater reliability. Total scores range from 0 to 20, with lower scores indicating increased disability and higher scores indicating greater independence. Functional capacity was categorized as heavily dependent on caregivers with a score of 0-10, needing moderate help with a score of 11-13, and independent as 14-20.[18]

Data cleaning and detailed analysis were performed using the IBM SPSS software version 23.0. Continuous variables were reported as means and standard deviation, and categorical variables were reported as counts and percentages. We used chi- square tests to assess bivariate associations between categorical variables. For analysis, the MNA variable was dichotomized: 'malnutrition' was collapsed with at risk of malnutrition to identify people with 'poor nutritional status' versus those with 'satisfactory dietary quality. Pearson's correlation coefficients were performed for linear relations between total MNA scores and BSI. Statistical significance was defined as $p < 0.05$.

Results:

The mean age was 66.12±6.52 years (range 60-95 years), and 48.4% were male. More than half of the participants (45.4%) were illiterate. The majority of them were living in a joint family with their spouse. About 70% of the participants were from lower socioeconomic classes, 82.2% were not engaged in any vocational activity, and 74.6% were entirely dependent economically on others (Table I).

Table I

Sociodemographic characteristics of the participants (n=213)

Variables	Frequency	Percentage
Age		
60-70 years	148	66.5
>70 years	65	33.5
Sex		
Male	103	48.4
Female	110	51.6
Education		
Illiterate	118	55.4
Literate	95	44.6
Marital status		
Partnered	180	84.5
Single	33	15.5
Family type		
Nuclear	54	25.4
Joint	159	74.6
Vocational status		
Working	38	17.8
Not working	175	82.2
Socioeconomic status		
Upper	2	0.9
Upper middle	10	4.7
Lower middle	29	13.6
Upper lower	109	51.2
Lower	63	29.6
Economic dependency		
Independent	30	14.1
Partly dependent	24	11.3
Fully dependent	159	74.6

Out of 213 participants only 10 (4.7%) were free from any morbidity. Most prevalent self reported co-morbid illness among the elderly population were HTN (46%) and DM (30.5%). Out of 213 rural elderly 110 (51.6%) had multi-morbidity. Out of 213 elderly subjects included in the study 30 (14.1%) had satisfactory nutritional status, 121 (56.8%) were at risk of malnutrition and 62 (29.1%) were malnourished by MNA tool. Out of 213 elderly subjects included in the study 120 (56.3%) were independent in performing their daily activities as assessed by BSI tool, 70 (32.9%)

need occasional help and 22 (10.8%) need major help for the same purpose.

Table II

Nutritional and functional status of the elderly participants

Variables	Frequency	Percentage
Nutritional status		
Satisfactory nutrition	30	14.1
At risk of malnutrition	121	56.8
Malnutrition	62	29.1
Functional status		
Independent	120	56.3
Need occasional help	70	32.9
Need major help	23	10.8

The correlation between MNA and BSI were examined and there was significant positive correlation between these two variables (Pearson correlation coefficient r=0.324, $p<0.05$) (Figure 1).
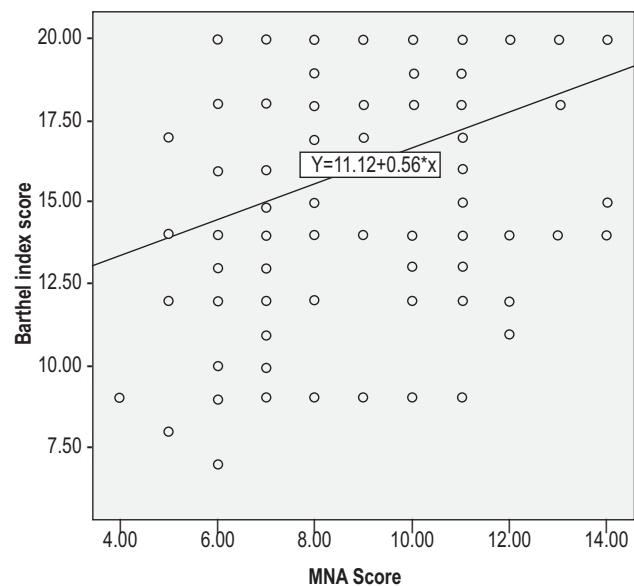

Figure 1: *Correlation between MNA score and BSI score among rural elderly.*

The characteristics associated with poor nutritional status (both malnutrition and at risk of malnutrition) were examined in Table III, which shows that, older age, being widowed/divorced and having multi-morbidity appeared to be significantly associated with a poor nutritional status ($p<0.05$).

Table III

Frequency of poor nutritional status evaluated by MNA according to baseline characteristics in rural elderly (n=213)

Variables		n	Poor nutritional statusn (%)	P value*
Age	60-70 years	148	121(81.8%)	0.008
	>70 years	65	62 (95.4%)	
Sex	Male	103	87 (84.5%)	0.556
	Female	110	96 (87.5%)	
Family type	Nuclear	54	50 (92.6%)	0.103
	Joint	159	133 (83.6%)	
Marital status	Partnered	180	150 (83.3%)	0.011
	Single	33	33 (100%)	
Education	Illiterate	118	104 (88.1%)	0.299
	Literate	95	79 (83.2%)	
Vocationalstatus	Working	38	29 (76.3%)	0.061
	Not working	175	154 (88.0%)	
Socioeconomicstatus	Upper & middle	48	39 (81.3%)	
	Lower	165	144 (87.3%)	0.291
Economic dependency	Independent	30	22 (73.3%)	
	Partly dependent	24	20 (83.3%)	0.080
	Fully dependent	159	141 (88.7%)	
Multi-morbidity	Absent	103	83 (80.6%)	0.030
	Present	110	100 (90.9%)	

*Chi-square test.

Discussion:

This research aimed to identify the nutritional status and functional capacity and factors associated with the nutritional status of the older population in rural area of Chattogram and revealed that 29.1% of them were malnourished, which corresponds with the findings from other studies conducted in Bangladesh, where the reported the proportion of malnutrition was 26.0 and 25.8%.[8,19] Studies conducted in India and Nepal showed a similar proportion of malnourished.[13,20,21] In contrast, a much lower proportion of malnutrition was observed in a study conducted in Hong Kong, where only 1.1% were malnourished.[22] As already showed in the previously published paper,[7] poor nutritional status, defined as either malnutrition or risk of malnutrition, was present among 85.9% of the studied population, much higher than the study conducted in community-dwelling elderly subjects in Lebanon (37.1%). A global study with data from community-dwelling older people in developed countries such as Switzerland, France, Japan, Sweden, and South Africa showed only 5.8% were malnourished.[23] Better healthcare facilities, especially targeting the older age group, and nutritional guidelines, which were strictly followed in the countries mentioned above, might be the reason behind the lower proportion of malnutrition. The other objective of our study was to estimate functional status of the elderly community dwellers. In this study 10.8% of the total elderly need major help in performing their daily activities which is almost similar to a study conducted in our country in rural area where only 7% reported limitations in ADL.[9]

There was a positive correlation between MNA and BSI scores in the present study population which indicated that as the nutritional status decreased functional capacity also declined proportionately. Malnutrition has previously been associated with poor functional status. MNA-SF is also a tool capable of predicting functional disability in the elderly. A low MNA-SF score has also been related to incident disability in older adults.[24,25]

In our study population, the proportion of poor nutritional status was higher among the elderly aged >70 years than the elderly aged between 60-70 years; among females than males; among the residents in nuclear families than joint family; among single than partnered elderly; among illiterate than literate; among vocationally inactive than active; among lower socioeconomic than middle and upper socioeconomic group; economically dependent than independent group; and among elderly with multi-morbidity than without. However, the association of age groups, marital status, and multi-morbidity reached statistical significance. Previous studies reported that female sex, elderly people suffering from poor financial condition, having low level of education, those with multiple chronic diseases, those reporting chronic pain or presenting mental disorders were at high risk of malnutrition.[7,8,12,13]

Limitations: Certain limitations apply to this study. Caution should be exercised in generalizing our study's findings due to the inclusion of the subjects from a single district of the southeastern part of Bangladesh. The cross-sectional study design used in this study was not ideal for identifying the cause-and-effect relationship between malnutrition and the associated factors. The sample size of this study was relatively smaller than studies of a similar nature.

Conclusion: The majority of the rural older population were malnourished or at risk of malnutrition. Higher age, living a single life and multi-morbidity status were the factors associated with the proper nutrition of the older population

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Ethical consideration: The study was conducted after approval from the ethical review committee of Chittagong Medical College. The confidentiality and anonymity of the study participants were maintained.

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