

Assessment of the Nutritional Status by Anthropometry and MNA-SF: A Study in Bengali Older Adults

Abstract: The increase in the older adults population size and arranging proper nutrition for them make a challenging situation for India to achieve Healthy aging. In this backdrop an attempt is being made to assess the nutritional status in Bengali older adults in terms of common anthropometric parameters and also MNA-SF. The results indicated a situation far from being ideal.

Keywords: Healthy aging, MNA, geriatric nutritional status, malnutrition, anthropometric parameters.

Aging society is a prevailing demographic phenomenon in India¹. As per 2011 Census data, India is having more than 100 million older adults people i.e., 8.58% of its total population is aged², which is projected to reach 319 million i.e., 19.5% of its total population by the year 2050³. The percentage of older adults population in the state of West Bengal is expected to reach about 18.2% of its total population by 2036 which was 8.6% in 2011⁴. With ever increasing older adults population, providing healthcare to them is becoming a challenging issue in India⁵. Rapid technological improvements in the healthcare system increased the lifespan of the elderly, but living longer does not signify living healthier^{6,7}. WHO defined 'Healthy Aging' as "the development and maintenance of functional ability that enables well-being in older age"⁸. The Indian joint family system provided a supportive measure in terms of healthcare to the older adults for decades, but modernization, changes in values and the family system bring a threat to the facility⁹. The physiological and psychological changes in older adults make them more susceptible to various diseases and disorders¹⁰⁻¹³ as well as to the dual burden of malnutrition¹⁴, which has been defined as a state of condition that results from intake of nutrients in deficient or excess amount, imbalance in essential nutrient consumption and impaired utilization of nutrients in the body¹⁵. Longitudinal Aging Study in India (LASI), 2020 depicted that one in every two Indian older adults aged 60 years and above are having malnutrition and the prevalence of malnutrition among the older adults

population of West Bengal were 22.6% in form of underweight, 11.9% in form of overweight and 2.4% in form of obesity respectively¹⁶; this also represent the previous state of lower functional capability and poor self related health status prevailing among them¹⁷.

Malnutrition has multifactorial etiology and has its significant presence in all age groups worldwide¹⁸⁻²³. Malnutrition among older adult is often neglected, as it is not considered as a disease²⁴; but it constitutes as a precursor for the development of several diseases and disorders, such as unintentional weight loss, muscle destruction, nutrient deficient disorders, immune dysfunction as well as non communicable diseases like metabolic disorders, cardiovascular diseases, musculoskeletal disorders and cancers²⁵⁻³². Several determinants including socioeconomic status, dietary habits, health condition and family support play a key role in the nutritional status of elderly persons³³⁻³⁶. Anthropometric assessments are essential tools for nutritional evaluation, including geriatric nutritional evaluation, to determine the severity and magnitude of malnutrition among them in terms of overweight, obesity, muscle loss, weight loss and fat tissue distribution³⁷⁻³⁹. Anthropometric evaluations are reliable factors for determining nutritional status and also reflect bodily changes in parameters and composition over time^{40,41}. Mini Nutritional Assessment- Short Form (MNA-SF) is also a validated tool for the evaluation of nutritional status in terms of determining the malnutrition risk among older adults persons and is used widely over a long period of time in different countries^{42,43}. In this backdrop, an attempt is being made to assess the nutritional status of Bengalee older adults in terms of common anthropometric indices and also MNA SF.

Methodology: The study was conducted on Bengalee older adults aged 60 years and above and residing in southern districts of West Bengal, in particular in Howrah, Hooghly and North 24 Parganas. After obtaining written consent for voluntary participation, anthropometric measurements such as standing body height (nearest to 0.1 cm) without shoes were measured using anthropometric

measurement set. Body weight (nearest to 0.1 kg) of the study participants wearing socially acceptable minimum clothing were noted using weighing scale. Waist circumference (WC) and hip circumference (nearest to 0.1 cm) were measured using a flexible non-stretchable measuring tape. Body Mass Index (BMI), Waist to Hip Ratio (WHR) and Waist to Height Ratio (WHtR) were calculated. The nutritional status of the individuals were assessed both in terms of anthropometric indicators, and using the Mini Nutritional Assessment Short Form (MNA-SF) questionnaire; in the latter, the scores were calculated. Information on Socio-economic status was obtained using revised Kuppaswamy's scale, which is an updated (by Sharma, 2017) version with updates on scoring of education and occupation⁴⁴. The Pearson's correlation (one tailed) was performed between the anthropometric parameters, and also between MNA-SF and anthropometric parameters. The study protocol is approved by IHEC of the University.

Results: The study was conducted on 68 Bengalee older adults persons living in the southern districts of Howrah, Hooghly and North 24 Parganas in southern part of West Bengal. The majority of the study participants were male (60.3%) with a mean age ($\pm$ SD) of 67.8 years ($\pm$ 4.2) and 39.7% were female with a mean age ($\pm$ SD) of 68.8 years ($\pm$ 5.5). The anthropometric information of the study participants has been presented in Table 1.

Table 1: Anthropometric Profile of the Study Participants

Parameters	Values
Body height (cm)	157.7 $\pm$ 8.77
Body weight (kg)	59.3 $\pm$ 10.72
BMI (kg/m ²)	23.84 $\pm$ 3.97
Waist circumference (cm)	89.2 $\pm$ 12.24
Hip circumference (cm)	91.1 $\pm$ 13.87
WHR (cm)	0.99 $\pm$ 0.10
WHtR (cm)	0.57 $\pm$ 0.08

AM $\pm$ SD

In Figure 1, the nutritional status, as assessed in terms of BMI, of the study participants has been presented.

The correlation coefficients scores(r) between the measured anthropometric markers of nutritional status has been presented as a correlation matrix in Table 2.

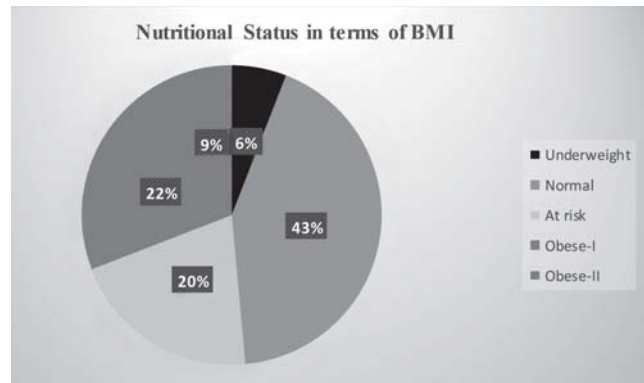


Fig.1: Nutritional Status of the study participants in terms of BMI.

Table.2: Correlation matrix involving anthropometric markers of nutritional status

	WC	WHR	WHtR
BMI	0.66**	-0.01^	0.71**
WC	---	0.21^	0.92**
WHR	---	---	0.11^

**P<0.01, ^ns

Out of 68 participants, 28(41.2%) in terms of WC and 5(7.3%) in terms of WHR belonged to normal category, and rest exceed the respective cut off values. In terms of WHtR, out of a total of 68 participants, 13(19.1%) belonged to the normal category, 35(51.5%) were at increased risk of metabolic disorders and 20(29.4%) were severely at risk of developing metabolic disorders. MNA-SF score indicated that 14.7% of the study participants were malnourished, 42.6 % were at risk of developing malnutrition and 42.7% were normal.

The values of coefficient of correlation calculated between anthropometric parameters and MNA-SF score of the study participants has been presented in Table 3.

Table.3: The values of the coefficient of Correlation between anthropometric parameters and the MNA-SF score of the study participants

Anthropometric Parameters	r value with MNA SF scores	P value
Body height (cm)	0.01^	0.932
Body weight (kg)	0.51*	<0.00001
BMI	0.56*	<0.00001
Waist Circumference (cm)	0.31*	0.011
Hip Circumference (cm)	0.40*	0.0006
WHR	-0.17^	0.173
WHtR	0.30*	0.012

*significant, ^ns

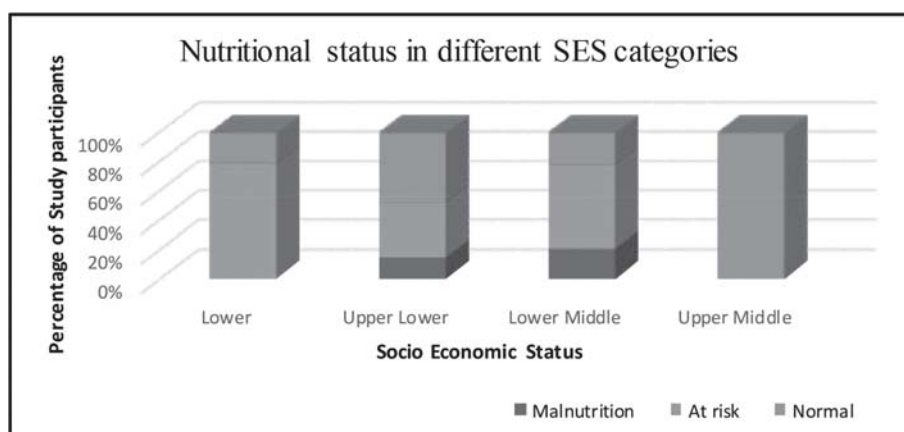


Fig. 2: Distribution of nutritional status as per SES classification among the study participants

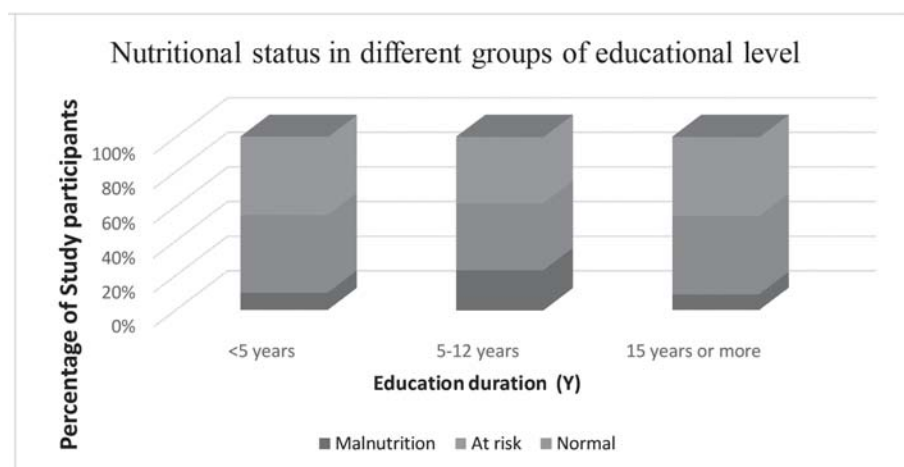


Fig. 3: Distribution of nutritional status as per the educational levels of the study participants

In figure 2, the status of nutrition in different SES categories has been presented

In figure 3, the status of nutrition in different groups having variation in with educational level has been presented.

Discussion: Malnutrition in the older adult possesses a substantial burden on health, and the healthcare system in India^{45,46}. In table 1, background information and in particular, information on nutritional status in respect of the anthropometric indicators has been presented. The mean value of BMI is found to be marginally more than 23.0, ie on an average participants are in at risk category. Going further, it has been demonstrated that 43% of the study participants belong to normal category of nutritional status, and rest have some form of malnutrition issues as detailed in figure 1, including 22% and 9% suffering from obesity of grade I and II; the geriatric individuals may consider adopting more active life style^{47,48} to address obesity issues which otherwise would invite more trouble.

In table 2, the values of coefficients of correlation has been presented in a form of correlation matrix. The data presented in table 2 indicate that there is significant ($P < 0.01$) correlation between BMI and WC, BMI and WHtR, WC and WHtR; again reinforcing that anthropometric indicators are conveying similar information about nutritional status.

In Table 3, the values of coefficient of correlation obtained between nutritional status as adjudged by MNA –SF and nutritional status as adjudged by a series of anthropometric indicators – both measured and computed – have been presented. Significant ($P < 0.05$) correlation coefficient, r values have been obtained involving BMI, WC, HC, WHtR and also body weight. The significant positive correlation reinforces the results indicating nutritional status, arrived at separately; the findings of the present study are in agreement with studies reported from

Thailand, Turkey and other countries⁴⁹⁻⁵¹.

Conclusion: The nutritional status of the geriatric population has several dimensions and determinants. The results of the present study revealed that there is a presence of malnutrition of different forms in Bengalee older adults under study. The caveat remains the not-so-large sample size.

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