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A Cross-sectional Study on the Assessment of Nutritional Status and its relation to Depression level among the Elderly People of some Localities of Hooghly and North 24 Pargana Districts of West Bengal.

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ABSTRACT

Elderly population is at risk of under-nutrition due to physical, cognitive as well as functional deterioration. There is general agreement that the nutritional status of elderly people is a result of an interdependence between cognitive performance, functional ability and living situation. Depression is one of the most common and reversible causes of malnutrition. Patients who are compromised nutritionally are more prone to depression. In many studies the correlation between nutritional status and depression level was found among elderlies. However, no such study was carried out in West Bengal in recent times particularly in the Hooghly and North 24 Parganas districts. The present study was conducted among the elderly people of 60-80 years of age residing in Hooghly and North 24 Parganas districts. Data was collected by anthropometric questionnaire, mini nutritional assessment (MNA), geriatric depression scale (GDS), mini–mental state examination (MMSE) and instrumental activity of daily living (IADL) questionnaires. In the present study majority of the participants are found to be suffering from malnutrition and depression of varying degrees. The reasons behind this are probably lack of proper nutritional knowledge, financial constraints and absence of caregivers.

Keywords: Nutritional status, Elderly, Depression level, BMI, Height, Calf circumference.

INTRODUCTION

Aging is an irreversible biological process which starts from conception and ends after death. Elderly population is at risk of under nutrition due to physical, cognitive as well as functional deterioration. There are different causes of nutritional risks like physiological causes including diseases, intake of excess medicines, various disabili-ties, economic reasons like reduction of income,

higher expenses of medicines, social causes like isolation from family, negligence of family member (Alam, *et al., 2011*). Nutritional deficiency is common and serious in older adults. Whereas some malnourishment stems from underlying illness, much is due simply to inadequate intake, which should be reversible if detected.

There is general agreement that the nutritional status of elderly people is a result of an interdependence between cognitive performance, functional ability and living situation. It is hypothesized that the relationship between these factors become stronger with increasing age (Pearson *et al*., 2001). Depression is one of the most common and reversible causes of malnutrition. The relationship between nutrition and depression is complex. Depression has been associated with under-nutrition, over-nutrition, and deficits in specific food components and nutrients. Patients who are compromised nutritionally are more prone to depression.

Many studies related to geriatric nutrition were carried out in India and abroad. In one of them at Bangladesh (Kabir *et. al., 2006*), found that half of the population was suffering from chronic energy deficiency. Mini Nutritional Assessment (MNA) revealed that a prevalence of 26% for protein energy malnutrition and 62% for risk of malnutrition. Another study in Hawassa city, Southern Ethiopia (Hailemariam *et. al., 2016*) revealed that 28.3% of the elderly were malnourished according to MNA score and 62.4% were at risk of malnutrition. Several studies were carried out in W.B on the nutritional status of elderly people by using MNA questionnaire method and result of one such study (Agarwalla *et. al., 2016*) showed that 15% were found to be malnourished and 55% were at risk of malnutrition. The association between nutritional status and older age group, female gender, dependent functional status, and inadequate calorie intake was found to be significant. Another study in W.B (Lahiri *et. al., 2015*) showed 29.4% elderly had malnutrition and 60.4% were at risk of malnutrition. Females were more malnourished than males. Older age, lower income, low literacy rate was associated with low MNA score. Several studies are done on MNA & Geriatric Depression Scale (GDS), in all around the world. One of them (Sharvanan *et. al., 2015*) in Chittoor District, A.P, India revealed that old people who are either malnourished or are prone to be malnourished are also susceptible for depression. Maity *et. al., 2015* found that the level of depression significantly rises with the degree of malnutrition. GDS score increased significantly in decrease in nutritional status. In Iran (Keshavarzi *et. al., 2015*) the malnourished elder showed higher GDS score compared to well nourished.

In many other studies the correlation between nutritional status and depression level was found among elderlies. However, no such study was carried out in West Bengal in recent times particularly in the Hooghly and North 24 Parganas districts. In view of this the present study was carried out with the following objectives:

1. Estimation of anthropometric data for computation of BMI.
2. Assessment of nutritional status of the elderly people in localities of Rishra, Serampore, Bandel and Barrackpore by means of MNA method (Guigoz Y 2006) which is an easy and non-invasive questionnaire method.
3. Assessment of depression status of the subjects by using Geriatric Depression Scale (GDS) questionnaire method (GDS-30), cognitive impairment by Mini Mental State Examination (MMSE) (Folstein *et al.,* 1975) and dependency for regular daily activities by Instrumental Activities of Daily Living Scales (IADL) (Lawton and Brody 1969) method and their association with the nutritional status of the subjects, if any.
4. Estimation of factors correlated to the MNA score of the subjects.

MATERIALS & METHODS

SUBJECTS

The present study was conducted among the elderly people of 60-80 years of age residing in localities of Rishra, Serampore, Bandel and Barrackpore areas of W.B. during the months of March and May 2017.The purpose of the present study was explained to them in their mother language and written consent from the subjects was obtained. The subjects of this study were chosen irrespective of socio-economic status so that reflection of this factor could also be considered.

METHODS

They were invited to answer the questions which deal with information such as age, educational status, monthly family income, past and present record of disease, medicine taken/ day etc.

Anthropometric measurement- Questions 1-4 include current body mass index (BMI), mid arm circumference (MAC), calf circumference (CC), and weight loss in last 3 months.

Global assessment- Questions 5-10 include living arrangements, number of prescribed medications, and psychological stress in the last 3 months, mobility, neuropsychological problems, and pressure sores.

Dietary assessment- Questions 11-16 include number of full meals per day, protein intake, fruit and vegetables intake, and decrease in food intake in last 3 months, fluid intake per day, and the ability to eat alone.

Subjective assessment- Questions 17 and 18 include subjective assessment of the participant's nutritional and health status. Malnutrition indicators scores of <17 were considered malnourished, between 17 and 23.5 were considered at risk of malnutrition, between 24 and 30 were considered normal.

Depression Level- For screening of the elderly patients at risk of depression, Geriatric Depression Scale, the GDS questionnaire (GDS-30) was used. The tool has been validated in Iran (Malakouti *et al.,* 2006). Total score is 30, which is graded as normal 90 (score 0-9), mild depression (score 10-19), and severe depression (score 20-30).

Assessment of Functional Status- The instrument used to assess functional status of the elderly is the instrumental activities of daily living scales (IADL) (Naik and Nirgude 2015) which consists of 8 items i.e. use of telephones, shopping, food preparation, laundering, housekeeping, ability to handle finances, transportation and responsibility for own medication. Score ranges from 0 (low function, dependent) to 8 (high function, independent) for women, 0-5 for men (Naik and Nirgude 2015).

Statistical Analysis

Statistical analysis was done using the Minitab statistical Software Version 17. Anthropometric and other parameters of all the subjects were expressed in terms of mean ± SD. Pie diagrams were used to express relative proportions of BMI, MNA score and GDS score. Chi Square test were performed to determine the association between gender and different nutritional status and depression level. Pearson's Correlation

Coefficient was computed to estimate the correlation between MNA score and other anthropometric, socioeconomic and psychomotor parameters of the subjects. Step wise multivariate regression analysis was used to determine the relationship between MNA scores as dependent variable and other factors as predictors.

RESULTS

A total of 80 elderly people from different localities were included in the study. The mean age, height, and weight of the subjects are shown in Table 1. The mean of mid-arm circumference (MAC), cuff circumference (CC), years of education and monthly income of the subjects are shown in Table 1.

Table 1: Table showing anthropometric and other parameters of the subjects

	Age (Yrs.)	Height(m)	Weight(kg)	MAC(cm)	CC(cm)	Yrs. of Education	Monthly Income (Rs.)
Mean	69.45	1.55	56.83	27.37	31.83	10.12	11023.7
SD	6.82	0.08	11.17	3.70	3.33	3.81	10251.7

Table 2: Distributions of subjects according to age, gender education and monthly income

	Age (Yrs.)		**Gender**		**Education level (std. up to)**					**Monthly income (Rs.)**				
	60-70	**71-80**	**M**	**F**	**VIII**	**X**	**XII**	**GRAD.**	**PG**	**0**	**1000-10000**	**11000 - 20000**	**21000 - 30000**	**>30000**
N	45	35	47	33	25	21	17	15	2	10	42	18	8	2
%	56.3	43.7	58.7	41.3	31.3	26.3	21.3	18.7	2.4	12.5	52.5	22.5	10	2.5

Table 3: Distributions of subjects according to BMI, MNA score and GDS score

	BMI value				MNA score			GDS score		
	Normal	Under weight	Over weight	Obese	Normal	Malnourished	At risk of malnutrition	Mild depression	Severe depression	No depression
N	41	10	24	5	17	28	35	48	20	12
%	51	13	30	6	21	35	44	60	25	15

Table 4 Nutritional status and depression status according to MNA and GDS scores respectively in male and female subjects

According to MNA	Female	Male	χ^2
Malnourished	18	10	N.S.
At risk of malnutrition	21	14	
Normal nutritional status	8	9	
According to GDS			
No Depression	4	8	N.S.
Mild Depression	29	19	
Severe Depression	14	6	

N.S. = not significant

Table 5 Pearson Correlation of MNA score with anthropometric, socioeconomic and some psychomotor parameters of the subjects

		Height	Weight	BMI	MAC	CC	Education	Monthly income	Medicines taken/day	GDS score	MMSE score	IADL score
MNA score	Pearson Correlation	0.44	0.502	0.279	0.284	0.49	0.304	0.279	-0.074	-0.518	0.471	0.455
	p Value	0.000**	0.000**	0.012*	0.011*	0.000**	0.006*	0.012*	0.512	0.00**0	0.000**	0.000**

** < 0.01, * < 0.05

58.7% of the subjects are males and 41.3% are females (Table 2). All the subjects were within the range of 60-80 years of age, 56.3% of the subjects belong to age group of 60-70 yrs and remaining 43.7% belong to age group of 70-80 yrs. (table 2). The education level of the subjects was classified and shown in Table 2, 31.3% of the subjects were found to be educated up to Class VII, 26.3% were educated up to Class X, 21.3% of them were educated up to XII, 18.7% of them were Graduate and 2.4% were post-graduate. Subjects are also divided according to their monthly income and shown in Table 2.

According to the WHO categorization of nutritional status based on BMI 51% of the subjects were categorised as normal weight, 13% underweight, 30% overweight and 6% obese respectively.

The nutritional status of the subjects based on their MNA score as follows: 21% are with normal nutritional status, 35% are malnourished, and 44% of the subjects are at risk of malnutrition.

According to GDS score, majority of the subjects were found to be suffering from mild depression (60%), 25% severe depression and 15 % were without depression.

Chi square test were performed to determine the association between gender and nutritional status (on the basis of MNA score) and depression level (on the basis of GDS score) (Table 4).

No significant association was found between gender and the nutritional status on the basis of MNA and GDS scores.

Pearson's correlation coefficients were determined between MNA score and anthropometric, socioeconomic and some psychomotor parameters of the subjects (Table 5)

Height, weight, BMI, MAC, CC, education, monthly income, GDS score, MMSE score, IADL score are found to be correlated significantly with the MNA score of the subjects.

Multivariate step wise regression analysis was used to examine the association between MNA score and other factors using MNA score as the dependent variable.

The Regression equation is calculated as below

MNA = -8.50 + 8.71 h + 0.428 cc - 0.2622 GDS + 0.1119 MMSE + 0.434 IADL

Stepwise linear regression analysis (table 5) identified height, calf circumference, GDS score and MMSE score of the subjects as the significant predictors for MNA score (dependent variable) among all the correlated factors.

DISCUSSION

The health of the elderly people is an important issue defining the health status of a population (Prakash *et al.,* 2004). The health problems suffered by the elderly people thereby contribute to disabilities (Joshi *et al.,*2003). One previous study (Meena *et al.,* 2014) conducted using the MNA questionnaire in Western Rajasthan showed 11.6 % elderly were malnourished and 46 % were at risk. Another such study in Bangladesh (Kabir *et al.,*2006) showed prevalence of malnutrition of 26% and 62 % at risk of malnutrition. In present study prevalence of malnutrition is higher i.e. 35% whereas 'at risk' group is lower which is 44%, than both the studies stated above.

A study conducted in Karnataka, India (Kansal *et al.,* 2016) on MNA showed that 44.7% were underweight, 20.5% were having normal weight and 34.7% were overweight, whereas present study revealed 13% as underweight, 51% as normal weight and 30% as overweight. In present study there is no significant association between gender and nutritional status which is similar to the result conducted in Karnataka. However, in another study conducted in W.B (Agarwalla *et al.,* 2016) using MNA questionnaire method revealed the significant association between nutritional status and female gender.

In present study, the anthropometric parameters such as the calf circumference and mid arm circumference are found to be correlated significantly with the nutritional status of the subjects. In a study at Mangalore (Kirtana Pai 2011) MNA scores were found to be positively correlated with MAC & CC. In Ethiopia (Hailemariam *et al.,* 2016) also CC & MAC were found to be correlated with the MNA scores.

One study in W.B (Lahiri *et al.,* 2015) showed association of older age, lower income, low literacy rate with lower MNA score. In present study the monthly income and education level have been found to be significantly correlated with nutritional status. This may be due to low income and lack of proper knowledge of nutrition of the subjects, they were prone to suffer from malnutrition.

In present study BMI have been shown to positively correlate with nutritional status of the subjects. Similar result was observed in a study in Mangalore (Kirtana Pai 2011).

Depression is one of the most common and reversible cause of malnutrition in elderly. Depression has been associated with under-nutrition, over-nutrition, and deficits in specific food components and nutrients. Patients who are compromised nutritionally are more prone to depression. Females are more prone to depression than men (German *et al.,* 2008). Lack of social support, stressful life, widowhood are some of the main causes of depression in old aged people. In the present study also GDS score was found to be correlated and associated significantly with MNA score.

CONCLUSION

In the present study only 21% of the elderly living in the Community have proper nutritional status, rest of them were either at risk of or suffering from malnutrition. 85% of the subjects were found to be suffering from mild or severe depression. Cognitive impairment and dependency for daily activities with some instruments were also correlated with the MNA score. Thus, it can be concluded from the present study that lack of sufficient income and proper nutritional knowledge may be the two principal factors for their poor nutritional status. This is enhanced by the fact that most of the elderly under study, were found to be either living lonely or with their spouses only, who is also similarly aged. As a result, there is lack of proper care giver in almost all the families under study and most of the subjects were found to be suffering from or at risk of malnutrition with mild or severe depression, cognitive impairment and highly dependent on others for daily activities that require some kind of instruments.

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Conflicts of Interest:
None of the authors have any conflict of interest regarding the publication of the paper.

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