

ASSESSMENT OF NUTRITIONAL STATUS OF ELDERLY PEOPLES IN OLD AGE HOMES OF HOOGHLY DISTRICT, WEST BENGAL, INDIA

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ABSTRACT

Nutrition is an important determinant of health in elderly population, where the malnutrition is associated with severe complications like decreased immunity, muscle wasting, decreased physical activities, increased risk of mortality and morbidity. The malnutrition in geriatric population is very common as because daily food consumption decreases usually with old age. So, the nutrition is the primary turning point in geriatric health and therefore nutritional screening or assessment is the key component in comprehensive geriatric evaluation. In parallel, the psychological impairment caused by depression, loneliness, insecurity, cognitive impairment and higher dependence are also to be considered as important factors of malnutrition. In consideration of the above fact, the present survey was performed from two old age homes in Hooghly District, West Bengal, India, on 50 elderly people of 60- 90 years age group for a period of three months considering both sexes irrespective of socio economic status and diseases following noninvasive questionnaire method. The present study revealed that few people (4%) were actually found to be malnourished, more than half of the population (56%) was at risk of malnutrition. Since, depression scores were also found to be significantly correlated with the nutritional status, more than half of the subjects (66%) were also found to be suffering from depression of different grades. Also the proportion of severely depressed females was found to be significantly higher than the male subjects. Therefore, early nutritional intervention should be implemented especially to those who were „malnourished“ or „at risk“. So, the nutritional development would improve the depression status of the elderly people and the residents of the homes will brought to the main stream of life again.

KEYWORDS: Elderly People, Malnutrition, Old Age Home, Psychological Impairment.

INTRODUCTION

Aging is a series of gradual changes in physiological processes which begins with life and continues throughout the life cycle, ending with death. It is an unavoidable universal process in every living organism and associated with deteriorating health status. The increase in life expectancy has been a spectacular achievement in this century but is not without new challenges. As per census 2011, 7.45% of the Indian population is of elderly people. According to WHO speculation, the world elderly population will reach to 800 million by 2025, and two-third of them will be in developing countries. In India, the projected geriatric population (>60 years) by 2026 may reach to 173.2 million, which accounts to 12.4 % of the total population, which comprises the 7.2% geriatric population in West Bengal.^[1] There is a widespread belief that the aged in India have no fear of being cast aside in homes. Despite this belief institutions for the aged are mushrooming since the 1990's. In 1998, India has 728 old age homes.^[2] while the recent statistics

(2009) revealed that there are 1281 old age homes in India.^[3] This elderly population is dependent on their children for physical, moral and financial support. However, owing to the socio-cultural changes occurring in India and the joint family system is slowly diminishing and the emergence of institutional homes is on the rise with steady increase in the number of inmates joining institutions. Whatever may be the present scenario, the question is of quality of nurturing the elderly people. In most cases, the malnutrition in older patients is regularly under diagnosed and many physicians have expressed the need for more education and training regarding maintenance of nutritional status in elderly people.^[4] The malnutrition in geriatric population is very common because daily food consumption decreases with old age. Also, the consumed food is of low calories, contributing to nutritional deficiencies and malnutrition. Again, the multi morbidity is associated with increasing age and is found to be more frequent in developing countries. So, screening or assessment of nutritional status of aged

persons is a key component in comprehensive geriatric evaluation. There are at least 40 screening and assessment tools for subjective nutritional status assessments for elderly people, which are Malnutrition Universal Screening Tool (MUST), Minimal Eating Observation and Nutrition Form (MEONF I and II), Mini Nutritional Assessment (MNA), Subjective Global Assessment, Prognostic Nutritional Index and Detsky Index etc.^[5] Of these, MNA is most widely used tool for nutrition screening or assessment.^[6,7] Along with these, Psychological impairment was also considered by Geriatric Depression Scale (GDS),^[8] Mini Mental State Examination (MMSE)^[9] and Instrumental Activities of Daily Living (IADL).^[10]

Following these tools, the present study was performed on two old age homes in Hooghly District, West Bengal, India, on 50 elderly people of 60- 90 years age group for a period of three months considering both sexes irrespective of socio economic status and diseases following noninvasive questionnaire method. The present study revealed that few people (4%) were actually found to be malnourished, more than half of the population (56%) was at risk of malnutrition. Since, depression scores were also found to be significantly correlated with the nutritional status, more than half of the subjects (66%) were also found to be suffering from depression of different grades. Also the proportion of severely depressed females was found to be significantly higher than the male subjects. Therefore, early nutritional intervention should be implemented especially to those who were „malnourished“ or „at risk“. So, the nutritional development would improve the depression status of the elderly people and the residents of the homes will brought to the main stream of life again.

MATERIALS AND METHODS

1. Subject Selection

The present study was conducted among 50 elderly people of 60- 90 years age group residing in two old age homes of Hooghly district, West Bengal, India, from March 2017 to May 2017, around three months

1. Anandomoyee Anandonivas, Chotto Khejuria, Hooghly, West Bengal, India -(32 participants)
2. Ramkrishno Old Age Home, Amarpur, Chinsurah, Hooghly ,West Bengal, India -(18 participants)

Subjects of both genders were considered in the study. The purpose of the study was explained to them in their mother tongue i.e. in Bengali and written consent was taken from willing persons. Subjects of this study were chosen irrespective of socio economic status and diseases, so that reflection of these factors on nutritional status could be achieved. Study tools included one pre designed and pre tested schedule to collect background information such as age, educational qualification, occupation, monthly income, past and present record of diseases and medicines consumed per day.

2. Screening or Measuring Tools

Screening was performed by the MNA (for assessment of nutritional risk), GDS (for assessment of depression), MMSE (for assessment of cognitive impairment) and IADL (for assessment of dependency). Anthropometric rod (for height measurement) weighing balance (for weight measurement) and measuring tape (for measuring MAC or Mid Arm Circumference and CC or Calf Circumference).

a. MNA Questionnaire^[6]

MNA (Mini Nutritional Assessment) provides a simple, rapid and validated screening tool of nutritional risk specifically designed for elderly people. It is comprised of 18 items derived from 4 groups namely anthropometric assessment, general assessment, dietary assessment and subjective assessment of health and nutrition.

1. Anthropometric assessment – Questions include current body mass index (BMI), Mid arm circumference (MAC), Calf circumference (CC) and weight loss in the last three months as weight loss is an important predictor of nutritional deterioration.
2. $BMI (kg/m^2) = \text{weight (kg)} / \text{height (m}^2)$
3. Global assessment – Questions include living arrangements, number of prescribed medicines per day and any psychological stress in last three months, mobility, neuropsychological problems and pressure sores or skin ulcers.
4. Dietary assessment – Questions include number of full meals per day, protein intake, fruit and vegetables intake (over 2 bowl per day), and decrease in food intake in the last three months, fluid intake per day (water, juice, coffee, tea, milk etc.) and the ability to eat alone.
5. Subjective assessment – Questions include self-view or self-perception of health and nutritional status.

There are two parts in MNA. Part I contains 6 screening questions and part II contains 12 assessment questions. The scoring pattern is mentioned as –
Part I: 12-14 – Normal ≤ 11 – Possible Malnutrition
Part II: >24 – Well Nourished 17-23.5 – Risk of Malnutrition <17 – Malnutrition

Note - If the score of part I is less than 11 then part II is applied.

b. GDS Questionnaire^[8]

GDS (Geriatric Depression Scale) long form is a 30 item self-report assessment was used to identify depression in elderly. This tool has been validated and yield 84% sensitivity rate and 95% specificity rate. 30 questions related with 7 common characteristics of general life namely somatic concern, lowered affect (affect in the outward expression of emotion), cognitive impairment, feeling of discrimination, impaired motivation, lack of future orientation and lack of self-esteem.

The questions of GDS have only 2 options: YES and NO. The scoring pattern is mentioned below:

0-9 – Normal
10-19 – Mild Depression 20-30 – Severe Depression.

c. MMSE Questionnaire^[9]

Cognitive status was evaluated by using the MMSE (Mini Mental State Examination). The MMSE is a validated and reliability tool. It is a 30 point questionnaire that includes simple questions and problems in a number of areas: the time and place of the test, repeating lists of words, arithmetic such as the serial sevens, language use and comprehension, and basic motor skills. The maximum score is 30 and scores < 24 indicate a cognitive disorder.

d. IADL Questionnaire^[10]

For functional capacity indicators IADL (Instrumental Activities of Daily Living) having 8 items was considered. It asked questions regarding using a telephone, walking outside, shopping, meal preparation, housework, self-medicating and handling money. Each item was rated for its applicability (Yes/No) and degree of disability (Scored 0-2). The total scoring of IADL is 0-8, with higher scores indicating better functioning.

3. Statistical analysis

Statistical analysis was done using the Minitab Statistical Software Version 17. Anthropometric and other parameters of the male and female subjects were

expressed in terms of mean \pm SD. Piediagrams were used to express relative proportions of age, gender, BMI, MNA scores and GDS scores. Bar diagrams were used to express educational qualification and monthly income.

Two sample t-test were performed to estimate the significance of difference between relative proportion of male and female subjects with different nutritional status and depression levels.

Chi square test were performed to determine the association between gender, different nutritional status and depression level. Pearson's Correlation Coefficients were computed to estimate the correlation between MNA scores and other parameters. Stepwise multivariate regression analysis was used to determine the relationship between MNA scores as dependent variable and other factors (as predictors).

RESULTS

1. The subjects of the present study were the inhabitants of Anandomoyee Anandonivas and Ramkrishno Old Age Home in Hooghly District of West Bengal, India. The age group was between 60-90 years. Majority of the subjects (62%) belonged to 60-75 years age, as shown below (Figure-1).

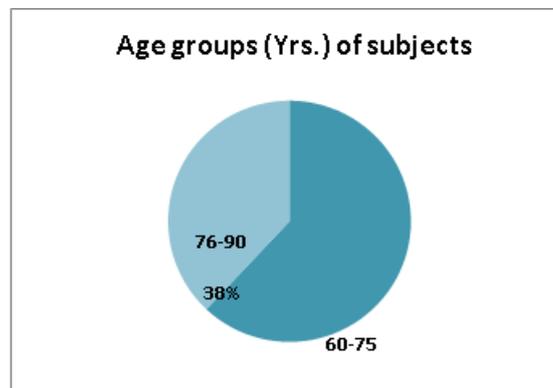


Figure 1: % Distribution of subjects according to age group.

2. Figure-2 shows that 56% of the subjects were females and remaining were males.

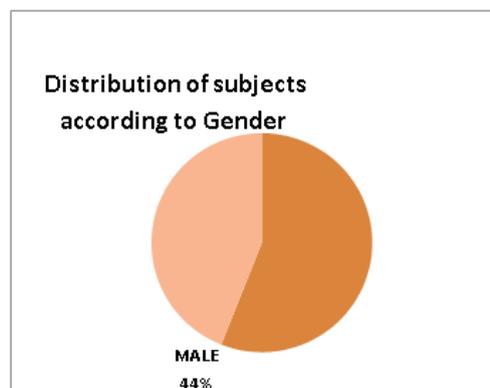


Figure 2: % Distribution of subjects according to gender.

3. The mean (\pm SD) age, height, weight, BMI, mid arm circumference (MAC), calf circumference (CC), years of education, monthly income and medicines taken per day of the subjects are given below (Table -1). The education level of the subjects in the present study was found to be

ranged from class VIII up to post graduation shown (Figure-3) below. Very few subjects (4%) were studied up to class VIII, whereas 8%, 20%, 36% and 32% of subjects were found to be educated up to class X, XII, undergraduate and postgraduate level respectively.

Table 1: Anthropometric and Other Parameters of the Subjects (mean \pm SD).

	Age (yrs.)	Height(m)	Weight(kg)	BMI	MAC(Cm)	CC (Cm)	Yrs. of education	Monthly income (Rs)	Med taken/day
Mean	72.46	1.57	64.16	25.77	29.49	34.95	14.38	13989.58	4.22
SD	7.56	0.09	11.52	3.81	3.56	3.32	2.66	10005.57	3.41

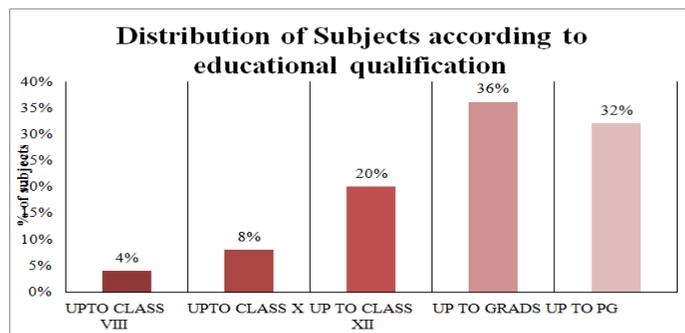


Figure 3: % Distribution of Subjects According to Educational Qualification (GRADS =Graduations/UG).

4. The financial status of the subjects is shown below (Figure-4). About 28% of the subjects do not have any source of income and thus depend on other members of their family. Although 10% of the subjects have monthly

income in the range of Rs. 1000/- to Rs.10, 000/-. Most of them (36%) have a monthly income in the range of Rs.11, 000/- to Rs.20, 000/-.

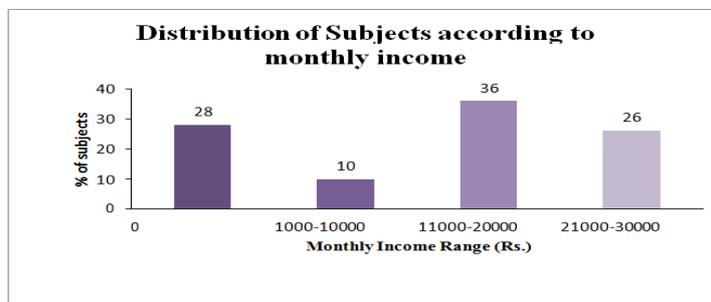


Figure 4: % Distribution of subjects according to the range of monthly income.

5. According to the BMI value 44% of the subjects had normal weight, 42% had overweight and 14% were found to be obese as shown below (Figure-5).

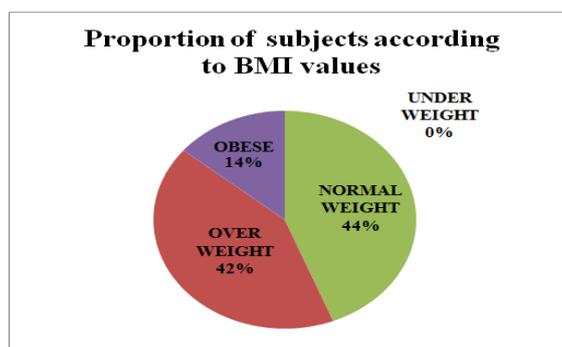


Figure 5: % Distribution of subjects according to BMI values.

6. According to MNA score, only 40% of the subjects are „well nourished“. 60 % (30/50) elderly people were identified and shortlisted as „possibly malnourished“.

Among these shortlisted, 4% were „malnourished“ and 56% were „at risk of malnutrition“ as shown below (Figure-6).

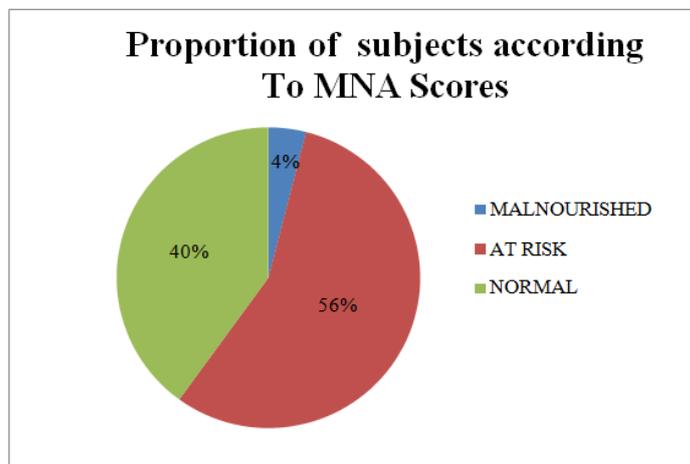


Figure 6: % of Nutritional Status of the subjects according to MNA scores.

7. Based on the GDS score system, 34% of the subjects did not have any depression. 66% elderly people were suffering from certain level of depression. Among them,

24% were severely depressed and 42% had mild depression as shown below (Figure-7).

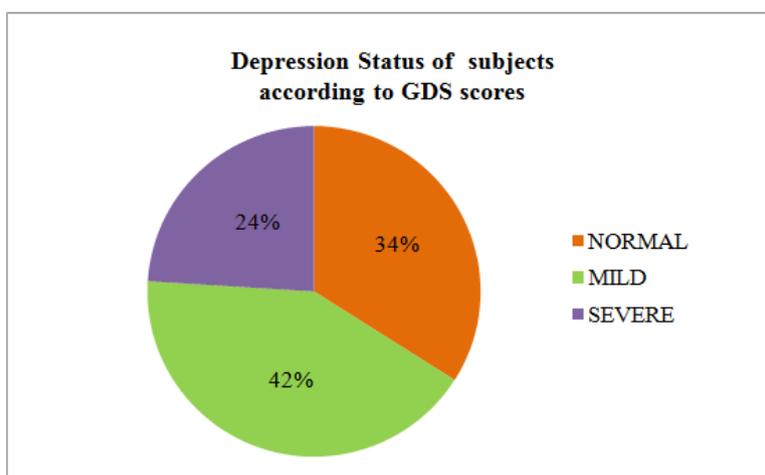


Figure 7: % of Depression level of subjects according to GDS scores.

8. Assessment by MNA method reveals that 3.6% of female and 4.5% of male participants were suffering from malnutrition. The mean MNA score was found to be higher in men than that women but the difference is not significant. The GDS scores show that 32.1% female and 13.6% male participants were suffering from severe

depression. The mean GDS score was found to be higher in women than men but the difference is non-significant. The relative proportion of males and females (in %) is shown (Table -2) as per MNA and GDS scores.

Table 2: Relative proportions of Males and Females (%) according to their Nutritional Status and Depression Level.

	Female (%)	Male (%)	Depression level	Female (%)	Male (%)
Malnutrition	3.6	4.5	Normal	32.1	36.4
At risk of malnutrition	64.3	45.5	Mild depression	35.7	50
Normal	32.1	50	Severe depression	32.1	13.6

9. Chi square test (Table -3) was performed to determine the association between gender and

nutritional status (on the basis of MNA scores) and depression level (on the basis of GDS scores). Gender

was found to be associated significantly with both the nutritional status and depression level based on the MNA and GDS scores respectively. Since gender is found to be associated significantly with the nutritional level and depression level, which was determined by the test for comparison of two proportions (Table – 4). The proportions of severely depressed women in the old age

home are significantly greater ($p \leq 0.05$) than that of male in the same home. Whereas, no significant difference was found between the proportions of women and men in respect of mild depression and no depression. No significant difference was found between the proportions of women and men with respect to the nutritional status according to MNA score.

Table 3: Nutritional Status and Depression Status According to MNA and GDS Scores Respectively in Male and Female Subjects.

	Female (n)	Male (n)	X ² (p Value)
Nutritional Status			
Malnourished	1	1	7.374 (0.02)
At risk of Malnutrition	18	10	
Normal Nutritional status	9	11	
Depression Level			
No Depression	9	8	9.558 (0.01)
Mild Depression	10	11	
Severe Depression	9	3	

Table 4: Test for Comparison of 2 Proportions (N.S – Non Significant).

	Female (n)	Male (n)	P Value
Nutritional Status			
Malnourished	1	1	N.S
At risk of Malnutrition	18	10	N.S
Normal Nutritional status	9	11	N.S
Depression Level			
No Depression	9	8	N.S
Mild Depression	10	11	N.S
Severe Depression	9	3	0.05

10. Pearson's correlation coefficients were determined between MNA score and anthropometric, socioeconomic and other factors of the subject. Weight, Medicines taken

per day and GDS level were found to be correlated significantly with the MNA score of the subjects (in Table – 5 below).

Table 5: Pearson Correlation of MNA Score With Anthropometric, Socioeconomic and Some Psychomotor Parameters of the Subjects. (P < 0.001 * P < 0.05).**

		Height	Weight	MAC	CC	Education	Monthly Income	Medicines taken /Day	GDS level	MMSE Score	IADL Score
MNA score	Pearson correlation	0.235	0.314	0.124	0.178	0.125	0.214	-0.54	-0.387	0.168	0.269
	p	0.10	0.02*	0.40	0.21	0.40	0.14	0.000**	0.006*	0.244	0.059

11. Multivariate step wise regression analysis was used to examine the association between MNA score and other factors using MNA score as the dependent variable. Stepwise linear regression analysis (Table – 6) identified weight, medicines taken per day and GDS score of the subjects as the significant predictors

for MNA score (dependent variable) among all the correlated factors.

The Regression Equation is calculated as: MNA score = 21.79 + 0.0734 weight (kg) - 0.389 Med taken/day - 0.1537 GDS level.

Table: 6 - Multiple Stepwise Regression for the Association between the MNA Score and Anthropometric and Other Characteristics of the Subjects.

Variables	Coefficients	SE coefficients	t value	P value
Weight	0.0734	0.0299	2.45	0.018
Medicines taken/ day	-0.389	0.102	-3.81	0.000
GDS score	-0.1537	0.0510	-3.01	0.004

DISCUSSION

The mean age of the subjects in the present study was around 72.5yrs on average, which is higher than the mean age of the subjects as studied in Hyderabad, Telengana by Maktha and Kumar,^[11] where 44% were men in the current study which is lower than the study conducted by Maktha and Kumar with 55% male subjects.^[11]

In the present study, the mean BMI of the elderly is almost similar to the mean BMI of older people living in homes for the aged in the Somerset, South Africa,^[12] indicating no such remarkable change in aged persons in our country.

The proportion of subjects with Malnutrition and at Risk of malnutrition (4% and 56% respectively) in the present study is correlated to a study at rural Finland (3% and 48% respectively) as reported by Soini H et. al.^[13] In another study, Marais et al also found 6% of older people malnourished and 47% at risk of malnutrition in Somerset, South Africa, which can be considered as another supporting evidence of our studies.^[12] Similar study was reported by Saha et. al having only 22% malnourished women and 56% women were at risk of malnutrition in Elderly Women of Old Age Homes of South Suburban Kolkata.^[14]

The epidemiological study on depression and related factors among geriatrics in tertiary care hospital, Kolkata showed that 34.70% had no depression, 36.2% had mild and 29.1% had severe depression.^[15] This report further supports the present study which shows 34% of the subject had no depression, 42% had mild and 24% had severe depression. Chalise H N.^[16] found 42.2% had normal depression, 46.7% had mild depression and 8.9% had severe depression among elderly living in old age home.

The nutritional assessment by MNA method reveal that 3.6% of female and 4.5% of male participants were suffering from malnutrition in the present study, which is mostly similar to the study at Turkey, where, 6.5% of the male and 8.8% of the female subjects had insufficient nutrition.^[17] A study by Burman et.al also showed the mean MNA score was higher for men than women.^[18] In another study by Ongan and Rakicioglu in Turkey, the mean MNA score was found to be significantly higher in men than women.^[19] Although, in the present study the mean MNA score was found to be higher in men than that of women, but the difference is insignificant, which is similar with the findings of Doumit et.al having no significant difference between women and men on MNA and GDS scores.^[20]

Previous studies of Maktha and Kumar found the prevalence of depression, which was significantly more in females^[11] and is comparable with the present study, where gender was found to be associated significantly with both the nutritional status and depression level

based on the MNA and GDS scores respectively and the proportion of severely depressed women in the old age home are significantly greater than that of male, which can be supported by another study in Brazil, having the prevalence of higher depression among females.^[21]

In the present study, the body weights, medicines taken per day and GDS level were found to be significantly correlated with the MNA score of the subjects. But, Kucukerdonmez et al found negative correlation between MNA and other factors like body weight, BMI, MUAC and CC.^[17] A comparative study in Mangalore by M Kirtana Pai in 2011, found that MNA scores were positively correlated with MAC and CC of old age home residents.^[22] But, in the current study, no correlation was found with MAC and CC. A study in Finland by T Kaipainen et al found persons at risk of malnutrition or who were malnourished, used more drugs and had a higher depressive score and a lower IADL and MMSE scores than well nourished participants,^[23] where in the present study no correlation was found between MNA and MMSE scores, though, Salameh P et al found positive correlation between MNA and MMSE scores.^[24] Similar to our study, Griep MI et al also reported the negative correlation between numbers of medicines taken and the MNA scores.^[25] In the present study, MNA scores were correlated significantly with the GDS scores, which can be further supported by the studies of Pirlich M et al.^[26]

The multivariate stepwise regression in the present study identified body weight, medicine taken per day and GDS scores of the subjects as the significant predictors of MNA score among all correlated factors. A study in Belgium by Griep MI et al used multiple regression and found a significant negative regression coefficients between numbers of drugs taken per day and MNA scores, because, the GDS is considered as only the independent risk factor for malnutrition in a multiple regression analysis by Pirlich M et al.^[25,26]

CONCLUSION

The present study revealed that although few subjects (4%) were actually found to be malnourished more than half of the subjects (56%) were at risk of malnutrition in the two old age homes under study in the Hooghly district, West Bengal, India. Since depression scores were also found to be significantly correlated with the nutritional status, more than half of the subjects (66%) were also found to be suffering from depression of different grades. Also the proportion of severely depressed females were found to be significantly high than the male subjects. Early nutritional intervention should be implemented especially to those who are „malnourished“ or „at risk“. In this way nutritional development would improve the depression status of the subjects so that the inhabitants of the old age homes will brought in the main stream of life.

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