Original Research Article

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A cross-sectional study on malnutrition in elderly using mini nutrition assessment scores in an urban slum

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ABSTRACT

Background: The global demographic shift presents new challenges regarding health of elderly. Nutrition in elderly affects their immunity and functional ability. Most cases of malnutrition in elderly go under-reported. Hence, this study was conducted to study malnutrition in elderly using MNA score with the aim to find out the prevalence of malnutrition in elderly and study its associated factors in an urban slum in the field practice area of parent medical college.

Methods: Study was conducted in 120 elderly (>60 years) study participants. A pre-tested semi-structured questionnaire consisting of information on lifestyle, somatic, functional, social factors and Mini Nutrition Assessment (MNA) questionnaire was administered to assess the nutritional status of the elderly. Descriptive statistical measures like percentage, mean, standard deviations and inferential statistical measure like chi square were calculated.

Results: Among 120 elderly study participants, 83 (69.17%) were females, 37 (30.83%) were male and their mean age was 67.21 (±6.27) years. 40 (33.33%) had malnutrition, 65 (54.17%) were at risk of malnutrition and 15 (12.5%) had satisfactory nutrition. Medication use, socio-economic status and marital status showed significant association with malnutrition in elderly.

Conclusions: The high prevalence of malnutrition and risk of malnutrition in elderly necessitates appropriate preventive and corrective measures like detailed evaluation, regular follow-up and dietary interventions to be undertaken to deal with malnutrition in elderly.

Keywords: Malnutrition, Elderly, MNA score

INTRODUCTION

The global demographic shift entails fundamental social, economic and development challenges and opportunities, not the least of which is the increasing priority to satisfy the needs of older persons while enabling them to have longer, healthier and more productive lives. The global share of older persons (aged 60 years or over) increased from 9.2 per cent in 1990 to 11.7 per cent in 2013 and will continue to grow as a proportion of the world

population, reaching 21.1 per cent by 2050. Presently, about two thirds of the world's older people live in developing countries. According to 2011 Census, 8.6% population in India is elderly.

Older persons are specifically susceptible to malnutrition as there are many practical issues encountered in providing adequate nutrition. With increasing age, though both lean body mass and basal metabolic rate declines, that leads to reduction in energy requirement, the

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necessity for other vital nutrients rises.³ Nutrition in elderly affects their immunity and functional ability.⁴⁻⁶

Factors like feeding difficulty, reduced mobility, psychological distress, being widowed, illiteracy, caring for children, poverty, and poor access to health and social services make elderly more vulnerable for malnutrition.⁷ Several studies have shown that malnutrition among elderly can cause increase in morbidity and mortality. Most cases of malnutrition in elderly go under-reported. There is no gold standard for estimating malnutrition among the elderly.9 Body mass index (BMI; weight [kg]/height [m]²) predicts disease risk both in those termed underweight and in those who are obese. The WHO categorizes underweight as BMI <18.5, normal 18.5-24.9, overweight 25-29.9, obese 30-30.99, and extreme obesity >40. However, BMI may be unreliable in the presence of confounding factors such as edema or ascites, and may not identify significant unintentional weight loss if used as a single assessment. 10-12 Furthermore, reliable measurement of height can be difficult in the elderly because of vertebral compression, loss of muscle tone, and postural changes. 10,13 Mini Nutrition Assessment (MNA) is a widely used international questionnaire to evaluate the nutritional state of elderly with high sensitivity (98.9%), specificity (94.3%) and diagnostic accuracy (97.2%). It closely correlates with biochemical (albumin, prealbumin, transferrin levels, and lymphocyte numbers) and anthropometrical markers (measuring of subcuticular fat and arms circumference) that were verified by a number of clinical studies on wide sets of geriatric patients. 14-16 However, in India, very few community studies were conducted to estimate malnutrition among elderly using MNA. Hence, this study was conducted to find out the prevalence of malnutrition and study its associated factors using Mini Nutrition Assessment (MNA) score.

METHODS

Study design

This was a cross sectional study done in the urban slum located in the field practise area of Topiwala National Medical College, Mumbai from January 2017 to July 2017

Inclusion and exclusion criteria

Individuals > 60 years old and who gave the consent were included in the study. Individuals > 60 years old who had undergone any surgery in last 1 month, individuals > 60 years old who have undergone bilateral above knee amputations or bilateral above-elbow amputation were excluded from the study.

Sample size

Sample size was calculated by using the formula $[n=(z^2)P(100-P)/d^2]$, where P=expected prevalence, z=z

statistic for level of confidence, d=allowable (absolute) error. Taking prevalence of malnutrition among elderly as 17.9 % based on a previous study, absolute precision of 7% and a confidence interval of 95%, sample size was calculated to be 120.²¹ Primary sampling unit was households. Total number of households in the field practise area of the Urban Health Centre was obtained from the register after which, systematic random sampling was employed to select the households. An individual >60 years of age was the study unit and was recruited into the study randomly from the selected households. Households which were locked even after three visits were excluded from the study.

Study tool

Data was collected after taking written informed consent by using a pre-tested semi-structured questionnaire consisting of close and open ended questions. Nutritional status was assessed with the MNA, a validated questionnaire for older individuals. 18 The questionnaire comprises 18 questions clustered in four sections: Anthropometric assessment (weight, height, and weight loss); general assessment (living situation, medicine use, and mobility); dietary assessment (number of meals, food and fluid intake, and autonomy of feeding), and subjective assessment (self-perception of health and nutritional status). A maximum score of 30 can be obtained. A score below 17 indicates malnutrition, a score of 17-23.5 indicates a risk of malnutrition, and a score of 24 or higher indicates a satisfactory nutritional status.

Possible factors associated with malnutrition were classified as lifestyle, somatic, functional, and social factors. Lifestyle characteristics included smoking and alcohol consumption. Somatic characteristics included medication use, co-morbidity, and use of walking aid. Functional characteristics included activities of daily life (ADL) and instrumental ADL (IADL). Social factors included socioeconomic status, education, marital status, pension, and living alone.

Parameters measured were weight, height, BMI, calf circumference and mid-arm circumference.

Statistical analysis

The data was entered in Microsoft Excel and analysed using SPSS 20 statistical software. Descriptive statistical measures like percentage, mean and standard deviation were calculated. An inferential statistical measure like Chi square was applied.

RESULTS

Among 120 elderly study participants 83 (69.17%) were females, 37 (30.83%) were male and their mean age was 67.21 (\pm 6.27) years. Using the MNA score, 40 (33.33%) had malnutrition (MNA score <17), 65 (54.17%) were at

risk of malnutrition (MNA score 17–23.5) and 15 (12.5%) had satisfactory nutrition (MNA score ≥24) (Table 1).

Majority elderly participants belonged to 60 to 69 years age group, out of which 28 (23.33%) were malnourished and 50 (41.67%) were at risk of malnutrition.

Malnutrition and risk of malnutrition was slightly higher in females compared to males. 28 (23.33%) out of 57 (47.50%) study participants belonging to socio-economic class V were having malnutrition. Malnutrition was higher in individuals with none or only primary level education (Table 2).

Table 1: Distribution of study participants as per sex and nutritional status according MNA score.

Sl. no.	Parameter		Total (n)	Percentage (%)
1.	Com	Male	37	30.83
	Sex	Female	83	69.17
2.	Nutritional status according to MNA scores	Malnourished (MNA score <17)	40	33.33
		At risk of malnutrition (MNA score 17–23.5)	65	54.17
		Satisfactory nutrition (MNA score ≥24)	15	12.50

Table 2: Distribution of nutritional status in elderly according to socio-demographic characteristics.

			Nutritional status according to MNA score					
Sl. no	Socio-demographic variable		Malnourished	At risk of	Satisfactory	Total		
				malnutrition	nutrition	N (%)		
			N (%)	N (%)	N (%)			
	Age group (years)	60 to 69	28 (23.33)	50 (41.67)	9 (7.50)	87 (72.50)		
1.		70 to 79	11 (9.16)	13 (10.83)	6 (5.00)	30 (25.00)		
1.		80 to 89	0 (0.00)	1 (0.83)	0 (0.00)	1 (0.83)		
		90 to 99	1 (0.83)	1 (0.83)	0 (0.00)	2 (1.66)		
2.	Sex	Male	12 (10.00)	18 (15.00)	7 (5.83)	37 (30.83)		
4.		Female	28 (23.33)	47 (39.17)	8 (6.67)	83 (69.17)		
	Socio- economic status	Class III	9 (7.50)	32 (26.67)	12 (10.00)	53 (44.17)		
3.		Class IV	3 (2.50)	4 (3.33)	3 (2.50)	10 (8.33)		
		Class V	28 (23.33)	29 (24.17)	0 (0.00)	57 (47.50)		
	Education	Illiterate	13 (10.83)	17 (14.17)	1 (0.83)	31 (25.83)		
		Primary	16 (13.33)	24 (20.00)	4 (3.33)	44 (36.67)		
4.		Secondary	5 (4.17)	10 (8.33)	2 (1.66)	17 (14.16)		
		Higher secondary	4 (3.33)	5 (4.17)	5 (4.17)	14 (11.67)		
		Graduate	2 (1.66)	9 (7.50)	3 (2.5)	14 (11.67)		

Table 3: Associations between lifestyle characteristics, somatic characteristics, functional characteristics and malnutrition in elderly.

Sl. no.	Parameter		Total N (%)	Malnourished N (%)	χ^2	p value	
	Lifestyle characteristics						
	Alcohol consumption	Yes	9 (7.50)	3 (2.50)	0.1351*	0.7132	
		No	111 (92.50)	37 (30.83)	0.1551		
1.	Tobacco consumption	Yes	20 (16.67)	8 (6.66)	0.48	0.4884	
		No	100 (83.33)	32 (26.67)	0.46		
	Smoking habit	Yes	7 (5.83)	2 (1.66)	0.0189*	0.8905	
		No	113 (94.17)	38 (31.67)	0.0109		
	Somatic characteristics						
	Medication use	>3	36 (30.00)	27 (22.50)	16.47	<0.0001	
		≤3	84 (70.00)	13 (10.83)	10.47		
2.	Co-morbidity	≥2	78 (65.00)	26 (21.67)	- 0	>0.999	
		<2	42 (35.00)	14 (11.66)	U		
	Use of walking aid	Yes	51 (42.50)	19 (15.83)	0.6138	0.4334	
		No	69 (57.50)	21 (17.5)	0.0136		

Continued.

Sl. no.	Parameter		Total N (%)	Malnourished N (%)	χ^2	p value
3.	Functional characteristics				•	
	ADL independent	No	7 (5.83)	7 (5.83)	11.85*	0.0006
		Yes	113 (94.17)	33 (27.50)		
	IADL independent	No	11 (9.17)	8 (6.66)	6.618*	0.0101
		Yes	109 (90.83)	32 (26.67)		

^{*} With Yates correction.

Table 4: Associations between social factors and malnutrition in elderly.

Sl. no.	Social factors		Total N (%)	Malnourished N (%)	χ^2	p value
1.	Education	Higher secondary and above	28 (23.33)	6 (5.00)	2.329	0.1270
1.		Up-to higher secondary	92 (76.67)	34 (28.33)	2.329	
2.	Socio-economic	Class I, II, III	53 (44.17)	19 (15.83)	11.42	0.0007
4.	status	Class IV and V	67 (55.83)	21 (17.50)		
2	Marital status	Married	61 (50.83)	11 (9.17)	13.07	0.0003
3.		Single/ widowed/ divorced	59 (49.17)	29 (24.16)		
4	4. Pension	Yes	13 (10.83)	2 (1.66)	1.305*	0.2533
4.		No	107 (89.17)	38 (31.67)		
5.	Living alone	No	1 (0.83)	1 (0.83)	0.1261*	0.7226
		Yes	119 (99.17)	39 (32.50)		

^{*} With Yates correction.

Lifestyle characteristics like alcohol consumption, tobacco consumption and smoking habit did not show significant association with malnutrition in elderly. Somatic characteristic of medication use showed significant association with malnutrition in elderly (p<0.001). Both ADL (activities of daily living) and ILDL (instrumental activities of daily living) studied as functional characteristics were significantly associated with malnutrition in elderly (p=0.0006 and p=0.0101 respectively) (Table 3).

Among the socio-demographic factors studied, socio-economic status (p=0.0007) and marital status (p=0.0003) showed significant association with malnutrition in elderly (Table 4).

DISCUSSION

In the present study among 120 elderly population, using the MNA score, 40 (33.33%) had malnutrition (MNA score <17) and 65 (54.17%) were at risk of malnutrition (MNA score 17-23.5). There are very few studies done so far in India to study malnutrition in elderly using MNA Score. Study by Kritika et al. showed that 20.8% of the elderly were malnourished and 43.7% were at risk of malnutrition as per MNA scores. 17 A slightly low prevalence, i.e., 14 % of malnutrition and 49% at risk of malnutrition was shown by Vedantam et al.¹⁹ A lower prevalence of malnutrion (11%) and higher prevalence of at risk of malnutrition (62%) among the elderly was shown by Baweja et al in Western Rajasthan as compared to our study.²⁰ Prevalence of malnutrition among elderly was found to be 17.9% and about 58.8% were at risk of malnutrition in a study by Krishnamoorthy et al.²¹ A study done in Spain showed lower percentages of malnutrition and at risk of malnutrition (4.3% and 25.4% respectively) in elderly. 22

In the present study, lifestyle characteristics like alcohol consumption, tobacco consumption and smoking habit did not show significant association with malnutrition in elderly, which is similar to the findings of the study by Mathew et al. However, many other studies showed statistical significance with lifestyle characteristics and malnutrition in elderly.

Somatic characteristic of medication use showed significant association with malnutrition in elderly in our study. However, no such association was seen by Mathew et al.9 in their study. In our study, no significant association was observed between higher co-morbidity and malnutrition as well as between use of walk aid and malnutrition which were consistent with findings reported by Mathew et al.9 Functional characteristics like ADL (activities of daily living) and ILDL (instrumental activities of daily living) showed significant association with malnutrition in elderly in our study which were consistent with findings reported by Mathew et al. 9 We observed that higher medication use and dependence for daily living activities pose greater risk of malnutrition for the geriatric population. Hence, primary care givers and peripheral health workers should be appropriately trained to identify such at risk cases and take the required preventive and corrective dietary measures.

Among the socio-demographic factors studied, socioeconomic status and marital status showed significant association with malnutrition in elderly in our study which is consistent with findings by Mathew et al. We observed that lower socioeconomic status compared to higher socioeconomic status and single/widowed/divorced compared to married increase the risk of developing malnutrition in geriatric population due to various reasons like low purchasing power, lack of resources to make proper dietary choices and lack emotional support from spouse. These findings will help policy makers to focus on the important contributory factors and develop programmes for prevention, early diagnosis and treatment of malnutrition in elderly.

Our study has several strengths. In this study we have used a validated questionnaire to elicit the prevalence of malnutrition and studied various possible factors that can affect malnutrition in elderly. However, there were certain limitations in the current study. Since this was cross-sectional study, establishing cause—effect relationship was not possible. As the study was done in smaller geographical region, it will be difficult to generalise it to other areas. Also, our data collection was dependent on the response of individual person and their relatives. This could have led to both under and over reporting of co-morbidities.

CONCLUSION

The prevalence of malnutrition in elderly is very high. There are several factors associated with risk of malnutrition in geriatric population. The present study suggests malnutrition is a multi-factorial condition associated with socio-demographic, somatic and functional status. Thus, we recommend that a multi-disciplinary approach including nutritional screening, early diagnosis and treatment and interventional dietary approaches be developed in this context. Further research is required to guide the policy makers to take appropriate action in context to malnutrition in elderly.

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