

Prevalence and Predictors of malnutrition among elderly in an urban area in Visakhapatnam (India)

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ABSTRACT

Introduction

Malnutrition in the elderly is a significant public health problem and often underreported. It has serious implications on the overall health and quality of life of elderly population.

Objective

To assess the prevalence of malnutrition and its associated factors among elderly.

Methodology: A community based cross sectional study was done for a period of two months during September 2022 to October 2022 in urban field practice area of a medical college. Total 186 elderly (≥ 60 years) were included in the study by simple random sampling method. An interview schedule was used to record the socio-demographic and relevant details of the study participants. Nutritional status assessment was done by using 18 items (30 points) Mini nutritional assessment (MNA) scale. Data was analyzed using SPSS version 25. Chi-square test and Fisher's exact test was applied based on the nature of the distribution of data. $P < 0.05$ taken as statistically significant.

Results

Majority of the participants (84.95%) were in the age group of 60-70 years. About 61.83% were females and 38.17% were males. The prevalence of malnutrition was 18.28%. Those who are at risk of malnutrition were 51.61%. There was no significant association between socio-demographic profile and malnutrition among elderly.

Conclusion

The present study showed that the majority of the elderly were at risk of malnutrition. There is a need for early diagnosis and management of malnutrition among elderly which will improve their quality of life.

Keywords: Elderly, Malnutrition, Prevalence, Urban

GJMEDPH 2024; Vol. 13, issue 5 | OPEN ACCESS

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Conflict of Interest—none | Funding—none

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INTRODUCTION

According to the World Health Organization (WHO) by 2030, 1 in 6 people (1.4 billion) in the world will be aged 60 years or over. The low- and middle-income countries are experiencing the shift in distribution of a country's population towards older ages – known as population ageing. By 2050, two-thirds of the world's population over 60 years will live in low- and middle-income countries.¹ In India as per the census 2011, the proportion of senior citizens was 8.4% of the total population.² The 'Report of the Technical Group on population projections- July 2020' by Ministry of Health and Family Welfare has projected increase in the population of senior citizens from 13.75 crore (10.1% of total population) in 2021 to 22.74 crore (14.9% of total population) in 2036.³ Hence, the health status of the elder population will have a significant impact on the well-being of the country. Maintaining an adequate nutritional status as well as recommended intake of nutrients is key to good quality of life and it is one of the prerequisites for healthy ageing as defined by the WHO.⁴ Nutritional intake and nutritional status in old age is influenced by various factors. Some of the factors are physical illness, feeding difficulty, psychological factors, socio-economic factors and food insecurity.^{5,6} Developing nations are facing a triple burden of malnutrition-underweight, obesity, micronutrient deficiency. In older adults underweight and micronutrient deficiency leads to fatigue and higher infection rates. On the contrary overweight leads to more chronic non-communicable diseases such as diabetes, hypertension, coronary artery disease, disability and mortality.^{7,8} Nutritional screening of the elderly population is important so that the individuals identified can undergo full nutrition assessment and possible intervention. Mini-nutritional assessment (MNA) tool is a simple and reliable tool for assessing elderly population at risk of malnutrition.⁹ Although some studies have been done to find the prevalence of malnutrition among elderly, it is still under-reported in several parts of India. Factors associated with malnutrition were also found to be under-reported.^{6,10} Hence, the objectives of the current study are to assess the prevalence of malnutrition and identify factors associated with it among elderly population.

Methodology:

A community based cross sectional study was done in an urban field practice area under department of community medicine of a private medical college in Visakhapatnam for a period of two months from September to October 2022. Study population included both elderly males and females aged ≥ 60 years residing in the urban field practice area for more than one year and who were willing to participate. Participants who were severely ill, unable to comprehend the questionnaire, those who had auditory problems, not present at time of visit and those who could not stand unsupported due to disability were excluded.

Sample size calculation: Prevalence of elderly malnutrition in a previous study¹¹ done in India was 14%. Sample size was calculated by using the formula, $N = \frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$, 95% confidence level taking absolute error as 5%, total sample size obtained was 186. The field practice area under urban health centre of a private medical college has eight wards, out of which four wards were randomly selected. The list of households in the selected wards with elderly ≥ 60 years of age was prepared. There were 328 households with elderly ≥ 60 years. By simple random sampling method, 186 elderly were interviewed from the selected list by house-to-house visit. A predesigned, pre-tested structured interview schedule was prepared which included-1) Socio Demographic profile of participants 2) Mini Nutritional Assessment scale (MNA scale) - to assess the nutritional status. The MNA scale is a validated tool for assessment of nutritional status among elderly, with a sensitivity of 96%, specificity of 98%, and a predictive value of 97%. It contains 18 items and evaluates four different aspects. 1. Anthropometric assessment 2. General assessment 3. Short dietary assessment 4. Subjective assessment of health and nutrition. Each question has a numerical score by adding up the scores (Total=30), individuals can be divided into 3 groups. < 17 - malnourished, $17-23.5$ - at risk of malnutrition, ≥ 24 - normal nutritional status. Informed consent was taken prior to the interview. Ethical clearance was obtained from the Institutional Ethical Committee. (Number:

GIMSR/Admn./Ethics/approval/IEC-5/2022.Dated : 10/08/2022).Data analysis was done using SPSS version 25. Continuous variables such as age were summarized as mean and standard deviation. Categorical variables were summarized as proportions. Results of malnutrition status were summarized as proportion with 95% confidence interval. Bivariate analysis (Chi-square test/Fisher's exact test) was used to find the association between socio-demographic factors and malnutrition. p value less than 0.05 was considered statistically significant.

RESULTS

A total of 186 elderly were included in this study, the majority (59.68 %) were in the age group of 60-65 years. The mean age of study participants was 66.40 ± 5.68 years. About 61.83% were females and 38.17 % were males. Most of the participants, 86% were Hindu by religion. About 58.6% were financially dependent and 74.7% live in their own house Among the participants, 55.9% belonged to the nuclear family and 38.7% belonged to the three generation family. The socio-demographic factors of the study participants are shown in **Table 1**.

Table 1: Socio-demographic factors of study participants (N=186)

Variable	Frequency (n)	Percentage (%)
Age distribution in years		
60-65	111	59.68
66-70	47	25.27
71-75	16	8.60
>75	12	6.45
Education status		
Illiterate	158	84.9%
Literate	28	15.1%
Occupation		
Unemployed	129	69.4%
Employed	57	30.6%
Socio-economic status (B.G. Prasad scale 2020)		
Lower class	2	1.1%
Lower middle class	89	47.8%
Middle Class	73	39.2%
Upper middle	15	8.1%
Upper class	7	3.8%
Marital status		
Unmarried	1	0.5
Married	131	70.4
Widowed	51	27.4
Separated	1	0.5
Divorced	2	1.1

Table 2 shows the anthropometric and general assessment components of MNA Scale. Among 186 individuals interviewed, 62 (33.3%) had a moderate decline in the food intake level. Majority of participants 178 (95.6%) had adequate mobility. During the past 3 months 123(71.5%) perceived psychological stress. About 28 (15.1%) were

underweight, 60 (32.5%) were obese based on Asia-Pacific guidelines for assessment of Body Mass Index (BMI).Regarding the quality of life and activity of daily living status of elderly, about 183 (98.38%) live independently, 52 (28%) take more than three prescription drugs per day, and 9 (4.8%) have pressure sores or ulcers.



Table 2: Anthropometric and general assessment of elderly using Mini-Nutritional Scale (N=186)

Characteristics	Category	Frequency (%)
Perceived decline in Food Intake	Severe decrease	0 (0%)
	Moderate decrease	62(33.3%)
	No decrease	124(66.6%)
Perceived Weight loss during last 3 months	More than 3 kg	0 (0%)
	Doesn't know	18(9.7%)
	Between 1-3 kg	52(27.95%)
	No weight loss	116(62.4%)
Mobility status	Bed/chair bound	0(0%)
	Able to get out of bed but doesn't go out	8 (4.3%)
	Goes out	178(95.6%)
Suffered psychological stress / acute disease in past 3 months	yes	53(28.5%)
	no	133(71.5%)
Neuropsychological problems	Severe dementia	0
	Mild dementia	80(43%)
	No	106(57%)
Body mass index	underweight	28(15.1%)
	Normal	68(36.6%)
	Overweight	30(15.8%)
	Obese	60(32.5%)

Table 3 shows the short dietary assessment of the elderly based on MNA Scale. About 136 (73.11%) have three meals per day, 126 (68%) have at least one serving of dairy products every day, 156 (84%) have at least two servings of legumes or egg per day, and 82 (44%) have at least two servings of fruits or vegetables per day. Around 99(53.2%) of

participants consume more than 5 cups of fluid per day. Majority of the study participants 182 (97.8%) self-fed without any difficulty. The study results showed that 82 (44%) perceived themselves as malnourished and 71 (38%) considered their health status lower when compared to the individuals in the same age group.



Table 3: Dietary assessment of the elderly using Mini-Nutritional Assessment (N=186)

Characteristics	Category	Frequency (%)
Full meals per day	1 meal	0 (0%)
	2 meals	50(27%)
	3 meals	136(73%)
At least one serving of dairy product per day	yes	126(68%)
	no	60(32%)
≥2 servings of legumes/ eggs per week	yes	156(84%)
	no	30(16%)
Meat, fish or poultry everyday	yes	55(29.5%)
	no	131(70.4%)
≥2 servings of fruits & vegetables per day	yes	82(44.1%)
	no	104(55.9%)
Fluid intake per day	<3 cups	5(2.7%)
	3-5 cups	82(44.1%)
	>5 cups	99(53.2%)
Mode of feeding	Unable to eat without assistance	0(0%)
	Self-fed with some difficulty	4(2.15%)
	Self fed without difficulty	182 (97.8%)

Figure 1 summarizes the overall nutritional status of the study population. The prevalence of malnutrition among elderly was 18% (95% CI:

12.6%–23.9%), 52% (95% CI: 44.5%–58.7%) were at risk of malnutrition and 30% were having normal nutritional status ((95% CI: 23.4%–36.8%).

Figure 1: Nutritional status of elderly using Mini-Nutritional Assessment scale (N = 186)

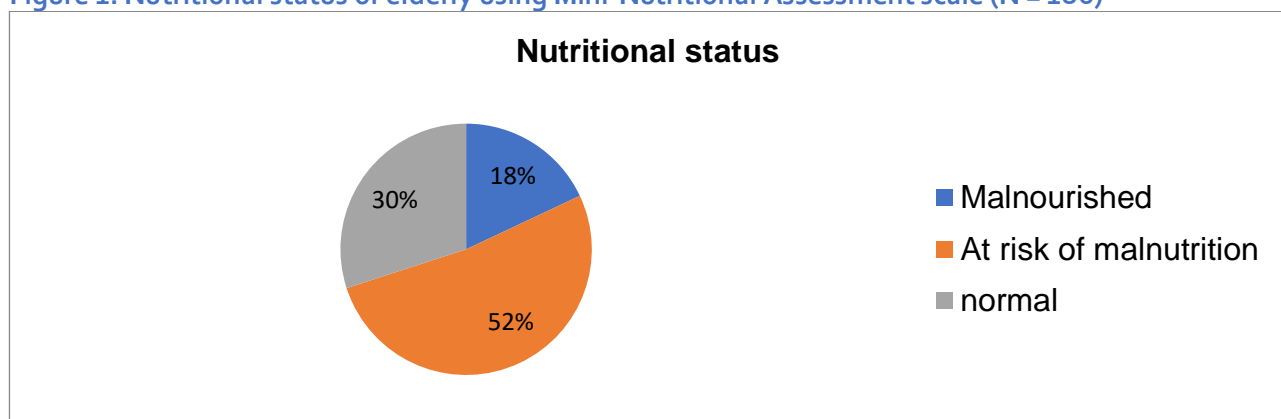


Table 4 shows the association between socio-demographic characteristics like age, gender, education, socio-economic status and malnutrition. The study results showed that there

was no significant association between status of malnutrition and socio-demographic profile of the study participants.

Parameters	Malnutrition status				Adjusted Odd's Ratio (95% CI)	P-value
	Normal		At Risk & Malnourished			
	Count	%	Count	%		
Age group						
60 - 65	36	64.3%	75	57.7%	-	0.353
66-70	15	26.8%	32	24.6%	0.09 (0.007 - 1.08)	
71-75	4	7.1%	12	9.2%	0.41 (0.108 - 1.59)	
76-80	1	1.8%	11	8.5%	0.76 (0.34 - 1.67)	
Gender						
Female	32	57.1%	83	63.8%	0.704 (0.34 - 1.45)	0.242
Male	24	42.9%	47	36.2%	-	
Educational status						
Illiterate	44	78.6%	114	87.7%	0.44 (0.16 - 1.25)	0.087
Literate	12	21.4%	16	12.3%	-	
Financial dependency						
Dependent	28	50.0%	81	62.3%	0.68 (0.33 - 1.41)	0.081
Independent	28	50.0%	49	37.7%	-	
SES						
Upper Class	8	14.3%	14	10.8%	-	0.365
Middle Class	25	44.6%	48	36.9%	2.08 (0.60 - 7.29)	
Lower Class	23	41.1%	68	52.3%	1.21 (0.35 - 4.27)	

DISCUSSION:

In the current study, the nutritional status of 186 elderly (≥ 60 years) residing in the urban field practice area of a private medical college was assessed by using MNA scale. The prevalence of malnutrition was found to be 18%. The proportion of participants who were underweight based on Body mass index, BMI (Asia-Pacific guidelines) was 15.1% which was almost similar to the

proportion of malnutrition assessed by MNA scale. In the previous studies done in India, the prevalence of malnutrition in elderly ranged from 13% to 54% (7,8,10-13). This variation in the prevalence might be due to various tools adopted to measure the status of malnutrition and socio-demographic profile of the study participants. Some studies used BMI as a tool to assess

malnutrition in elderly. Longitudinal Aging Study in India (LASI) which was done by Khan J et al²⁰ based on a survey conducted across all states and union territories (UTs) in India during 2017 to 2018 reported prevalence of under nutrition as 25% in females and 28% in males. The studies done in Puducherry by Kalaiselvi S et al⁷ and in Uttarakhand by Gupta A et al⁸ also used anthropometric index BMI as a measure to assess nutritional status reported prevalence of malnutrition as 24.8% and 26.6% respectively. The studies done by Gupta A et al in high altitude regions of India²¹, by Krishnamoorthy Y et al in rural Puducherry²² and Mathew AC et al in urban Coimbatore²³ using MNA scale found the prevalence of malnutrition as 14.3%, 17.9%, 19.47% respectively. These findings were similar to the result of the current study with prevalence 18%. The studies done by using MNA scale reported lesser prevalence of malnutrition. This might be due to the reasons that the MNA tool includes various parameters to assess malnutrition and comprehensively covers anthropometric, psychological, dietary, and perceived nutritional status. The combination of these components provides a more comprehensive assessment of an individual's nutritional status. Whereas the studies which used only anthropometric measurements (BMI) to assess nutritional status led to overestimation of the burden of malnutrition. The prevalence of the elderly who are at risk of malnutrition was found to be 52%. Similarly the studies done in Puducherry by Kalaiselvi S et al⁷, West Bengal by Lahiri S et al²⁴, Vellore by Vedantam A et al²⁵ reported that 50-60% of elderly were at risk of malnutrition. This indicates the importance of screening for nutritional status among elderly at early stage to prevent malnutrition. In the current study the anthropometric measurement (BMI) of the participants indicated that 32.5% were obese

similar to findings of a study done in Karnataka by Ratnaprabha GK.¹⁶ The prevalence of obesity varied between 5% to 20% in the studies done in Puducherry by Rajkamal R et al¹⁷ and Tamil Nadu by Shankar R et al.¹⁸ The higher prevalence of the obesity in the current study might be due to Asia-Pacific guidelines used to assess obesity, whereas other studies used WHO classification. In the current study the risk of malnutrition was more among age group 60-65 yrs, females, illiterates, those individuals who were financially dependent and those who belonged to lower socio-economic status. But the association between these socio-demographic variables and status of malnutrition was statistically not significant. These findings were similar to the studies done in West Bengal by Lahiri S et al²⁴, Haryana by Jamir L et al²⁹, Uttarakhand by Gupta A et al⁸ and in other countries like Turkey by Nazan S et al²⁰ and Spain by Julio MPM et al.²¹ The strengths of the current study are – it is a community-based study, standardized validated questionnaire and simple random sampling method are used to collect the data. These factors will increase the internal and external validity of the study results.

Conclusion

The study indicates that the elderly population are at risk of developing malnutrition. It is evident that both undernutrition and overnutrition (obesity) might lead to health issues in the elderly. Therefore, it is important to identify the elderly with malnutrition at an early stage by opportunistic screening at health centers as well as by health workers at the community level. Management of malnutrition among elderly needs a multidisciplinary approach like dietary counseling and nutritional supplementation which will further improve the quality of life.



REFERENCES

1. World Health Organization (WHO). Ageing and Health [internet]. 2022 Oct1. Available from <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health> [last accessed 2023 Aug 16].
2. Census of India. Registrar General of India office, Government of India, India; 2011. [last accessed on February 2023]
3. NSO (2021), Elderly in India, National Statistical Office, Ministry of Statistics & Programme Implementation, Government of India, New Delhi. Available from: <https://mospi.gov.in/web/mospi/reports-publications>. [Last accessed on February 2023]
4. Rudnicka E., Napierała P., Podfigurna A., Męczekalski B., Smolarczyk R., Grymowicz M. The World Health Organization (WHO) approach to healthy ageing. *Maturitas*. 2020; 139:6–11.
5. Norman K, Haß U, Pirlich M. Malnutrition in Older Adults-Recent Advances and Remaining Challenges. *Nutrients*. 2021 Aug 12;13(8):2764.
6. Kandapan B, Pradhan I, Pradhan J. Food Insecurity and Malnutrition among Indian Older Adults: Findings from Longitudinal Ageing Study in India, 2017-18. *J Popul Ageing*. 2022 Aug 3:1-21.
7. Kalaiselvi S, Arjumand Y, Jayalakshmy R, Gomathi R, Pruthu T, Palanivel C. Prevalence of under-nutrition, associated factors and perceived nutritional status among elderly in a rural area of Puducherry, South India. *Arch Gerontol Geriatr*. 2016; 65:156–60.
8. Gupta A, Kapil U, Khandelwal R, Khenduja P, Sareen N, Pandey RM, Upadhyay AD. Prevalence and risk factors of underweight, overweight and obesity among a geriatric population living in a high-altitude region of rural Uttarakhand, India. *Public Health Nutrition*. 2018;21(10):1904–1911.
9. Vellas B, Guigoz Y, Garry PJ, Nourhashemi F, Bennahum D, Lauque S, et al. The Mini Nutritional Assessment (MNA) and its use in grading the nutritional state of elderly patients. *Nutrition*. 1999; 15:116–22
10. Khan, J., Chattopadhyay, A. & Shaw, S. Assessment of nutritional status using anthropometric index among older adult and elderly population in India. *Sci Rep* 2023;13, 13015.
11. Gupta A, Kapil U, Belwal R. Assessment of nutritional status of elderly population living at high altitude regions of India utilizing Mini Nutritional Assessment (MNA) methodology. *Indian J Comm Health*. 2022;34(1):49-53.
12. Krishnamoorthy Y, Vijayageetha M, Kumar SG, Rajaa S, Rehman T. Prevalence of malnutrition and its associated factors among elderly population in rural Puducherry using mini-nutritional assessment questionnaire. *J Family Med Prim Care* 2018; 7:1429-33.
13. Mathew AC, Das D, Sampath S, Vijayakumar M, Ramakrishnan N, Ravishankar SL. Prevalence and correlates of malnutrition among elderly in an urban area in Coimbatore. *Indian J Public Health*. 2016 Apr-Jun;60(2):112-7.
14. Lahiri S, Biswas A, Santra S, Lahiri S. Assessment of nutritional status among elderly population in a rural area of West Bengal, India. *Int J Med Sci Public Health* 2015 ;4:569-72.
15. Vedantam A, Subramanian V, Vijay Rao N, John K. Malnutrition in free-living elderly in rural south India: Prevalence and risk factors. *Public Health Nut* 2010; 13:1328-32.
16. Ratnaprabha GK, Farah NF, Twinkle A, Naveen JT, Ashit BX. Prevalence of obesity and its associated factors among elderly in a rural area of South Karnataka. *Ann Community Health* 2015; 2:15-21.
17. Rajkamal R, Singh Z, Stalin P, Muthu Rajesh E. Prevalence And determinants of overweight and obesity among elderly population in an urban area of Puducherry. *Int J Med Sci Public Health* 2015; 4:369-72.
18. Shankar R, Balamurugan SS. Prevalence of chronic energy deficiency, overweight and obesity among the geriatric population in rural area in Tamil Nadu in Sri Ramchandra. *J Med* 2011;4:24-9.
19. Jamir L, Kalaivani M, Nongkynrih B, Misra P, Gupta SK. Anthropometric characteristics and undernutrition among older persons in a rural area of northern India. *Asia Pac J Public Health*. 2015 Mar;27(2):NP2246-58.
20. Nazan S, Buket K. Evaluation of Nutritional Status of Elderly Patients Presenting to the Family Health Center. *Pak J Med Sci*. 2018 Mar-Apr;34(2):446-451.
21. Julio MPM, Clavero AE, Soler MLM. Nutritional status and factors associated with non-institutionalized people over 75 years of age. *Rev Bras Enferm*. 2018 May;71(3):1007-1012.