A cross-sectional study to assess the under-nutrition amongst the elderly population in a rural area of district Gautam Buddha Nagar, Uttar Pradesh

Meraj Gohar, Kabita Barua, Shalini Srivastava, Harsh Mahajan, Amit S. Pawaiya, Sachin K. Nagar

Department of Community Medicine, School of Medical Sciences, Sharda University, Greater Noida, Uttar Pradesh, India

Abstract

Background: Ageing is a universal process. It is influenced by a person's genetic makeup, lifestyle, and environmental factors. Nutrition plays a significant role in modulation of ageing. In developing countries like India, the health and nutritional status of the elderly population is not satisfactory. **Objectives:** The current study was done to assess undernutrition amongst the elderly population and to find the various associations with sociodemographic factors and social determinants. **Materials and Methods:** This cross-sectional study was done from February 2023 to July 2023 in rural area of District Gautam Buddha Nagar, Uttar Pradesh. The elderly participants who were 60 years of age and more and who met the inclusion criteria were selected by simple random sampling technique for the study. Undernutrition was assessed by Mini Nutritional Assessment Tool (MNA). **Result:** Out of the total of 400 elderly persons, 18% were found to be undernourished and 38% were at risk of undernutrition. The association between undernutrition and age group, gender, occupation, family type, living arrangements that is staying with family or not, financial dependence, any co-morbid illness, smoking, and physical activity was found to be significant. **Conclusion:** The present findings reveal that undernutrition is not an uncommon problem in the elderly, and further studies are needed in this regard.

Keywords: Elderly, mini nutritional assessment tool (MNA), undernutrition

Introduction

The elderly population is growing rapidly worldwide. The global number of the elderly population is projected to rise from an estimated 524 million in 2010 to nearly 1500 million in 2050, with most of this increase in developing countries.[1] India's elderly population is also growing rapidly and accounted for 7.5% of the total population in 2010 and is projected to increase to 11.1% by 2025.[2] Such a rapid rise in the elderly population will definitely pose several challenges.

The lack of guaranteed sufficient income to support themselves, the absence of social security, loss of social status and recognition, unavailability of opportunities for creative use of time, and persistent ill health are some of the daunting problems the elderly face in the country.[3]

Undernutrition can be defined as the state of being poorly nourished.[4] Older people are vulnerable to under-nutrition for many reasons including physiological and functional changes that occur with age. lack of financial support and inadequate access to food. In India, the problem of the health of the elderly is compounded by poor nutrition together with medical issues, including both communicable and noncommunicable diseases. The nutrition and health of the elderly is often neglected. Most

Address for correspondence: Dr. Meraj Gohar, Department of Community Medicine, School of Medical Sciences, Sharda University, Greater Noida - 201 310, Uttar Pradesh, India. E-mail: mohammad.gohar@sharda.ac.in

Access this article online

Quick Response Code:

Website:
http://journals.lww.com/JFMPC

DOI:
10.4103/jfmpc.jfmpc_1383_23

How to cite this article: Gohar M, Barua K, Srivastava S, Mahajan H, Pawaiya AS, Nagar SK. A cross-sectional study to assess the under-nutrition amongst the elderly population in a rural area of district Gautam Buddha Nagar, Uttar Pradesh. J Family Med Prim Care 2024;13:780-6.

nutritional intervention programs are directed toward infants, young children, adolescents, and pregnant and lactating mothers. However, nutritional interventions could play a part in the prevention of degenerative conditions of the elderly and an improvement of their quality of life.

A timely intervention can stop nutritional problems in those at risk of undernutrition. Unfortunately, not much explanation has been given for the precise estimate of undernutrition in this age group in research. The Mini Nutritional Assessment (MNA) Tool is a well-validated tool for assessing under-nutrition in the elderly.[5] The nutritional assessment using the MNA tool can be easily administered by primary health care providers to detect patients who could be helped by early nutritional intervention.

Rationale of the study

The current study is undertaken to decipher the prevalence of undernutrition among the elderly and support the policy makers to take up an important aspect of the health of the elderly population which will further pave the way towards improvement in their quality of life.

Objectives

To assess the undernutrition amongst the elderly population.

To find the association of undernutrition with various sociodemographic factors and social determinants.

Materials and Methods

Study area

The present study was undertaken in the rural area of District Gautam Buddha Nagar, Greater Noida, Uttar Pradesh which is the field practice area of the Department of Community Medicine of a Medical College in Western Uttar Pradesh.

Study population

The elderly population 60 years of age and above living in the study area and who met the inclusion criteria.

Study design

It was a community based cross-sectional study to assess the undernutrition amongst the elderly population in the study area.

Study period

It was conducted during the period of February 2023 to July 2023.

Study methodology

Sample size

Based on the study conducted by Tomar R *et al.*, regarding the assessment of the nutritional health status of the rural geriatric population in District Saharanpur (U.P.), the prevalence of undernutrition at 48% was considered for the study.[6]

Sample size calculation

The sample size was calculated by the formula: $n = 4pq/L^2$ where 'n' is the sample size, 'p' is the prevalence, q = (100-p), and 'L' is the admissible error which is taken as 5%. So, putting the values in the formula, [$n = 4 \times 48 \times 52/5 \times 5$], $n = 399.36 = 400$. So, the sample size comes to 400.

Eligibility criteria

Inclusion criteria

Elderly participants aged 60 years and above of both the genders residing in the study area for more than 6 months.

Exclusion criteria

Those who were severely ill and mentally unsound.

Sampling technique

Out of the eight villages which are catered by RHTC of Department of Community Medicine of Medical College, 4 villages (Panchayatan, Girdharpur, Cheersi and Ghanghola) were selected by simple random sampling using lottery method. The total population and the total geriatric population in those 4 villages were as follows: Panchayatan (Total population-2435 and total geriatric population-533), Girdharpur (Total population-2438 and total geriatric population-541), Cheersi (Total population-2011 and total geriatric population-444), Ghanghola (Total population-4523 and total geriatric population-446). We applied Proportion Probability Sampling method for the respondent selected from each of the 4 villages.

By using the formula, N = Geriatric population of one village X Desired Sample size/Total geriatric population of 4 villages.

By putting the values in the above formula for all the 4 villages, sample size of each of the 4 villages were as follows: Panchayatan-109, Girdharpur-110, Cheersi-90 and Ghanghola- 91. From the total geriatric population of each of the 4 villages, the desired participants for each of the 4 villages were selected by simple random sampling method and those who fulfilled the inclusion criteria were interviewed face to face.

Methodology

The study was conducted after approval from the Institutional Ethics Committee. The sample size included males as well as females of age 60 years and above of the study area. After obtaining the consent, a face to face interview of the study subjects was taken. Undernutrition assessment was done by the Mini Nutritional Assessment Tool (MNA)[7] which is a well validated tool for assessing malnutrition in the elderly. The tool was shown to have an accuracy of 92% when it was compared with a clinical evaluation by two physicians specialists in nutrition and 98% when it was compared with a comprehensive nutritional assessment, including biochemical tests, anthropometric

measurements, and dietary assessment. The present study was carried out to assess the nutritional status of the elderly using the Mini Nutritional Assessment Tool (MNA), and to study the various factors influencing their nutritional status. Interpretation of scores was done as follows: Score 12-14 points: Normal Nutritional status, Score 8-11 points: At risk of undernutrition, and Score 0-7 points: Undernourished.[7] An anthropometric examination was done for height, weight, and BMI. Weight and height were measured by using a standardized weighing machine and stadiometer respectively. For the calculation of the socioeconomic scale, the Modified B.G. Prasad Socioeconomic Scale of 2022 was used.[8]

Data collection

The data collection was done from February 2023 to July 2023. Before starting the data collection, the informed consent of the participants was taken. Data was collected consisting of a questionnaire. The total duration for the face to face interview was about 20 minutes. The (Mini Nutritional Assessment) tool was used to assess the undernutrition of the elderly.

Data entry and analysis

Data was entered into Microsoft Excel and analysis was done using SPSS package version 20. The statistical test used for analysis was Chi-square test.

Results

Table 1 Socio-demographic characteristics of the study participants (*n* = 400).

The majority that is 55% of the participants belonged to the age group between 60-80 years. Distribution according to the gender of the participants showed that 73% were females. Religion wise distribution showed that 79% were Hindus. The marital status data showed that most of them that is 77% were married. Education status showed that 55% of the participants were illiterate. Participants in the present study were mostly unemployed/homemakers that is 62%. As per the family type, most of the participants that is 60% of the participants belonged to a joint family. According to Modified B.G. Prasad socioeconomic status scale 2022, 32% of the study subjects were from class IV.

Table 2 Social determinants of the study participants (*n* = 400).

Majority that is 81% of the participants stay with their family. Distribution as per the financial dependence showed that 62% of the participants were financially dependent. The co-morbid data illness showed that 64% of the participants didn't have any comorbid illness. A total of 57% of the participants were smokers. As far as physical activity is concerned, 53% of the participants were doing physical activity.

According to the Mini Nutritional Assessment Scoring System, 44% of the participants had normal nutritional

Table 1: Depicts about the sociodemographic data of the study participants

Variable	Frequency (%)
Age group:	
60-80	220 (55%)
81-100	180 (45%)
Gender:	
Female	292 (73%)
Male	108 (27%)
Religion:	
Hindu	316 (79%)
Muslim	84 (21%)
Marital Status:	
Married	308 (77%)
Others (Unmarried, Divorce and Widow/widower)	92 (23%)
Education:	
Illiterate	220 (55%)
Just literate/Primary	76 (19%)
Secondary	60 (15%)
≥Higher Secondary	44 (11%)
Occupation:	
Unemployed/Homemaker	248 (62%)
Unskilled and Semiskilled	48 (12%)
Others (Skilled, Semi-professional, Professional)	104 (26%)
Family Type:	
Nuclear	76 (19%)
Three Generation	84 (21%)
Joint	240 (60%)
Socioeconomic class (Modified B.G. Prasad Class, 2022):	
Class I	40 (10%)
Class II	80 (20%)
Class III	56 (14%)
Class IV	128 (32%)
Class V	96 (24%)

Table 2: Depicts about the social determinants of the study sample

Variable	Frequency (%)
Stay with family:	
Yes	324 (81%)
No	76 (19%)
Financial dependence:	
Yes	248 (62%)
No	152 (38%)
Co-morbid illness:	
Yes	144 (36%)
No	256 (64%)
Smoking:	
Yes	228 (57%)
No	172 (43%)
Physical activity:	
Yes	212 (53%)
No	188 (47%)

status which was followed by at risk of undernutrition which was 38%. Among the 400 participants, 18% of them had undernutrition.

Table 3 Association of undernutrition with sociodemographic profile of the study participants (*n* = 400).

In studying the association of undernutrition with sociodemographic profile, statistical association was seen with age group, gender, occupation, and family type.

Table 4 Association of undernutrition with social determinants of the study participants (*n* = 400).

In studying the association of undernutrition with social determinants, the statistical association was seen with living arrangements, financial dependence, co-morbid illness, smoking, and physical activity.

Discussion

The present Community based study was conducted in a rural area of District Gautam Buddha Nagar, which is the field practice area of Department of Community Medicine of a Medical College in Western Uttar Pradesh. It was conducted from February 2023 to July 2023. The study aimed to assess the undernutrition amongst the elderly population and to find the association with various socio-demographic factors and social determinants residing in the study area. A total of 400 participants were interviewed face to face.

In our study, out of 400 study participants, the majority that is 55% of the study participants belonged to the age group between 60-80 years. In a similar study done by Manna *et al.*,[9] the majority (73%) belonged to 60-69 years. Distribution as per the gender of the participants showed that 73% were females. In a similar study done by Manna *et al.* the majority (60%) were females.[9] Religion wise distribution showed that 79% were Hindus. In a similar study done by Ananthesh BG *et al.*,[10] 83.3% of the participants were Hindus. The marital status data showed that most of the participants that is 77% were married. In a similar study done by Baratwal J *et al.*[11] 59.54% of the participants were married. As per the education status, it was seen that 55% of the participants were illiterate. In a similar study done by Baratwal J *et al.*,[11] 60% of the participants were illiterate. Participants in the present study were mostly unemployed/homemakers that is 62%. In a similar study done by Baratwal J *et al.*,[11] 78.64% of the participants were not employed. In the present study majority i.e., 60% of the study subjects belonged to joint families. In a similar study done by Baratwal J *et al.*,[11] 92.5% of the participants belonged to a joint family. According to the Modified B.G. Prasad socioeconomic status scale 2022,[8] 32% of the study subjects were from class IV. In a similar study done by Baratwal J *et al.*,[11] 59.09% of the participants were from class III of Modified B.G. Prasad Socioeconomic class.

In our study, out of 400 study participants, the majority that is 81% of the study participants stay with their families. In a similar

Sociodemographic factors	Undernutrition			Chi-square value, df, *P*
	No undernutrition frequency (%)	At risk of undernutrition frequency (%)	Undernutrition frequency (%)	
Age Group:				
60-80	124 (56.4%)	60 (27.3%)	36 (16.4%)	32.517, 2, 0.000
81-100	52 (28.9%)	92 (51.1%)	36 (20.0%)	Significant.
Gender:				
Female	104 (35.6%)	128 (43.8%)	60 (20.5%)	30.868, 2, 0.000
Male	72 (66.7%)	24 (22.2%)	12 (11.1%)	Significant
Religion:				
Hindu	144 (45.6%)	120 (38%)	52 (16.5%)	2.837, 2, 0.242, Not
Muslim	32 (38.1%)	32 (38.1%)	20 (23.8%)	Significant.
Marital Status:				
Married	140 (45.5%)	112 (36.4%)	56 (18.2%)	1.612,2, 0.447, Not
Others	36 (39.1%)	40 (43.5%)	16 (17.4%)	Significant.
Education:*				
Illiterate	88 (40.0%)	88 (40.0%)	44 (20.0%)	3.379, 2, 0.185, Not
≥Literate	88 (48.9%)	64 (35.6%)	28 (15.6%)	Significant.
Occupation:#				
Unemployed or Homemaker	96 (38.7%)	100 (40.3%)	52 (21.0%)	8.271, 2, 0.016 Significant.
Employed	80 (52.6%)	52 (34.2%)	20 (13.2%)	
Family Type:				
Nuclear	52 (68.4%)	20 (26.3%)	04 (5.3%)	25.809, 4, 0.000
3 generation	28 (33.3%)	36 (42.9%)	20 (23.8%)	Significant
Joint	96 (40.0%)	96 (40.0%)	48 (20.0%)	
Socioeconomic class:$				
Upper class (I, II, III)	76 (43.2%)	72 (40.9%)	28 (15.9%)	1.511, 2, 0.470, Not
Lower class (IV, V)	100 (44.6%)	80 (35.7%)	44 (19.6%)	Significant.

Table 3: Depicts the association of undernutrition with a sociodemographic profile of the study participants

*,#,$the data was pooled/clubbed for the analysis purpose

Table 4: Depicts the association of undernutrition with social determinants of participants				
Social determinant factors	Undernutrition			Chi-square value, df, P
	No undernutrition frequency (%)	At risk of undernutrition frequency (%)	Undernutrition frequency (%)	
Stay with the family:				
Yes	124 (38.3%)	132 (40.7%)	68 (21.0%)	24.545, 2, 0.000
No	52 (68.4%)	20 (26.3%)	04 (5.3%)	Significant.
Financial dependence:				
Yes	84 (33.9%)	112 (45.2%)	52 (21.0%)	27.219, 2, 0.000
No	92 (60.5%)	40 (26.3%)	20 (13.2%)	Significant.
Co-morbid illness:				
Yes	48 (33.3%)	68 (47.2%)	28 (19.4%)	11.115, 2, 0.004
No	128 (50.0%)	84 (32.8%)	44 (17.2%)	Significant.
Smoking:				
Yes	76 (33.3%)	112 (49.1%)	40 (17.5%)	31.035, 2, 0.000
No	100 (58.1%)	40 (23.3%)	32 (18.6%)	Significant.
Physical activity:				
Yes	104 (49.1%)	64 (30.2%)	44 (20.8%)	11.766, 2, 0.003
No	72 (38.3%)	88 (46.8%)	28 (14.9%)	Significant.

study done by Joymati O *et al.*,[12] 98.4% of the participants were staying with their family. Distribution as per the financial dependence showed that 62% of the study participants were financially dependent. In a similar study done by Manna *et al.*,[9] 54.7% of the participants were financially dependent on others. The co-morbid data illness showed that 64% of the study participants didn't have any comorbid illness. In a similar study done by Joymati O *et al.*,[12] 60.8% of the participants had co-morbid illness. Distribution as per smoking, 57% of the study participants were addicted to smoking. In a similar study done by Joymati O *et al.*,[12] 60.8% of the participants were addicted to smoking. As far as physical activity is concerned 53% of the participants were doing physical activity. In a similar study done by Sayed N *et al.*,[13] 54.78% of the participants were doing physical activity.

The present study revealed that 18% of the elderly were undernourished and 38% were at risk of undernutrition according to the Mini Nutritional Assessment Scoring System.[7] In a similar study done by Agarwalla *et al.*,[14] 15% of the elderly were undernourished and 55% were at risk of undernutrition. However, the study done by Manna *et al.*,[9] 21% were undernourished, and 46% were at risk of undernutrition.

In an attempt to study the relationship of different variables with undernutrition, a significant relationship was observed between age group and undernutrition (0.000). In a similar study done by Agarwalla *et al.*,[14] a significant relationship was found between age group and undernutrition (<0.05). The study done by Tomar R *et al.*[6] a significant association between age group and undernutrition was seen (<0.05).

The association between undernutrition and gender was found to be statistically significant (0.000). This could be attributed to factors such as the role of women in society and financial dependency which affects the nutritional status. The significant association between gender and undernutrition was also observed

by the study done by Agarwalla *et al.*,[14] (<0.05). In a similar study done by Tomar R *et al.*[6] significant association was observed between gender and undernutrition (<0.05).

An analysis of the relationship between undernutrition and occupation was found to be significantly associated (0.016). However, in a similar study done by Manna *et al.*,[9] no statistical association between undernutrition and occupation was observed (0.7457).

A significant relationship was observed between family type and undernutrition (0.000). In a similar study done by Moly K *et al.*,[15] a significant association between type of family and undernutrition was observed (0.011).

In the present study statistical association was found between undernutrition and living arrangements that is stay with family (0.000). In a similar study done by Moly K *et al.*,[15] a significant association between undernutrition and living arrangements was observed (0.021).

An analysis of the relationship of financial dependency with undernutrition revealed a significant association (0.000). A significant association between financial dependency the undernutrition was also observed in the study done by Agarwalla *et al.*[14] (<0.05). The significant association between financial dependency and undernutrition was also found in a study done by Manna *et al.*[9] (0.016).

The association between undernutrition and co-morbid illness was observed (0.004). In a similar study done by Kritika *et al.*,[16] the association between undernutrition and co-morbid illness was also observed (0.0001).

In the present study, a significant association between smoking and undernutrition was observed (0.000). In a similar study done by Joymati O *et al.*,[12] a significant association between smoking and undernutrition was observed (0.024).

In the current study, a significant association between undernutrition and physical activity was observed (0.003). However, in the study done by Sayed N *et al.*,[13] no such association between undernutrition and physical activity was observed (>0.05).

Primary health care providers and family physicians play an important role in addressing undernutrition in older people. They are responsible for identifying the risk factors and symptoms of undernutrition in older adults and providing appropriate treatment. The family physician can help prevent undernutrition by conducting nutritional assessments. They can also provide nutritional counselling and recommend dietary supplements if necessary. In addition, the primary healthcare provider can work with other healthcare professionals, such as dietitians and social workers, to develop a comprehensive care plan for the elderly who are at risk of undernutrition.

Conclusion and Recommendation

The overall prevalence of undernutrition was found to be 18%, and the proportion of elderly people at risk of undernutrition was 38%. In an attempt to study the relationship of different variables with undernutrition, a significant relationship was observed between age group and undernutrition (0.000).

The association between undernutrition and gender was found to be statistically significant (0.000). This could be attributed to factors such as the role of women in society and financial dependency which affects the nutritional status.

An analysis of the relationship between undernutrition and occupation was found to be significantly associated (0.016). A significant relationship was observed between family type and undernutrition (0.000).

In the present study, statistical association was found between undernutrition and living arrangements that is stay with family (0.000). An analysis of the relationship of financial dependency with undernutrition revealed a significant association (0.000). The association between undernutrition and co-morbid illness was observed (0.004).

In the present study, a significant association between smoking and undernutrition was observed (0.000). In the current study, significant association between undernutrition and physical activity was observed (0.003).

Considering the poor nutritional status among the elderly and especially the females, more focus on diet and possible nutritional interventions are required for those found to be at risk of undernutrition or undernourished. The social security scheme meant for the elderly, needs to be more effectively implemented at the community level to increase their utilisation, which in turn can improve the financial status of the elderly and further influence their nutritional status and health outcomes.

Key messages

The elderly population is affected by many causes of undernutrition which can be reversed if it is addressed early. Management of undernutrition in the elderly population requires a multidisciplinary approach that treats pathology and uses both social and dietary forms of intervention.

Acknowledgment

Financial support and sponsorship

Conflicts of interest

There are no conflicts of interest.

References

1. Global Health and Ageing. National institute on aging, national institutes of health, United States: NIH Publication. 2011.

2. Dey S, Nambiar D, Lakshmi JK, Sheikh K. Reddy S. Health of elderly in India: Challenges of Access and Affordability.

3. Panigrahi AK. Determinants of Living Arrangements of Elderly in Orissa: An Analysis: Working Paper 2009. Bangalore: The Institute for Social and Economic Change; 2009.

4. Hickson M. Malnutrition and ageing. Postgrad Med J 2006;82:2-8. doi: 10.1136/pgmj.2005.037564.

5. Vellas B, Villars H, Abellan G, Soto ME, Rolland Y, Guigoz Y, *et al.* Overview of the MNA--Its history and challenges. J Nutr Health Aging 2006;10:456-63.

6. Tomar R, Chhabra P. Assessment of the nutritional health status of rural old people in district Saharanpur (U.P.). Int j health sci res 2018;3:266-73.

7. Mini Nutritional Assessment. Nestle nutrition institute. Available from: http://www.mna-elderly.com.

8. Abu Bashar MD. Modified BG Prasad socioeconomic status scale: Updated for the year 2022. Indian Pediatr 2022;59:816.

9. Manna N, Bhattacharya S, Biswas R, A cross sectional study on nutritional status of elderly population in a rural area of West Bengal using MNA Screening Tool. Indian Journal of Scientific Research April 2021; 4202738.

10. Ananthesh BG, Bathija GV, Bant DD. A community based cross-sectional study to assess malnutrition among elderly population residing in urban and rural areas of a district in Karnataka, India. Int J Community Med Public Health 2017;4:51-8.

11. Bartwal J, Rawat CMS, Awasthi S. Nutritional status of elderly in rural areas of Haldwani, Nainital district of Uttarakhand. Int J Community Med Public Health 2016;3:687-91.

12. Joymati O, Ningombam M, Rajkumari B, Gangmei A. Assessment of nutritional status among elderly population in a rural area in Manipur: Community-based cross-sectional study. Int J Community Med Public Health 2018;5:3125-9.

13. Sayed N, Kshirsagar V, Parande M, Shewte M, Tambe M, Borle P, Baviskar R. Assessment of nutritional status and

physical activity level among geriatric population in the urban field practice area of a medical college: A community based cross-sectional study. European Journal of Molecular & Clinical Medicine 2515-8260 Volume 10, Issue 06, 2023 650.

14. Agarwalla R, Saikia AM, Baruah R. Assessment of the nutritional status of the elderly and its correlates. J Family Community Med 2015;22:39-43.

15. Moly K, Monisha, Biju A, Shajan F. Prevalence of malnutrition and its contributing factors among geriatric patients. Journal of Positive School Psychology 2022; 6:4529-36.

16. Kritika, Deepshikha, Semwal J, Vyas S, Juyal R, Sati H. Nutritional status and associated comorbidities among the elderly in Doiwala block, Dehradun: Indian Journal of Community Health/Vol 26/Supp 02/Dec2014.