



## A CROSS SECTIONAL STUDY ON NUTRITIONAL STATUS OF ELDERLY POPULATION IN A RURAL AREA OF WEST BENGAL USING MNA SCREENING TOOL.

### Community Medicine

**Dr. Nirmalya Manna**

Associate Professor, Department of Community Medicine, Medical College Kolkata.

**Dr. Saikat Bhattacharya**

Assistant Professor, Department of Community Medicine, Medical College Kolkata.

**Dr. Rahul Biswas**

Assistant Professor, Department of Community Medicine, Medical College Kolkata.

**Dr. Soumitra Mondal\***

Demonstrator, Department of Community Medicine, Medical College Kolkata.

\*Corresponding Author

**Dr. V. Abinash**

3<sup>rd</sup> year Post Graduate Trainee, Department of Community Medicine, Medical College Kolkata.

### ABSTRACT

Malnutrition, or under nutrition, is a frequent and often unrecognized problem in older adults. It can result in immune dysfunction; poor wound healing, anaemia, longer hospitalization and higher readmission rates, delayed recovery from surgery and a higher rate of mortality. Current statistics for the elderly in India gives a prelude to a new set of medical, social, and economic problems that could arise if a timely initiative in this direction is not taken by the program managers and policy makers. A community based observational, descriptive cross-sectional study was conducted among the elderly people residing at Banspole sub-centre area to find out their nutritional status. Geriatric people who were the permanent resident of the study area for at least six months were included in the study. A proforma was used to collect the baseline information of the study subjects and details of factors influencing nutrition status. Mini nutritional assessment (MNA) tool was used to assess nutritional status of elderly. 300 elderly patients were included in this study with an average age of  $77.29 \pm 6.97$  years and BMI of  $23.67 \pm 3.49 \text{ kg/m}^2$ . Age, literacy and financial status were found to be significantly associated with malnutrition. Geriatric nutritional assessment should be integrated into a comprehensive geriatric assessment. Regular assessment of the nutritional status among elderly followed by early interventions will improve the health outcomes, prevents the onset of disability, improves quality of life and saves healthcare costs.

### KEYWORDS

Malnutrition, Elderly, Mini Nutritional Assessment, Financial status.

### INTRODUCTION

Due to a wide range of physiological, psychological, social or environmental factors, older people are vulnerable to the development of nutritional impairments. Malnutrition, or undernutrition, is a frequent and often unrecognized problem in older adults (Kaiser et al., 2010; *Recognition by Medical and Nursing Professionals of Malnutrition and Risk of Malnutrition in Elderly Hospitalised Patients - ADAMS - 2008 - Nutrition & Dietetics - Wiley Online Library*, n.d.). Malnutrition can result in immune dysfunction, poor wound healing, anaemia, longer hospitalization and higher readmission rates, delayed recovery from surgery and a higher rate of mortality. Various studies have associated malnutrition with poor functional status, impaired muscle strength, low bone mass and reduced cognitive function (Chapman, 2006). Beyond the individual burden, malnutrition also places an economic burden on the health care system by increasing healthcare costs (Martínez-Reig et al., 2018).

Nutritional status defined as “the condition of the body in those respects influenced by the diet; the levels of nutrients in the body and the ability of those levels to maintain normal metabolic integrity” (Morley, 2018) contributes to the older people's health status and risk of many diseases. In older age this status is influenced by the cumulative effect of comorbidities, functional status, medical history and economic status. Hormonal, metabolic and other changes may affect the nutritional status of the elderly, predisposing to deviations from normality.

The incidence of malnutrition varies between environments. Whereas the prevalence ranges between 5 and 10% among older adults living in the community, it may reach as high as 60% in institutionalized subjects (Stange et al., 2013). Institutionalization is described as a factor that may be connected with poorer nutritional and functional status in older people (Cobo, 2014; Jerez-Roig et al., 2017), while living in a nursing home (NH) increases their degree of dependence (Carpenter et al., 2006; Jerez-Roig et al., 2017). In addition, a strong relationship has been found between malnutrition, and nutritional status in general, and functional status. However, although impaired functional status has been found to be related to

impaired nutritional state among both NH residents (Stange et al., 2013) and community-dwelling (CD) older people (Conzade et al., 2019; Wirth et al., 2011), it remains unclear whether the two groups are equally susceptible to the impact of malnutrition. Therefore, the aim of the present study was to verify whether the relationship between nutritional and functional status differs between seniors in the community and those resident in long-term care institutions.

India is in a phase of demographic transition. As per the 1991 census, the population of the elderly in India was 57 million as compared with 20 million in 1951. There has been a sharp increase in the number of elderly persons between 1991 and 2001. In India the percentage of elderly population (60+) accounts to about 8.0 percent, constituting 104 million with 53 million females and 51 million males during 2011 census (*Census of India Website : Office of the Registrar General & Census Commissioner, India*, n.d.) and it has been projected that by the year 2050, the number of elderly people would rise to about 324 million. India has thus acquired the label of “an ageing nation” with 7.7% of its population being more than 60 years old. The demographic transition is attributed to the decreasing fertility and mortality rates due to the availability of better health care services. It has been observed that the reduction in mortality is higher as compared with fertility. There has been a sharp decline in the crude death rate from 28.5 during 1951–1961 to 8.4 in 1996; while the crude birth rate for the same time period fell from 47.3 to 22.8 in 1996. Over the past decades, India's health program and policies have been focusing on issues like population stabilization, maternal and child health, and disease control. However, current statistics for the elderly in India gives a prelude to a new set of medical, social, and economic problems that could arise if a timely initiative in this direction is not taken by the program managers and policy makers. There is a need to highlight the medical and socio-economic problems that are being faced by the elderly people in India, and strategies for bringing about an improvement in their quality of life also need to be explored. The objective of this study are (i) to identify the socio demographic profile of elderly residing in Banspole village, a rural area in West Bengal. (ii) to assess the nutritional status using MNA tool. (iii) to find out factor(s) influencing it among the study population, if any.

**METHOD & METHODOLOGY****2.1 Study area**

This community based observational, descriptive & cross-sectional study was done in Banspole, the rural field practice area of Community Medicine department, Medical College Kolkata. Recruitment was carried out among elderly people residing in Banspole village.

Inclusion criteria included: Age  $\geq 60$ ; residing in the study area for a minimum of 6 months; consent to participate in the study; must have undergone nutritional screening.

Exclusion criteria included: excluded for nutritional risk screening; patient with critical illness, acute disease or infection, needing treatment prior to nutritional assessment at the time of study.

**2.2 Study period**

The study was carried out between months of December 2020 to February 2021.

**2.3. Sample size**

Based on a study done (Tamang et al., 2019) on elderly nutritional status - 24.97% were malnourished. With 20% allowable error, sample size was calculated as 313 by using the formula ( $n = 4pq/d^2$ ), taking 10 % non-response rate final sample size was calculated as 344.

**2.4 Sampling method**

Simple random sampling without replacement was used. Geriatric register maintained by department of Community Medicine acted as sampling frame. Random number table was used to select sample.

**2.5 Data collection**

A survey was done in the rural field practice area of Medical College Kolkata. All those who were identified to be 60 years and above, where explained about the purpose of the study and where assured that their responses would be kept confidential and among all those who consented to participate. Personal information (age, sex, ethnicity, educational status, occupation, income, coexisting comorbidities) were collected. Data collection was done by using a semi-structured, validated questionnaire, which was taken up at a quiet place. A proforma was used to collect the baseline information of the subjects, details of factors influencing nutrition in elderly, MNA tool was used to assess nutritional status of elderly. After their agreement, nutritional screening was performed by the same researchers after standard training. Patients' weight and height from admission to discharge were measured also by the researchers with the same standard scale: before meals in the morning, with shoes off and wearing a hospital gown. The height of the patient was measured to the nearest 0.5 cm, and body weight to the nearest 0.5kg. Data were evaluated independently by two individuals before entering the information into the electronic database.

**2.6 Nutritional screening methods**

MNA were used to evaluate patient nutritional status. NRS 2002 consists of three sections: impaired nutritional status, severity of disease and age. It contains a total of 7 points. Impaired nutritional status is scored from 0-3 according to changes of Body Mass Index (BMI), weight loss and food intake.

Severity of disease is scored 0-3 according to different kinds of disease. If age  $\geq 65$  years: add 1 to the total score. Patients with a score  $\geq 3$  have nutritional risk and in need of nutritional support with weekly review. Patients with a score  $< 3$  do not have nutritional risk and need no intervention. However, reviews should be conducted after one week.

Mini nutritional assessment (MNA) has been observed to be such a tool which provides a single and rapid assessment of nutritional status in older people in clinical as well as in home based settings. Nutritional status assessment using the MNA tool with 18 questions has. Beside this- (i) Anthropometric assessment: height & weight (BMI), arm and calf circumferences, (ii) General assessment: lifestyle, medication and mobility, (iii) Dietary assessment: food & fluid intake, autonomy of feeding and number of meals, (iv) Subjective assessment: self-perception about health and nutrition. Scoring system ranged from 0 to 30 which categorizes subjects as- (i) Normal/having adequate nutritional status (score  $\geq 24$  points), (ii) Border line/at risk of malnutrition (undernutrition, score 17 to 23.5) (iii) Malnourished/undernourished (score  $\leq 17$  points).

**2.7 Nutritional support analysis**

This study documented various aspects of nutritional support which included the specific method and type of medication (if any comorbidity) and the daily nutrients and energy provided.

**2.9 Statistical analysis**

The data was compiled in MS Excel Sheet and Statistical analyses were performed with SPSS 20.0. Quantitative data were expressed as mean  $\pm$  standard deviation, and qualitative data were expressed as proportions. Differences in Quantitative data were analysed using analysis of variance. Differences in qualitative data were measured by chi-square test or Fisher's exact test. Multivariate statistical analysis of the factors affecting clinical outcomes were measured by Logistic multiple regression analysis.  $P < 0.05$  was considered statistically significant.

**RESULTS****3.1 Basic material analysis**

Among the 300 elderly population, 73% were from 60-69 years age group & 60% female population. 69% were illiterates 54.7% dependent, 53% with spouse or children, and 63% were unemployed.

**Table 1: Socio-demographic profile of study participants (n=300)**

| Categories          | Variables               | Frequency | Percentage (%) |
|---------------------|-------------------------|-----------|----------------|
| Age                 | 60-69 years             | 219       | 73.0           |
|                     | 70-79 years             | 60        | 20.0           |
|                     | >80 years               | 21        | 7.0            |
| Gender              | Female                  | 180       | 60.0           |
|                     | Male                    | 120       | 40.0           |
| Literacy            | Illiterate              | 207       | 69.0           |
|                     | Literate                | 93        | 31.0           |
| Finance status      | Dependent               | 164       | 54.7           |
|                     | Independent             | 136       | 45.3           |
| Living arrangements | With spouse & children  | 67        | 22.3           |
|                     | With spouse or children | 159       | 53.0           |
|                     | With relatives          | 47        | 15.7           |
|                     | Alone                   | 27        | 9.0            |
| Employment status   | Employed                | 66        | 22.0           |
|                     | Retired                 | 45        | 15.0           |
|                     | Unemployed              | 189       | 63.0           |

**3.2 Analysis of nutritional risk and rate of malnutrition**

Of the 300 patients, there were 63 cases (21%) of malnutrition (BMI  $< 18.5\text{kg/m}^2$ ) and nutritional risk was 46%. Using the MNA-SF to evaluate the nutritional status of patients, the study found that the ratio for patients with normal nutritional status was 33%, the malnutrition rate was 21% & the risk of malnutrition was 46%. Age, literacy and financial status was found to be significantly associated with malnutrition.

**Table 2 showing the Nutritional status (n=300)**

| NUTRITIONAL STATUS      |           |                |
|-------------------------|-----------|----------------|
|                         | Frequency | Percentage (%) |
| At risk of malnutrition | 138       | 46.0           |
| Malnutrition            | 63        | 21.0           |
| No Malnutrition         | 99        | 33.0           |
| Total                   | 300       | 100.0          |

**Table 3: Distribution of nutritional status in relation to socio-demographic factors (n=300)**

|        |              | Distribution of Nutritional status |            |              | $\chi^2$ | p value<br>Level of significance at $p < 0.05$ |
|--------|--------------|------------------------------------|------------|--------------|----------|------------------------------------------------|
|        |              | No malnutrition                    | At risk    | Malnutrition |          |                                                |
| Age    | 60-69 (219)  | 78(35.62%)                         | 97(44.29%) | 44(20.09%)   | 10.65    | 0.0307                                         |
|        | 70-79 (60)   | 15(25%)                            | 35(58.33%) | 10(16.67%)   |          |                                                |
|        | >80 (21)     | 6(28.57%)                          | 6(28.57%)  | 9(42.86%)    |          |                                                |
| Gender | Male (120)   | 33(27.45%)                         | 63(52.5%)  | 24(20%)      | 3.76     | 0.1521                                         |
|        | Female (180) | 66(36.67%)                         | 75(41.67%) | 39(21.66%)   |          |                                                |

|                     |                                           |            |            |            |       |               |
|---------------------|-------------------------------------------|------------|------------|------------|-------|---------------|
| Literacy            | <i>Illiterate</i><br>(207)                | 77(37.19%) | 98(47.34%) | 32(15.45%) | 13.59 | <b>0.0011</b> |
|                     | <i>Literate</i><br>(93)                   | 22(23.65%) | 40(43.01%) | 31(33.34%) |       |               |
| Financial status    | <i>Independent</i><br>(136)               | 57(41.91%) | 53(38.97%) | 26(19.11%) | 9.07  | <b>0.0106</b> |
|                     | <i>Dependent</i><br>(164)                 | 42(25.61%) | 85(51.83%) | 37(22.56%) |       |               |
| Employment status   | <i>Employed</i><br>(66)                   | 20(30.30%) | 35(53.03%) | 11(16.67%) | 1.94  | 0.7457        |
|                     | <i>Retired</i> (45)                       | 16(35.56%) | 19(42.22%) | 10(22.22%) |       |               |
|                     | <i>Unemployed</i><br>(189)                | 63(33.33%) | 84(44.44%) | 42(22.22%) |       |               |
| Living arrangements | <i>With spouse &amp; children</i><br>(67) | 28(41.80%) | 29(43.29%) | 10(14.91%) | 4.57  | 0.5989        |
|                     | <i>With spouse/children</i><br>(159)      | 51(32.07%) | 73(45.91%) | 35(22.02%) |       |               |
|                     | <i>With relatives</i><br>(47)             | 12(25.53%) | 24(51.06%) | 11(23.41%) |       |               |
|                     | <i>Alone</i> (27)                         | 8(29.62%)  | 12(44.44%) | 7(25.94%)  |       |               |
| <b>Total (300)</b>  |                                           | <b>99</b>  | <b>138</b> | <b>63</b>  |       |               |

## DISCUSSION

In the present study advancing age, literacy, dependent financial status and living arrangements without spouse and/or children worsen the nutritional status among elderly. In a study carried out by Shivaj M et al (*Study of Nutritional Status in Elderly in Indian Population | International Journal of Current Research*, n.d.) in Bikaner, Rajasthan, showed that approximately 11.6% elderly were malnourished while 46% were at risk of malnutrition and 42.4% were well nourished. An another study done by Jain et al (S et al., 2017) in rural India, in which the MNA scale classified 14% as malnourished and 49% at risk of malnourishment.

In the present study 21% were malnourished, 46% were at risk of malnutrition and 33% were well nourished. These findings are similar to a study done by Shivraj M et al (*Study of Nutritional Status in Elderly in Indian Population | International Journal of Current Research*, n.d.) on elderly nutritional status.

The nutritional status declines with the advancing age in the present study >80 years (42.86%) In a study done among rural population of Belagavi it was found that 25.4% males and 21% females were suffering from malnutrition. It is seen that both the genders are equally susceptible to malnutrition. Male (20%) and female (21.66%) A study done by Shivraj M et al (*Study of Nutritional Status in Elderly in Indian Population | International Journal of Current Research*, n.d.) on elderly nutritional status where among illiterate the prevalence of malnutrition was 26.03%. Higher prevalence (33.34%) of malnutrition was noted among literates in the present study in comparison to illiterates.

## CONCLUSION:

Geriatric nutritional assessment should be integrated into a comprehensive geriatric assessment. Assessment of the nutritional status regularly followed by early interventions will improve the health outcomes, prevents the onset of disability, improves quality of life and saves healthcare costs. The social security scheme meant for the elderly, needs to be more effectively implemented at the community level to increase their utilization, which in turn can improve the financial status of elderly and further influencing their nutritional status and health outcomes.

## REFERENCES:

- Carpenter, G. I., Hastie, C. L., Morris, J. N., Fries, B. E., & Ankri, J. (2006). Measuring change in activities of daily living in nursing home residents with moderate to severe cognitive impairment. *BMC Geriatrics*, 6(1), 7. <https://doi.org/10.1186/1471-2318-67>
- Census of India Website: Office of the Registrar General & Census Commissioner, India. (n.d.). Retrieved March 11, 2021, from <https://censusindia.gov.in/2011common/censusdata2011.html>
- Chapman, I. M. (2006). Nutritional disorders in the elderly. *The Medical Clinics of North America*, 90(5), 887–907. <https://doi.org/10.1016/j.mcna.2006.05.010>
- Cobo, C. M. S. (2014). The influence of institutionalization on the perception of autonomy and quality of life in old people. *Revista Da Escola de Enfermagem Da USP*, 48(6), 1013–1019. <https://doi.org/10.1590/S0080-623420140000700008>

- Conzade, R., Phu, S., Vogrin, S., Bani Hassan, E., Sepúlveda-Loyola, W., Thorand, B., & Duque, G. (2019). Changes in Nutritional Status and Musculoskeletal Health in a Geriatric Post-Fall Care Plan Setting. *Nutrients*, 11(7). <https://doi.org/10.3390/nu11071551>
- Jerez-Roig, J., de Brito Macedo Ferreira, L. M., Torres de Araújo, J. R., & Costa Lima, K. (2017). Functional decline in nursing home residents: A prognostic study. *PLoS One*, 12(5), e0177353. <https://doi.org/10.1371/journal.pone.0177353>
- Kaiser, M. J., Bauer, J. M., Rämisch, C., Uter, W., Guigoz, Y., Cederholm, T., Thomas, D. R., Anthony, P. S., Charlton, K. E., Maggio, M., Tsai, A. C., Vellas, B., Sieber, C. C., & Mini Nutritional Assessment International Group. (2010). Frequency of malnutrition in older adults: A multinational perspective using the mini nutritional assessment. *Journal of the American Geriatrics Society*, 58(9), 1734–1738. <https://doi.org/10.1111/j.1532-5415.2010.03016.x>
- Martinez-Reig, M., Aranda-Reneo, I., Peña-Longobardo, L. M., Oliva-Moreno, J., Barcons-Vilardell, N., Hoogendijk, E. O., & Abizanda, P. (2018). Use of health resources and healthcare costs associated with nutritional risk: The FRADEA study. *Clinical Nutrition (Edinburgh, Scotland)*, 37(4), 1299–1305. <https://doi.org/10.1016/j.clnu.2017.05.021>
- Morley, J. E. (2018). Defining Undernutrition (Malnutrition) in Older Persons. *The Journal of Nutrition, Health & Aging*, 22(3), 308–310. <https://doi.org/10.1007/s12603-0170991-3>
- Recognition by medical and nursing professionals of malnutrition and risk of malnutrition in elderly hospitalised patients—ADAMS - 2008—Nutrition & Dietetics—Wiley Online Library. (n.d.). Retrieved March 11, 2021, from <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1747-0080.2008.00226.x>
- S, R. M., S, R. T., Jadhav, J., & B, S. N. (2017). To assess the nutritional status among elderly and factors influencing it, in an urban area, Bengaluru—A cross sectional study. *International Journal Of Community Medicine And Public Health*, 4(5), 1727–1732. <https://doi.org/10.18203/2394-6040.ijcmph20171792>
- Stange, I., Poeschl, K., Stehle, P., Sieber, C. C., & Volkert, D. (2013). Screening for malnutrition in nursing home residents: Comparison of different risk markers and their association to functional impairment. *The Journal of Nutrition, Health & Aging*, 17(4), 357–363. <https://doi.org/10.1007/s12603-013-0021-z>
- Study of nutritional status in elderly in indian population | International Journal of Current Research. (n.d.). Retrieved March 11, 2021, from <http://journalcra.com/article/studynutritional-status-elderly-indian-population>
- Tamang, M. K., Yadav, U. N., Hosseinzadeh, H., Kafle, B., Paudel, G., Khatriwada, S., & Sekaran, V. C. (2019). Nutritional assessment and factors associated with malnutrition among the elderly population of Nepal: A cross-sectional study. *BMC Research Notes*, 12(1), 246. <https://doi.org/10.1186/s13104-019-4282-4>
- Wirth, R., Smoliner, C., Sieber, C. C., & Volkert, D. (2011). Cognitive function is associated with body composition and nutritional risk of geriatric patients. *The Journal of Nutrition, Health & Aging*, 15(8), 706–710. <https://doi.org/10.1007/s12603-011-00892>