Nutritional status and correlates of malnutrition among elderly adults in a South Indian village

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ABSTRACT
Nutrition is the single most important determinant of the health of an individual and provides essential support during the ageing process. Malnutrition is not a consequence of ageing and should never be considered as a normal process. Early detection of nutritional problems is vital to ensure the quality of life throughout these extended years. This study aimed, at assessing the nutritional status among the elderly (60 years and above), in the rural field practice area of SRM Medical College Hospital and Research Centre (Kalivanthapattu village), and to identify the correlates of malnutrition. A Community-based Cross-sectional study was conducted for assessing the Nutritional status of the elderly population (≥ 60 years) in Kalivanthapattu village using MNA (Mini Nutritional Assessment) scale. Data analysed using SPSS 22. Descriptive data were presented in percentages, mean, standard deviation. Chi-square test was used to prove the association between categorical variables. p-value < 0.05 is considered statistically significant. Among 102 participants, 33% are with normal nutritional status, 59% were at risk, and 8% of individuals were malnourished. Both males and females were >50% at risk of malnutrition. The association of age, spouse status, whether alive or dead and the type of house were found to be statistically significant (p <0.05). This study stresses on the nutritional assessment of elderly followed by anthropometric, clinical, biochemical and functional assessments in malnourished individuals and those at risk of malnutrition. Like immunisation schedule for under-five children, it is essential to rope Malnutrition scale to assess the nutritional status at or over the age of 60 years.

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INTRODUCTION
Nutrition is the most critical determinant of the health of an individual and provides essential support during the ageing process. There is a decline in basal metabolic rate, lean body mass and energy requirements in the elderly and are vulnerable to malnutrition due to physiological, psychological, social, dietary and environmental risk factors. Malnutrition is not a consequence of ageing and should never be considered a normal process as it is often associated with complications and premature death. The progression to malnutrition is insidious and mostly undetected. Most of the degenerative diseases of elderly like osteoporosis, cardiovascular...
disease, cancer and cerebrovascular disease are all diet-affected (Khatami et al., 2020; Soundararajan et al., 2017). Both obesity and underweight affect the functional status of the elderly. Weight loss in the elderly is often associated with a loss of muscle mass, and obesity can cause or exacerbate chronic health problems like hypertension and diabetes. According to the National family health survey NFHS-4 (2017), India has 76.6 million people at or over the age of 60 years, accounting for 8% of the total population. This rising elderly population is placing pressure on the healthcare providers to meet their increased needs in nutrition, economic and social support. The first step in this prevention process is early identification (Phillips et al., 2010). Hence, early detection of the nutritional problems is essential, particularly in the vulnerable groups to ensure the quality of life throughout these extended years. This study was aimed at assessing the nutritional status of the elderly population using the Mini Nutritional Assessment (MNA) scale and strived to determine the correlates of malnutrition.

MATERIALS AND METHODS

Study Design
A Community-based Cross-sectional study.

Study Period
March 2019 to May 2019 (3 months)

Study Area
Rural field practice area of SRM Medical College and Research Institute, Kattankulathur, Chengalpattu district, Tamil Nadu.

Study Population
Elderly population (60 years and above)

Study Tool
Mini Nutritional Assessment (MNA) scale

Mini Nutritional Assessment (MNA) scale is a pre-designed and pretested questionnaire developed by Nestle Nutrition Institute comprising of 18 questions that gives a Malnutrition Indicator Score. (van Bokhorst-de van der Schueren et al., 2014).

The participants were classified as normal nutritional status (24–30 points), at risk of malnutrition (17–23.5 points), or malnourished (<17 points) based on that MNA Score.

Inclusion criteria
All individuals of age 60 years and above residing for more than one year in the Kalivathapattu village (Field practice area of Rural health centre of SRM medical college)

Exclusion criteria
Those not willing to participate and not available at the time of questioning

Sample size
According to 2011 census, 8% of the total population are elderly (60 years and above) Total population of Kalivathapattu village is 1431; considering 8% to be elderly population, the sample size was calculated to be 115. Government of India recognised identity proof was sought for age confirmation. Approval for the study was obtained from the Institutional Ethics Committee. Informed consent was obtained from all the participants included in the study.

Statistical Analysis
Data analysed using SPSS 22. Descriptive data were presented in percentages, mean. Chi-square test was used to prove the association between categorical variables. p-value < 0.05 was considered statistically significant.

Study Variables
Age, sex, education, occupation, socio-economic status, type of family, type of house, disability/deformity, chronic illness, availing government benefits and vital spouse status (alive/dead).

RESULTS AND DISCUSSION

Demographic data of the study area
The sample size was calculated to be 115, out of which 13 were excluded as they were either unavailable during the study or unwilling to participate. Among the 102 participants, 38 (37%) males and 64 (63%) females participated in the study. Out of which 38% belonged to the age group of 60–65 years, 32% in 66-70 years, 13% in 71-75 years, 17% in >75 years respectively.

This study included all the individuals of age 60 years and above belonging to the Village (Kalivanthapattu, Tamilnadu) where agriculture is the predominant occupation, and >90% individuals fall under the primary education category. Hence, both the variables (education and occupation) were excluded. In our study, 20 (20%) participants belonged to class V, 38 (37%) to class IV, 29 (28%) to class III, 15 (15%) to class IV and none underclass I.

Nutritional status of the study population
Out of the 102 participants, 33% were with normal nutritional status, 59% were at risk of malnutrition, and 8% of individuals were malnourished.
Table 1: Distribution of Nutritional status among participants by socio demographic variables

| Variable            | Nos | Normal | At-risk | Malnourished |
|---------------------|-----|--------|---------|--------------|
| Age                 |     |        |         |              |
| 60-65               | 39  | 16 (41%)| 21 (54%)| 2 (5%)       |
| 66-70               | 33  | 8 (24%) | 25 (76%)| 0            |
| 71-75               | 13  | 3 (23%) | 8 (61.5%)| 2 (15.5%)    |
| >75                 | 17  | 7 (41%) | 6 (35%) | 4 (24%)      |
| Total               | 102 | 34 (33%)| 60 (59%)| 8 (8%)       |
| Sex                 |     |        |         |              |
| Male                | 38  | 13 (34.2%)| 23 (60.5%)| 2 (5.3%)  |
| Female              | 64  | 21 (33%) | 37 (58%) | 6 (9%)     |
| Type of family      |     |        |         |              |
| Nuclear             | 50  | 19 (38%) | 29 (58%) | 2 (4%)     |
| Three generation    | 39  | 10 (25.5%)| 24 (61.5%)| 5 (13%)    |
| Joint               | 13  | 5 (38%)  | 7 (54%)  | 1 (8%)     |
| Type of house       |     |        |         |              |
| Pucca               | 50  | 19 (38%) | 29 (58%) | 2 (4%)     |
| Semipucca           | 41  | 14 (34%) | 25 (61%) | 2 (5%)     |
| Kutcha              | 11  | 1 (9%)   | 6 (55%)  | 4 (36%)    |
| Socio economic class|     |        |         |              |
| I                   | 0   | 0       | 0       | 0           |
| II                  | 15  | 2 (13%) | 12 (80%)| 1 (7%)      |
| III                 | 29  | 13 (45%)| 15 (52%)| 1 (3%)      |
| IV                  | 36  | 14 (37%)| 21 (55%)| 3 (8%)      |
| V                   | 20  | 5 (25%) | 12 (60%)| 3 (15%)     |
| Disability/Deformity|     |        |         |              |
| Yes                 | 5   | 1 (20%) | 3 (60%) | 1 (20%)     |
| No                  | 97  | 33 (34%)| 57 (59%)| 7 (7%)      |
| Chronic illness     |     |        |         |              |
| Yes                 | 50  | 18 (36%)| 27 (54%)| 5 (10%)     |
| No                  | 52  | 16 (31%)| 33 (63%)| 3 (6%)      |
| Government benefits |     |        |         |              |
| Yes                 | 34  | 8 (23.5%)| 25 (73.5%)| 1 (3%)   |
| No                  | 68  | 26 (38%)| 35 (52%)| 7 (10%)     |
| Spouse vital status |     |        |         |              |
| Alive               | 72  | 30 (42%)| 39 (54%)| 3 (4%)      |
| Dead                | 30  | 4 (13%) | 21 (70%)| 5 (17%)     |

Based on the Mini Nutritional Assessment scale. Table 1 shows the distribution of nutritional status by sociodemographic characteristics. Both males and females were more than 50% at risk of malnutrition. Percentage of Malnutrition was high in those living in a kutcha house and low socio-economic status Table 1. The area of the at-risk category was alarming and might add up to the malnourished category in future Figure 1. The at-risk category was high in the age group 60-65 years and 66-70 years and malnutrition was most commonly seen in the age group above 70 years Figure 2.

Factors associated with malnutrition

The association of the independent variables like age, sex, education, occupation, socio-economic status, type of family, type of house, chronic illness, a person living with disability/deformity, whether availing government benefits and spouse vital status (alive/dead) against the dependent variable was determined using Chi-square test Table 2. Age, type of house and spouse vital status (alive/dead) were found to be statistically significant ($p < 0.05$) and found to be associated with malnutrition.
Table 2: Factors associated with malnutrition

| Variable                  | Nos | Malnourished | Chi-square | p-value |
|---------------------------|-----|--------------|------------|---------|
| Age                       |     |              |            |         |
| 60-65                     | 39  | 2 (5%)       | 15.865     | 0.014   |
| 66-70                     | 33  | 0            |            |         |
| 71-75                     | 13  | 2 (15.5%)    |            |         |
| >75                       | 17  | 4 (24%)      |            |         |
| Sex                       |     |              |            |         |
| Male                      | 38  | 2 (5.3%)     | 0.584      | 0.747   |
| Female                    | 64  | 6 (9%)       |            |         |
| Type of family            |     |              |            |         |
| Nuclear                   | 50  | 2 (4%)       | 3.170      | 0.530   |
| Three generation          | 39  | 5 (13%)      |            |         |
| Joint                     | 13  | 1 (8%)       |            |         |
| Type of house             |     |              |            |         |
| Pucca                     | 50  | 2 (4%)       | 15.315     | 0.004   |
| Semipucca                 | 41  | 2 (5%)       |            |         |
| Kutcha                    | 11  | 4 (36%)      |            |         |
| Socio-economic class      |     |              |            |         |
| I                         | 0   | 0            | 5.732      | 0.454   |
| II                        | 15  | 1 (7%)       |            |         |
| III                       | 29  | 1 (3%)       |            |         |
| IV                        | 38  | 3 (8%)       |            |         |
| V                         | 20  | 3            |            |         |
| Disability/Deformity      |     |              |            |         |
| Yes                       | 5   | 1 (20%)      | 1.239      | 0.538   |
| No                        | 97  | 7 (7%)       |            |         |
| Chronic illness           |     |              |            |         |
| Yes                       | 50  | 5 (10%)      | 2.547      | 0.280   |
| No                        | 52  | 3 (6%)       |            |         |
| Government benefits       |     |              |            |         |
| Yes                       | 34  | 1 (3%)       | 4.396      | 0.111   |
| No                        | 68  | 7 (10%)      |            |         |
| Spouse vital status       |     |              |            |         |
| Alive                     | 72  | 3 (4%)       | 12.083     | 0.002   |
| Dead                      | 30  | 5 (17%)      |            |         |

The study conducted in Kalivanthapattu village showed 8% of individuals were malnourished and 59% were at risk of malnutrition. Both males and females were more than 50% at risk of malnutrition. Although the percentage of malnutrition was only 8% among the individuals ≥ 60 years, it stands around 24% in individuals above 70 years of age. The primary concern is that the at-risk category occupies the large proportion (59%) of the elderly population Figure 1. We noticed that malnutrition increases with age and significantly associated with the type of house and the spouse vital status Figure 2.

A similar study conducted in rural Belagavi, Karnataka showed 23% prevalence of malnutrition and 43% at risk of malnutrition (Patil and Shindhe, 2018). Age, female gender, low educational level and financial dependence found to be significantly associated with malnutrition (Kansal et al., 2016). Prevalence of malnutrition among elderly was found to be 17.9% and about 58.8% were at risk of malnutrition in the study done in rural Puducherry using Mini Nutritional Assessment (MNA) questionnaire. The study also identified the prevalence of obesity to be around 32.5% among the elderly (Vijayageetha et al., 2018). The double burden of malnutrition was
stressed in various studies (Dutta et al., 2019). (Ram et al., 2017) found that half of the elderly persons (53.2%) had normal nutritional status, while 20.8% were underweight, 19.4% were overweight, and 6.6% were obese among the older adults in Delhi. An institution-based cross-sectional study in West Bengal conducted among elderly visiting Out-patient department using Mini Nutritional Assessment Short Form (MNA-SF) questionnaire identified slightly higher percentage (31.2%) of malnutrition (Ghosh et al., 1978). The presence of various geriatric syndromes like visual disturbances, dizziness, hearing loss, dementia and depression were significantly higher in malnourished individuals compared to normal elderly adults, and the majority of the malnourished suffered from one or more chronic diseases (Mathew et al., 2016; Reddy, 2014). Studies have also stressed the importance of deficient protein-energy intake and micronutrient intake to malnutrition (Vedantam et al., 2010).

According to WHO’s Integrated Care for Older People (ICOPE, 2017) undernutrition is common among older people over 60 years of age. The prevalence of undernutrition among older people living in the community ranges between 1.3% and 47.8% and is much higher in low and middle-income countries. Studies done in countries like China showed 30% at risk of Malnutrition (Wong et al., 2019) and in Nepal, 49.6% were at risk for malnutrition while 24.8% were in the malnourished range, based on Mini Nutritional Assessment scores (Tamang et al., 2019; Parasaraman and

Figure 1: Distribution of participants based on the Mini Nutritional Assessment (MNA) Score

Figure 2: Agewise distribution of Nutritional status among the study participants
Hospital-based Norway study associates sarcopenia, cancer and pulmonary disease with the declining nutritional status (Jacobsen et al., 2016).

Limitations

The study is cross-sectional expresses the correlation and not the causal relationship of the study variables. It evaluates only the current nutritional status and prevalence of malnutrition among the elderly population. Generalizability is limited as the study covers only a sample of individuals from one single community in Chengalpattu district of Tamilnadu state.

CONCLUSIONS

The malnutrition among community-dwelling adults was less compared to those in care centres. But the proportion of elderly adults at risk of malnutrition is higher and has to be addressed to achieve the concept of healthy ageing. Like immunisation schedule for under-five children, it is essential to rope Malnutrition scale to assess the nutritional status at or over the age of 60 years. Nutritional assessment should be an integral part of primary health care of the elderly population. Anthropometric, clinical, biochemical and functional assessments should be carried out in the malnourished individuals and those at risk of malnutrition. Specially formulated foods to help meet the nutritional requirements of the elderly should be supplemented via government platform. Arranging recreation programmes, providing primary health care and counselling services at doorsteps through the existing village health nurses, enacting policies for a continuum of care would be of more helpful for the vulnerable elderly population in rural areas.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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REFERENCES

ICOPE 2017. WHO Guidelines On Integrated Care For Older People (ICOPE). World Health Organization.

Dutta, M., Selvamani, Y., Singh, P., Prashad, L. 2019. The double burden of malnutrition among adults in India: evidence from the National Family Health Survey-4 (2015-16). Epidemiology and Health, 41:e2019050–e2019050.

Ghosh, A., Dasgupta, P. A., Paul, B., Sembiah, S., Biswas, B., Mallick, N. 1978. Screening for Malnutrition among the Elderly with MNA Scale: A Clinic based study in a Rural Area of West Bengal. International Journal of Contemporary Medical Research, 4.

Jacobsen, E. L., Brovold, T., Bergland, A., Bye, A. 2016. Prevalence of factors associated with malnutrition among acute geriatric patients in Norway: a cross-sectional study. BMJ Open, 6(9):e011512–e011512.

Kansal, D., Baliga, S., K, K., Mallapur, M. 2016. Nutritional assessment among elderly population of rural Belagavi: a cross-sectional study. International Journal of Medical Science and Public Health, 5(7):1496–1496.

Khatami, F., Shafiee, G., Kamali, K., Ebrahimi, M., Azimi, M., Ahadi, Z., Sharifi, F., Tanjani, P. T., Heshmat, R. 2020. Correlation between malnutrition and health-related quality of life (HRQOL) in elderly Iranian adults. Journal of International Medical Research, 48(1):030006051986349.

Mathew, A., Das, D., Sampath, S., Vijayakumar, M., Ramakrishnan, N., Ravishankar, S. L. 2016. Prevalence and correlates of malnutrition among elderly in an urban area in Coimbatore. Indian Journal of Public Health, 60(2):112–112.

Parasuraman, S., Raveendran, R. 2011. Effect of cleistanthin A and B on adrenergic and cholinergic receptors. Pharmacognosy Magazine, 7:243–243.

Patil, D. J., Shindhe, M. M. 2018. Nutritional status assessment of elderly using MNA tool in rural Belagavi: a cross sectional study. International Journal Of Community Medicine And Public Health, 5(11):4799–4799.

Phillips, M., Foley, A., Barnard, R., Isenring, E., Miller, M. 2010. Nutritional screening in community-dwelling older adults: A systematic literature review. Asia Pacific Journal of Clinical Nutrition, 19:440–449.

Ram, F., Paswan, B., Singh, S. K., Lhungdim, H., Shekhar, C., Singh, A., Bansod, D., Alagarajan, M., Dwivedi, L., Pedgaonkar, S., Pradhan, M. R., Arnold,
F. 2017. National Family Health Survey-4 (2015-16). *Economic and Political Weekly*, pages 66–70.

Reddy, N. B. 2014. A Study on nutritional status and prevalence of non-communicable diseases among the rural elderly of Tamil Nadu: A community-based cross-sectional study. *Int J Res Health Sci*, 2:604–609.

Soundararajan, A. S., Mathew, A. C., Nanjuudan, R., Ganesh, A. 2017. Association of Geriatric Syndromes with Malnutrition Among Elderly. *International Journal of Medical Research & Health Sciences*, 6(5):14–18.

Tamang, M. K., Yadav, U. N., Hosseinzadeh, H., Kafle, B., Paudel, G., Khatiwada, 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):246–246.

van Bokhorst-de van der Schueren, M. A., Guaitoli, P. R., Jansma, E. P., de Vet, H. C. 2014. Nutrition screening tools: Does one size fit all? A systematic review of screening tools for the hospital setting. *Clinical Nutrition*, 33(1):39–58.

Vedantam, A., Subramanian, V., Rao, N. V., John, K. R. 2010. Malnutrition in free-living elderly in rural south India: prevalence and risk factors. *Public Health Nutrition*, 13(9):1328–1332.

Vijayageetha, M., Krishnamoorthy, Y., Kumar, S., Rajaa, S., Rehman, T. 2018. Prevalence of malnutrition and its associated factors among elderly population in rural Puducherry using mini-nutritional assessment questionnaire. *Journal of Family Medicine and Primary Care*, 7(6):1429–1429.

Wong, M. M. H., So, W. K. W., Choi, K. C., Cheung, R., Chan, H. Y. L., Sit, J. W. H., Ho, B., Li, F., Lee, T. Y., Chair, S. Y. 2019. Malnutrition risks and their associated factors among home-living older Chinese adults in Hong Kong: hidden problems in an affluent Chinese community. *BMC Geriatrics*, 19(1).