

Original Research Article

Nutritional status of older adults in a community in Pathanamthitta district of Kerala

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ABSTRACT

Background: India is said to be shifting from an undernourished to over nourished population with advances in health, economy and medical care. But there is paucity of information regarding nutritional status of older adults in the country, who are socially and economically insecure. Hence the present study attempts to assess the nutritional status of people above 60 years of age, and to find the factors associated with it.

Methods: A cross sectional study was conducted among 129 people aged above 60 years, residing in Pathanamthitta district, Kerala. Mini Nutritional Assessment tool (MNA) was used to classify the respondents as having 'normal nutrition' (score 23.5 and above), 'at risk of malnutrition' (17-23.5), 'malnourished' (<17). A 24-hour dietary recall was done to calculate per day calorie intake and compare with Recommended Daily Allowance (RDA). The results were interpreted as adequate or deficient. Descriptive statistics, chi-square and spearman's correlation were done to find relationship between various sociodemographic variables, MNA status, BMI and calorie intake.

Results: Females constituted 75.2%; 81.4% were unemployed; 62% belonged to rural area. Nutritional assessment showed 41.9% to be having normal nutrition, 46.5% at risk of malnutrition, and 11.6% malnourished. Caloric intake was less than the RDA in 89.1%. There was no association between calorie intake per day and MNA status. Education ($p=0.025$), place of residence ($p=0.021$), marital status ($p=0.003$), and family income ($p=0.031$) were factors significantly influencing nutritional status in elderly. There was significant correlation between MNA status and BMI ($p<0.001$, $r=0.329$).

Conclusions: Malnutrition was seen in 11.6% of older adults in this study and another major proportion was at risk of malnutrition. Better nutritional status was significantly associated with good education, urban residence, married state, and higher family income. Dietary intake was inadequate among older adults. 24-hour dietary recall reflected nutritional status of only the malnourished.

Keywords: BMI, Calorie intake, Mini nutritional assessment tool, Older adults

INTRODUCTION

India is said to be shifting from an undernourished to over-nourished population, with advances in health, economy and medical care.¹ Older adults constitute 8.1%

of Indian population (2011 censuses).² Decrease in mortality, fall in fertility and better medical care had brought about this increasing trend. The physiological changes of aging makes them more vulnerable to diseases, and malnutrition is a prominent problem

especially in those living alone.³ The 2011 census has shown that 15 million elderly in India are living alone, with Tamil Nadu and Andhra Pradesh holding the highest proportion.⁴ While considering Kerala, older adults constitute 13% of its population. But there is paucity of information regarding nutritional status of older adults in the country. Knowing their nutritional status can help in reducing the morbidity associated with aging and aid in improving their quality of life.⁵ It is important to find those elderly who are 'at risk of malnutrition' as nutrient deficiency can make these physically weak people more vulnerable to diseases.⁶ Preventive strategies in nutrition can be applied in them to halt their progression towards frank malnutrition.

Many biochemical and anthropometric tests have been devised to screen and follow up the nutritional status in older people. Haemoglobin level, plasma ascorbic acid, and serum albumin were used as indicators of nutritional status in the study by Sarah et al.⁷ Apart from this, simple and non-invasive screening tools are also available like the Mini Nutritional Assessment (MNA) tool which has been validated over time in different countries and in different sections of people.⁸ Subjective Global Assessment (SGA) is a very widely used tool to assess the nutritional status in patients who are already disadvantaged by some acute or chronic disease.⁹ This tool gives an account on how much the disease has affected their nutrient intake. The present study was conducted among older adults to assess the nutritional status and to find its determinants.

The objectives of the study were to assess the nutritional status of older adults in a community in Pathanamthitta district of Kerala. To find the association of nutritional status with various sociodemographic factors, Body Mass Index (BMI), and dietary intake.

METHODS

A cross sectional study was conducted in a community of Pathanamthitta district of Kerala, among individuals aged 60 years and above. The minimum sample size needed was estimated to be 104, based on a 49% expected proportion of malnourished elderly, 95% confidence level and 20% precision.⁸ The study was conducted in communities served by Department of Community Medicine, of a tertiary care medical college which include both urban and rural localities. Excluding those with severe cognitive dysfunction and those on tube feeding, 129 older adults were recruited for the study using convenient sampling.

Mini Nutritional Assessment (MNA) tool was used to assess the nutritional status of the participants. It is a well validated tool with 95.4% sensitivity and 93.9% specificity and is used both as a screening tool and as an assessment tool for nutritional status.⁸ It has four sections namely anthropometric assessment, general assessment, diet assessment, and subjective assessment. Those with

score > 23.5 are having normal nutrition, 17- 23.5 "at risk" of malnutrition, <17 malnourished. A personal data sheet specifically prepared and pilot tested was used to collect socio-demographic details, 24hour dietary recall and medical information. The 24hour dietary intake was interpreted as excess or deficient after comparing it with Recommended Dietary Allowances(RDA) for Indians as laid out by Indian Council of Medical Research in 2010.¹⁰ RDA gives the average nutrient intake level taken daily that is sufficient to meet the nutrient requirement of 98% of the healthy people of a particular age and gender. The energy requirement differs according to gender, body weight and increases with the intensity of physical work done.

The participants were made to list out all food items including fluids and snacks taken by them in the previous day. It takes around 20 minutes to list out all food items taken. Amount taken was measured in locally known quantities like tea spoon, cup. In case they had any acute illness likely to affect food intake they were asked to recall food taken 2 days back. Recall method was not used beyond this time.

Permission for conducting the study was taken from the institutional ethics and research committee. The measuring tape and weighing machine were standardised before use. In the community, house to house survey was conducted with the help of local volunteers to create better rapport with the participants. Those who gave consent for the study were interviewed using the questionnaires. The anthropometric measurements were taken by the investigator and entered into the questionnaire.

A single measuring tape was used for mid arm circumference, calf circumference and height. Mid arm circumference was taken from left upper arm of all individuals at a point midway between acromion process of scapula and olecranon process. Calf circumference was measured at site of maximum width around the right calf. For measuring height, the person was made to stand against a rigid wall, without footwear and foot, buttock, shoulder blade touching the wall, head at Frankfurt horizontal plane. A cardboard was pressed over the head to compress the hair and the position marked with a sketch pen over the wall. The height from ground in centimetres was taken using the measuring tape. Weight of the participants in kilograms was taken using a weighing scale. Each time the machine was checked for zero error. The person wearing light clothing was made to stand on the weighing scale barefooted. They were made to stand still in the centre of the scale platform, facing the recorder, hands on both sides, with head straight. The data thus obtained were coded and entered into excel, cleaned and then analysed using Epi-Info. Descriptive statistics was prepared, and chi-square was done to find association between various sociodemographic variables, MNA status, BMI and calorie intake. Correlation between BMI with MNA status was also found.

RESULTS

Of the 129 older adults in the study 97 (75.2%) are females, 47(36.4%) has studied upto primary school, only 11(8.6%) has education beyond high school. Majority (105, 81.4%) are currently unemployed, and 11.6% involved in unskilled labour. Majority are from rural area

(62%); 59.7% married and 39.5% widowed. To meet daily needs 64.3% are depending on child’s/spouse’s income, 69% are receiving some sort of pension, 17.1% have income from shop or labour. Hypertension is the commonest comorbidity present in the study population. When in conditions of ill-health 56.4% depend on government hospitals for treatment.

Table 1: Socio-demographic variables and MNA status.

Variable	Normal nutrition No. (%)	At risk of malnutrition No. (%)	Malnourished No. (%)	Total	P value
Age (in years)					
60-69	38 (48.7)	33 (42.3)	7 (9)	78	0.317
70-79	13 (34.2)	19 (50)	6 (15.8)	38	
80 and above	3 (23.1)	8 (61.5)	2 (15.4)	13	
Gender					
Female	39 (40.2)	47 (48.5)	11 (11.3)	97	0.741
Male	15 (46.9)	13 (40.6)	4 (12.5)	32	
Education					
Illiterate	5 (27.8)	10 (55.6)	3 (16.7)	18	0.005*
Upto middle class	21 (30.9)	39 (57.4)	8 (11.8)	68	
High school and above	28 (65.1)	11 (25.6)	4 (9.3)	43	
Occupation					
Unemployed	40 (38.1)	55 (52.4)	10 (9.5)	105	0.016*
Working	14 (58.3)	5 (20.8)	5 (20.8)	24	
Place of residence					
Rural	27 (33.8)	40 (50)	13 (16.2)	80	0.021*
Urban	27 (55.1)	20 (40.8)	2 (4.1)	49	
Marital status					
Currently married	43 (55.8)	27 (35.1)	7 (9.1)	77	0.021*
Widowed/separated	11 (21.1)	33 (63.4)	8 (15.38)	52	
Monthly family income (Rs.)					
<2110	5 (21.7)	14 (60.9)	4 (17.4)	23	0.054*
2111-41785	42 (43.3)	45 (46.4)	10 (10.3)	97	
>41796	7 (77.8)	1 (11.1)	1 (11.1)	9	
Hospital visited					
Government	21 (28.4)	39 (52.7)	14 (18.9)	74	<0.001*
Private	33 (60)	21 (38.2)	1 (1.8)	55	

*Significant by Chi-Square test at p<0.05

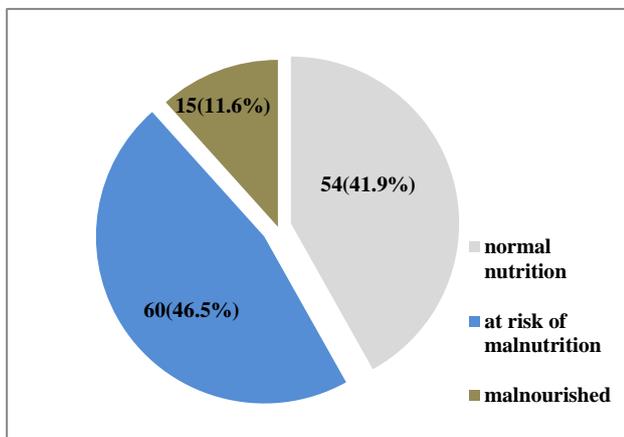


Figure 1: Nutritional status by MNA score.

Figure 1 shows the distribution of participants by their nutritional status. It is seen that 15 (11.6%) are malnourished, 60 (46.5%) at risk of malnutrition and 54(41.9%) has normal nutritional status.

On checking the influence of various socio-demographic variables on MNA status (Table 1) it is seen that education status, occupational status, place of residence, marital status, and monthly family income affects the nutritional status in older adults. Age and gender do not show significant association with nutritional status. Compared to unemployed the working group is nutritionally better (p=0.016). Other factors associated with better nutritional status are urban residence (p=0.021), currently married (p=0.003), higher educational status (p=0.005), and better income

($p=0.054$). People going to private hospitals have better nutritional status when compared to those preferring government hospitals. The presence of comorbidities did not affect their nutritional status.

When the effect of source of income on nutritional status was checked it was seen that currently working group has better score on MNA compared to those depending on pension and child's or spouse's income (Figure 2), though the difference is not statistically significant ($p=0.3650$).

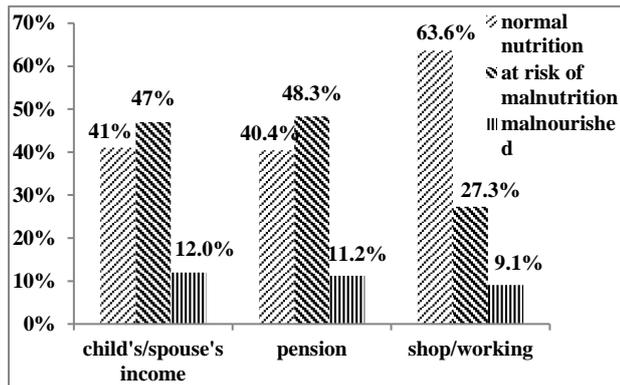


Figure 2: Nutritional status according to source of income.

Nutritional status and 24hour calorie intake

Only 10.9% of the study participants have adequate calorie intake by 24hour dietary recall; 14.8% of those with normal MNA score and 10 % of those at risk. But all 15 who are malnourished according to MNA are having deficient calorie intake in the past 24hour when dietary recall method was used (Table 2).

Table 2: Nutritional status according to 24hour calorie intake (n=129).

Nutritional Status (By MNA Score)	24 HR Calorie Intake	
	Adequate No. (%)	Deficient No. (%)
Normal	8 (14.8)	46 (85.2)
At risk	6 (10)	54 (90)
Malnourished	-	15 (100)
Total	14 (10.9)	115

The nutritional status by MNA score does not show any association with 24hour calorie intake ($P=0.25$). Protein intake is adequate in 64.3% of the study population. Of those having normal nutritional status by MNA score 77.77% have adequate protein intake. Regarding intake of fruits and vegetables, 89% are taking in adequate amount but only 43.5% of them are nutritionally normal by MNA score. Fluid intake as tea, coffee, milk, fruit juices and water are also found to be adequate in the study population (73%), though 45% are not aware about

the minimum intake of fluids to be taken per day by a healthy adult.

Nutritional status according to MNA scoring shows a correlation with BMI of the participants ($r=0.329$). Those who are underweight according to BMI have more chance to be malnourished as well. None of the obese participants are malnourished by MNA score (Figure 3).

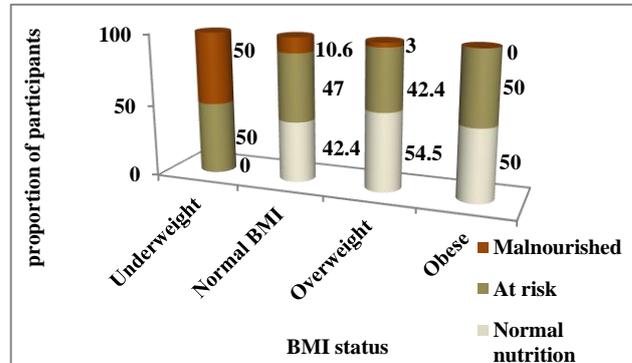


Figure 3: Nutritional status and BMI of the study population.

DISCUSSION

Present study on 129 older adults shows prevalence of malnutrition to be 11.6% with another 46.5% at risk of developing malnutrition. A similar study from Kochi, metro city of Kerala had found 7% of the elderly to be malnourished and 40% to be at risk of malnutrition. The study had also included institutionalized older adults and better care in these institutions may have resulted in the lower prevalence of malnutrition in their setting.⁸ The study also validated the use of MNA tool in older adults, taking the diagnosis given by physicians trained in nutrition to be the gold standard. MNA tool was found to have a sensitivity of 90.2% and specificity of 96.4%. Similar study in West Bengal, had shown a higher prevalence of malnutrition, 29.4% and another 60.4% were at risk of malnutrition.¹¹ Among those malnourished 59.4% were females when compared to 73.3% in the present study. Nutritional score decreased with increasing age in West Bengal study whereas age did not seem to have association with the MNA score in our study population. Single or widowed state, and lower socioeconomic status are found to be related to poor nutrition in the present study. Presence of comorbidities or number of drugs does not show any association with nutritional status in our study. Similar results were observed by Anil et al.¹²

Place of residence also effect the nutritional status in older adults. Urban dwellers were seen to be nutritionally more stable than rural inhabitants. This difference may be due to inadequate access to food items in rural areas where they depend on locally available food grains. Inadequate transportation facilities may also be a hindrance in ready availability of commodities even in

presence of government policies providing ample food supply.¹³

Body Mass Index showed a positive correlation with nutritional status in present study similar to study by Sarah et al.⁷ In our study about one-eighth of the participants were obese and another one-fourth overweight. According to National Health and Nutrition Examination Survey the prevalence of obesity among older adults of U.S.A was 39.7% for the year 2010.¹⁴ Inactivity, improper dietary habits, decreased basal energy requirements may be the predisposing factors contributing to the rising trend in obesity among older adults in general population. According to Inelmen et al this is contributing to increased morbidity and mortality among the older adults.¹⁵ Adoption of western eating habits may be contributing to rise in proportion of overweight people in India. In a study at Dehradun in India in 2012, 48.6% were underweight and 5.6% obese.¹⁶ In their study undernutrition was more common among males, and overweight and obesity more common in females. However, the prevalence of obesity was same among males and females in the present study.

By the 24 hour dietary recall method only 10.9% were meeting the daily calorie requirement. A study done in UK showed that most of the interviewers preferred 24 hour recall as a feasible tool in collecting information on nutrient intake. Four multiple pass 24 hour recall was found to be a more useful tool than single attempt.¹⁷ Recall method completely relies on the respondents memory. The chance of recall bias may have affected the result. Interactive computer based technologies are available now in US including Automated Multiple Pass Method (AMPM), menu-driven standardized 24HR program (EPIC-Soft), but such a web based programme is not feasible in our study population.¹⁸ Though not found to be associated with MNA status it still seems to be a useful tool to educate on nutrition as all malnourished showed deficient intake. The study cannot be generalised as it covered only a sample of individuals from one single community in Pathanamthitta district.

CONCLUSION

Just over a tenth of older adults in the community from Pathanamthitta are malnourished and almost half are at risk of malnutrition. Better nutritional status is associated with good education, higher family income, currently employed, married people and urban residence. The 24-hour total calorie intake does not reflect the current nutritional status of older adults except in malnourished individuals. Source of income does not seem to influence the nutritional status of the study group.

Recommendations

Taking 24 hour dietary intake prospectively or weighing of raw food may be a better assessment method for nutritional status. Widowed elderly women should be a

priority while planning nutritional programmes for the community.

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