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Original Research Article

A study on nutritional status of elderly and association with morbidity in a rural village of Andhra Pradesh, India

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ABSTRACT

Background: Aging is a universal process. Individual ageing is influenced primarily by a person's genetic makeup, lifestyle and environmental factors. Among the various environmental factors that modulate ageing, nutrition plays a significant role. Objectives of the study was to assess the nutritional status of the elderly residing in a rural community and incidence of morbidity among them and to identify risk factors for the occurrence of morbidity among the elderly and suggest possible strategies for intervention.
Methods: A cross-sectional survey was conducted on elderly people residing in Pedautapalli village.
Results: Comparison between energy, protein and fat intakes and socioeconomic status is found to be significant. The most common complaint was that of musculo-skeletal pain (29.9%) followed by visual problems (25.2%) and joint pains (17.2%). 20 (47.6%) males and 28 (62.2%) females were deficient in energy, 22 (52.3%) males and 33 (73.3%) females were deficient in protein, p=0.043, and 7 (16.6%) males and 10 (22.2%) were deficient in fat. Counting all the episodes of morbid conditions, the incidence of morbidity was 262.9 episodes per 100 person years. In the undernourished group (BMI<18.5, n=22) it was 213.6 episodes per 100 person years and in the others (normal and overweight, BMI≥25, n=40) the incidence rate was 240 episodes per 100 person years. The relative risk was 0.89.
Conclusions: It was concluded that there was no association between nutritional status and the incidence of morbidity in the study population.

Keywords: Elderly people, Morbidity levels, Nutrition status

INTRODUCTION

Ageing is a physiological process that starts from birth, continues throughout life, and ends with death. Among numerous environmental factors that modulate ageing, nutrition plays a significant role. While poor nutrition is not a natural concomitant of ageing, older adults are at risk of malnutrition due to physiological, psychological, social, dietary, and environmental risk factors.[1]

The World Health Organization (WHO) estimates that the total number of older or elderly people (≥60 years) worldwide would cross the figure of 1.2 billion by 2025, including around 840 million people from low income countries.[2] The global number of the elderly 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.[3] In January 1999, Government of India adopted 'National Policy on Older Persons' which defines 'senior citizen' or 'elderly' as a person who is of age 60 years or above.[4]

Older persons are specifically susceptible to malnutrition as there are many practical issues encountered in providing adequate nutrition. With increasing age, though

both lean body mass and basal metabolic rate declines that leads to reduction in energy

requirement, the necessity for other vital nutrients rises.[5] Hence, the appropriate inclusion of all categories of food in diet needs to be taken care of. Since nutrition of the elderly affects immunity as well as functional ability, it is an important component of elderly care that warrants further attention.[6] Factors like feeding difficulty, reduced mobility, psychological distress, being widowed, illiteracy, caring for children, poverty, and poor access to health and social services make elderly more vulnerable for malnutrition.[7]

Malnourished elderly is more likely to require health and social services, need more hospitalization, and demand extra challenges from caregiver. So, early detection and prompt interventions are essential for prevention of malnutrition in this group.[8] In this view, this present study was undertaken to assess the nutritional status of elderly living in rural India and to study the morbidity factors related to their nutritional status.

Aim and objectives of the study were to assess the nutritional status of the elderly residing in a rural community and incidence of morbidity among them. To identify risk factors for the occurrence of morbidity among the elderly and suggest possible strategies for intervention.

METHODS

Study design was a cross sectional study. Study population was elderly people residing in Pedautapalli village. Study period was January 2016-June 2016.

Inclusion criteria

All the elderly defined as those above the 60 years of age residing in study area and who consented to participate in the study were enrolled.

Exclusion criteria

Those not found at 3 attempts were excluded from the study. Subjects whose height or weight could not be obtained due to deformities or any other valid reason that prevented the measurements were excluded from the study. Subjects who were critically ill for example cancer, end-stage renal disease or receiving artificial enteral or parenteral nutrition.

Sample size

The sample comprised of all the elderly identified as residing in and number of elderly enumerated was 97.

Plan of study

The area chosen for the study was Pedautapalli village, which is a sub-centre under the Pedautapalli Primary Health Centre. It is at a distance of 25 kilometres from Vijayawada. The Rural Health Centre of the Department of Community Medicine, Siddhartha Medical College is based at Pedautapalli village.

Data collection

The data was collected from house to house visit. After taking informed oral consent, data was noted down by face to face interview using a pre-designed and well-structured questionnaire.

Ethical issues

Ethical clearance for the study was taken from ethical committee of Siddhartha Medical College before starting the study proper. Informed written consent was taken from each subject before interview. The nature and purpose of the survey were explained to them in their own language. Confidentiality was assured. Interviews were conducted in a nonjudgmental manner. Local cultural values and ideas were respected.

Statistical analysis

The data was entered in MS-Excel and analyzed in SPSS. Percentages, means, standard deviations and frequency tables were used as descriptive statistics.

RESULTS

Age distribution

The number of elderly enumerated was 97, comprising 8.6% of the total population. This is slightly more than 8.1%, the national average for Rural India and less than Andhra Pradesh average 10.2% (census 2011). 87 are included in study and out of that 42 (48.2%) were men and 45 (51.7%) were women are enrolled. The age group of 60-69 years had the largest number of elderly (49.6%) of whom 23 (26.4%) were women (Figure 1).

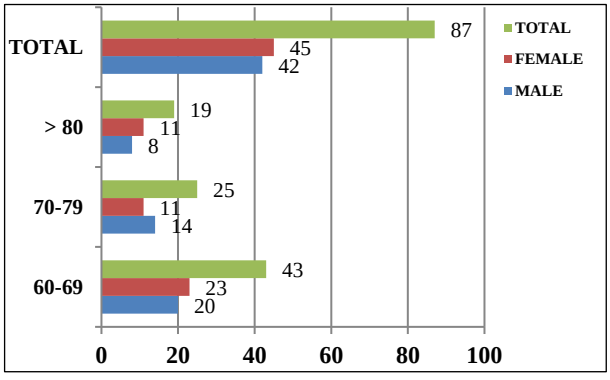

Figure 1: Age and gender distribution.

Education

Most of the elderly, 54 (62.1%), were illiterate. Of the women 71.1% of the women were illiterate. 3 (7.1%) of the men had studied up to the 10th standard, while only 1 (2.2%) woman had obtained this educational status. None of the subjects in this study had studied beyond the 10th standard (Figure 2).

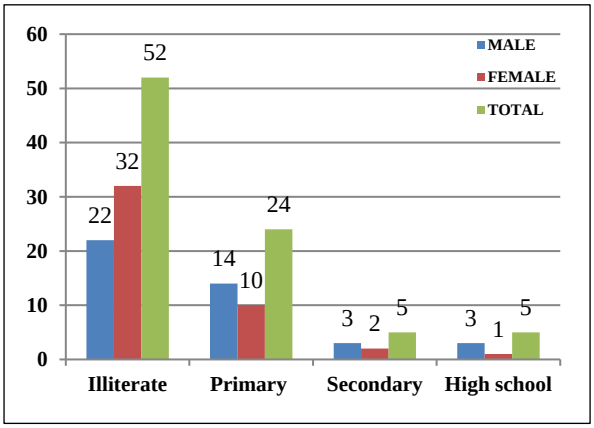

Figure 2: Levels of education.

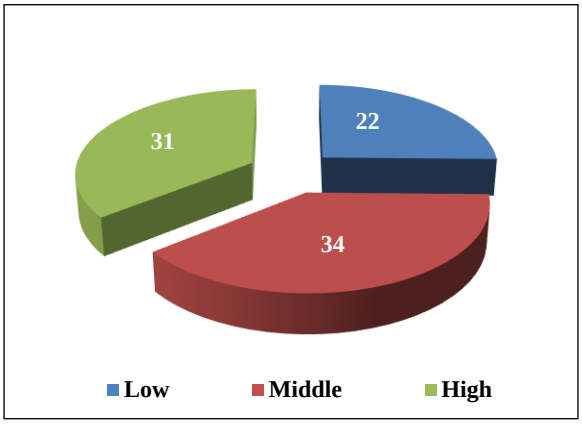

Figure 3: Socio-economic status.

Energy intake

The mean energy consumption of the study population was 1998.9 with a range of 505.9-3796.52 kcal/day. In females it was 1668±82.9 kcal/day and the ranged between 505.93-2820.79 kcal/ day.

It was found to be significantly lesser than that of the males, p<0.05. The net energy balance of the population (actual intake-RDA) had a mean of surplus of 195.9 kcal in males and a deficit of 230.54 kcal in females (Figure 4).

Protein intake

The males had significantly better consumption rates of protein, mean 61.19±4.98 g/day, in comparison to that of the females, mean 41.42±2.09 g/day. There was a negative balance in the consumption of protein in females with a mean of 8.23±2.1 g/day (Figure 5).

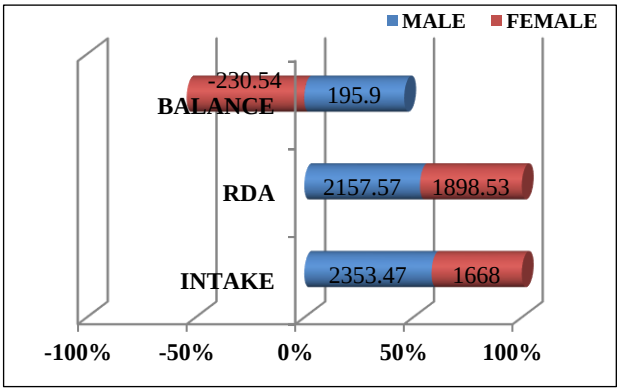

Figure 4: Mean energy intake.

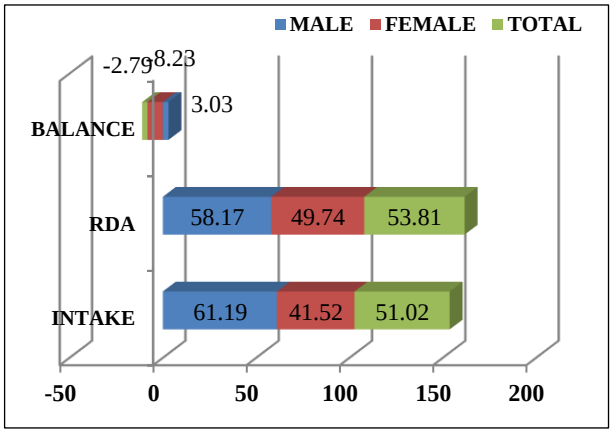

Figure 5: Mean protein intake.

Fat intake

The fat intake of the entire population had a mean of 39 g/day and ranged between 4.6g-149.2 g/day. The mean fat consumption of males was significantly higher than that of the females, p<0.05 (Figure 6).

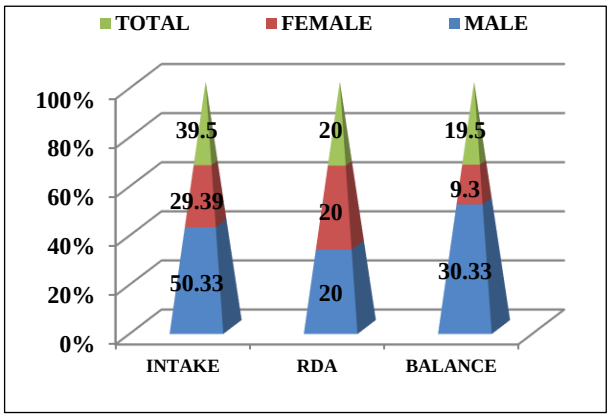

Figure 6: Mean fat intake.

The energy, protein and fat intake were found to be significantly associated to the socioeconomic status, 0.001, 0.002 and 0.032 respectively ($p<0.05$).

Table 1: Mean height, weight and BMI.

Gender	Total	Height (mt)	Weight (kg)	BMI
Male	42	1.645	56.8	20.95
Female	45	1.526	47.5	20.48

A significant difference was found in the heights and weights between the two groups, $p<0.05$. The mean BMI of the two groups were 20.95±3.6 for males and 20.48±4.2 for females (Table 1).

Table 2: Morbidity profile.

System/disease	Male	Female	Total (%)
Eye disease	31	30	61 (70.1)
Ear disease	13	5	18 (20.6)
Respiratory system	11	7	18 (20.6)
Cardiovascular system	2	0	2 (2.2)
Gastrointestinal system	3	4	7 (8)
Hypertension	15	18	33 (37.9)
Diabetes mellitus	2	4	6 (6.8)
Skin	3	3	6 (6.8)
Musculoskeletal	15	17	32 (36.8)
CNS/ depression	11	17	28 (32.2)
Infections	2	3	5 (5.70)
Others	8	5	13 (14.9)

Table 3: Episodes of illness last six months.

System/disease	Episodes of illness			
	Male	Female	Total	/100 person years
Eye disease	1	1	2	3
Ear disease	0	1	1	16
Respiratory system	25	10	35	56
Cardiovascular system	3	3	6	9
Gastrointestinal system	9	8	17	27
Hypertension	0	1	1	16
Diabetes mellitus	1	0	1	16
Skin	3	9	12	19
Musculoskeletal	7	15	22	35
CNS/ depression	5	6	13	21
Infections	5	12	17	27
Others	7	9	16	26

Table 4: Morbidity pattern and BMI.

Systems / Diseases	Episodes of illness (/100 person years)		Relative risk (RR)
	Low BMI	Normal/ high BMI	
Eye disease	9	0	-
Ear disease	0	3	-
Respiratory system	41	5	0.82
Cardiovascular system	9	1	0.9
Gastrointestinal system	9	26	0.34
Hypertension	0	2	-
Diabetes mellitus	0	3	-
Skin	41	0	-
Musculoskeletal	36	35	1.02
CNS/depression	14	40	0.35
Infections	41	5	8.2
Others	13	33	0.39
Total	213.6	240	0.89

The prevalence of cataract was found to be 48.3% in one or both eyes. The prevalence of hearing impairment was 20.7% in the study (Table 2).

DISCUSSION

In the present study, 49.6% belong to the age group of 60-69 years. In Purty et al 72.5% belong to the age group of 60-69 years.[9] In Krishnamoorthy et al 63.8% belong to the age group of 60-69 years.[10] In Katta et al 60.1% belong to the age group of 60-69 years.[14] In Kumar et al 54.9% belong to the age group of 60-69 years.[19]

In the present study, 48.2% were men and 51.7% were women. In Purty et al 41.2% were men and 58.8% were women.[9] In Krishnamoorthy et al 31.9% were men and 68.1% were women.[10] In Lahiri et al 18 55.7% were men and 44.3% women.[15]

Most of the elderly, 54 (62.1%), were illiterate. Of the women 71.1% of the women were illiterate. 3 (7.1%) of the men had studied up to the 10th standard, while only 1 (2.2%) woman had obtained this educational status. None of the subjects in this study had studied beyond the 10th standard. In Purty et al most of the elderly (78.7%), were illiterates.[9] In Ananthesh et al most of the elderly (56.8%), were illiterates.[16] In Lahiri et al 18 (7.7%) were illiterates.

In the present study, 25.3% belongs to low socio-economic status, 39.1% belongs to middle socio-economic status, 35.6% belongs to high socio-economic status. In Ananthesh et al 24% belongs to Class I socio-economic status, 20.1% belongs to Class III socio-economic status, 11.3% belongs to Class V socio-economic status.[16] In Lahiri et al 1.7% belonged to Class I

status, and majority were from Class III (51.5%), Class IV (18.3%), and Class V (16.2%) SES.[18]

In the present study, a significant difference was found in the heights and weights between the two groups, $p<0.05$. The mean BMI of the two groups were 20.95±3.6 for males and 20.48±4.2 for females. In Purty et al the mean BMI was 19.02 kg/m^2 and below 18 kg/m^2 in 49.61% of the study population.[9] The average height was 1.53 m. (SD 0.096), males 1.58 m and females 1.48 m. The average weight was 45.4 kgs (SD 10.9), males 49.4 kgs and females 42.2 kgs. In Krishnamoorthy et al risk of malnutrition was found to be 58.8%.[10] Study conducted in Spain among elderly population has shown that about 27% were at high risk of malnutrition. This difference could be due to the fact that setting was more of rural population when compared with the other study.[11] Another study done in Turkey also showed that the proportion of elderly at risk of malnutrition was found to be 18.6% using MNA scores.[12] Sordestrom et al conducted a study in Sweden, where they concluded with the results exactly same as these findings and even stated that people >80 are at more risk for malnutrition that was similar to this study findings.[13]

In the present study, the prevalence of cataract was found to be 48.3% in one or both eyes. The prevalence of hearing impairment was 20.7% in the study. Respiratory diseases are present in 20.6% patients, cardiovascular diseases are present in 2.2% patients, gastrointestinal diseases are present in 8% patients, hypertension is present in 37.9% patients, diabetes mellitus is present in 6.8% patients, skin diseases is present in 6.8% patients, musculoskeletal diseases are present in 36.8% patients, depression is present in 5.7% patients and minor infections in 5.7% patients.

In Purty et al pain in the joints and joint stiffness was the most common morbidity in 139 (43.4%), followed by dental and chewing complaints in 135 (42%), decreased visual acuity due to cataract and refractive errors in 182 (57%) and hearing impairment in 46 (15.4%).[9] Other morbidities were hypertension in 42 (14%), diarrhoea in 38 (12%), chronic cough in 37 (12%), skin diseases in 38 (12%), heart illness in 27 (9%), diabetes in 26 (8.1%), asthma in 19 (6%) and urinary complaints in 18 (5.6%).

In Katta et al morbidities associated with musculoskeletal system (38.8%) were reported predominantly such as arthritis, lumbar pain etc.[14] Ophthalmic morbidities (13.2%) like cataract and refractive errors burdened next to musculoskeletal system, where prevalence seems to be more among males. 4% of the elderly were known hypertensive under treatment. Morbidities associated with ENT and other systems were also found to be low. The study conducted in Spain by Valderrama-Gama et al reported that osteoarthritis and related diseases were the most prevalent morbidities, followed by vision impairment and hypertension.[15]

In Clausen et al the most prominent health problems were related to the musculoskeletal system, comprising 446 of the problems.[17] The two most frequently diagnosed musculoskeletal problems were lumbar pain, and neck/ shoulder pain. Eye diseases were diagnosed 232 times of all health problems, with cataract seen in 115 of the elderly. Thirty-six were registered as blind. Glaucoma was registered among 30 of the elderly. 25 had increased pressure on one eye, while five had increased pressure on both eyes. Neurological problems were the third most frequently seen category. The most common single diagnosis was headache, seen in 13% of the elderly. Circulatory problems comprised the fourth largest group with 189 entries. Sixty-three persons had a previous undiagnosed pathological increased blood pressure. Additionally, 37 persons had a known hypertension. Mental problems were registered 109 times. There was no depression score system used, but depression was clinically diagnosed by the doctor in 32 cases.

In Kumar et al morbidities present are anemia (32.8%), hypertension (52.8%), IHD (11.2%), diabetes (32.3%), osteoarthritis (22.5%), hearing impairments (10.3%), cataract (24.2%), urinary problems (8.6%), skin diseases (5.6%), blindness (1.6%), psychiatric problems (1.1%), dental problems (16.4%), constipation (24.2%) and COPD (16.4%).[19]

Lena et al reported in a study at Karnataka that most of the respondents had health problems, the most common were hypertension, osteoarthritis, diabetes, or bronchial asthma; others included cataract, anemia, and skin problems.[20] These findings are in favor of this study. Some more recent studies also favor these findings. Joshi et al have reported in his study that elderly people were distressed physically, psychologically, and both.[21] The most prevalent morbidity was anemia, followed by the dental problems, hypertension, chronic obstructive airway disease, cataract and osteoarthritis. In another important study conducted by Mujahid, age-related disorders include life-threatening diseases such as heart disease, stroke, cancer, diabetes, and infections, as well as certain chronic disabling conditions affecting vision, mobility, and hearing were reported as most common morbidities among elderly.[22]

CONCLUSION

On the whole the dietary intake and nutritional status of the population was found to be poor. Diet had a significant association with socioeconomic status. Both minor health problems and chronic diseases were as prevalent as in other elderly populations. Counting all the episodes of morbid conditions, the incidence of morbidity was 262.9 episodes per 100 person years. In the undernourished group (BMI<18.5, n=22) it was 213.6 episodes per 100 person years and in the others (normal and overweight, BMI≥25, n=40) the incidence rate was 240 episodes per 100 person years. The relative risk was 0.89. Therefore, it was concluded that there was no

association between nutritional status and the incidence of morbidity in the study population.

Recommendations

Individual: general recommendations regarding Health and nutrition. Family: extra care and attention to their elders, supervision of diet is advised. Community and legislations: geriatric health and training centers at village level. Proper implementation of acts like maintenance and Welfare of Parents and Senior Citizens Act, 2007, National Policy on Older Persons (NPOP), 1999 and Integrated Programme for Older Persons (IPOP), 1992.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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