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RESEARCH ARTICLE

STUDY OF NUTRITIONAL STATUS IN ELDERLY IN INDIAN POPULATION

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ABSTRACT

Introduction: Nutrition is an important factor contributing to health and functional ability. There is definite evidence that malnutrition is more common in geriatric population but it is underestimated in diagnostic and therapeutic procedures.

Objective: The present study was carried out to assess nutritional status in elderly population aged ≥65 years.

Material and Methods: It was a cross sectional study of 500 elderly subjects of age ≥65 years (63% subjects from urban and 37% subjects from rural area). Nutritional status assessment was done by using 18 items (30 points) Mini nutritional assessment (MNA) scale.

Results: Present study revealed that 11.6% elderly were malnourished while 46% were at risk of malnutrition and only 42.4% were well nourished. Malnutrition and risk of malnutrition was more common in rural 104 (52.21%) , 47 (25.41%) than urban 126 (40%), 11 (3.49%) respectively. malnutrition according to literacy status as Illiterate, literature, primary, middle, secondary, college and professional was 26.03%, 8.47%, 0%,6.15%, 3.89%, 2.06% and 0% respectively. Prevalence of malnutrition according to financial status, self dependent and depend on others was 6.85% and 17.48% respectively. Prevalence of malnutrition in relation to BMI <19, 19-23, >23kg/m^2 was 49 (47.11%), 9 (9.67%), 0 (0%) respectively.

Conclusion: Nutritional status declines further as the age advances. Nutritional status of our urban elderly was better than nutritional status of rural elderly. Illiteracy depended on other by financial status and low BMI worsen the nutritional status significantly in elderly, Nutritional evaluation should be a part of clinical assessment of elderly.

INTRODUCTION

The number of elderly is on the increase, both in developed and developing countries (Kinsella and Suzman, 1992). Aging is associated with various physiological changes and needs, which make elderly people vulnerable to malnutrition (Meydani, 2001). Malnutrition is both a common condition and serious health problem among the elderly. It increases morbidity (Sullivan and Walls, 1995) and mortality (Persson *et al*., 2002) among the elderly, is often accompanied by anorexia, and it is also a risk factor for osteoporotic fracture (Guigoz *et al*., 1996 and Gerber *et al*., 2003). The prevalence of malnutrition varies considerably depending on the population studied and the criteria used for the diagnosis (Joosten *et al*., 1999). Available data for malnutrition worldwide shows that the prevalence of malnutrition as rated by the Mini Nutritional Assessment short form (MNA-SF) among the elderly is the following: 0–8% for those living in a community, 0–30% among the non-institutionalized elderly and 0–74% for the hospitalized and institutionalized elderly (Guigoz, 2006). Although good nutrition is beneficial both for health and the ability to resist and recover from disease, malnutrition leads to dependency (Ghisla *et al*., 2007). Dependency interferes with the health and quality of life, not only for the elderly, but also for relatives and health-care providers (Millán-Calenti *et al*., 2000). There is definite evidence that malnutrition is more common in geriatric population but it is underestimated in diagnostic and therapeutic procedures. A number of studies have pointed out that physicians often overlook this problem and so fail to treat malnutrition in elderly patients. Reversible causes of malnutrition such as depression and medication induced anorexia are usually under recognized and under treated (Baweja *et al*., 2008).

The MNA-SF is a validated questionnaire for simple and rapid assessment of the nutritional status of elderly people.[5, 8] It is easy to administer and non-invasive, and is widely used to detect those who could be assisted by early nutritional intervention. Therefore, it should be integrated into a comprehensive geriatric assessment (Vellas and Guigoz, 1995).

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The present study was carried out to assess nutritional status in elderly. Population aged 65 years or above and to study the impact of age related patho-physiological changes on nutritional status.

MATERIAL AND METHODS

It was a cross sectional study of 500 elderly subjects of age 65 years or above (63% subjects from urban area and 37 % subjects from rural area). This study was conducted in the Geriatric clinics during September 2009 to march 2011. Most of the elderly persons visited the clinics; however camps were made in Bikaner city and rural area for those who were unable to attend it. A door to door survey was carried out by geriatric social workers in the randomly selected wards and a list of households having individuals aged ≥65 was prepared using voter's ID list. Individuals to be interviewed and sampled will be selected by systematic random sampling method i.e. every 2nd individual from the list of all individual aged 65 and above. The house to house survey was conducted in the selected households. Consent from patients was also taken before filling Performa on consent form. For this study, permission also taken from medical ethics board of the medical college. Nutritional status assessment (Guigoz *et al*., 1994) was done by using 18 items (30 points) Mini nutritional assessment (MNA) scale which included questions regarding appetite, Weight, mobility, acute and chronic illness, medication history, dietary history, anthropometric measurements (BMI, MAC, MCC) and self perception of nutritional status and health. Interpretation of scores was done as follows:

Score <17: Malnourished
Score 17-23.5: At risk of malnutrition
Score - 23-5: Well nourished.

All the subjects were interviewed for demographic profile, present, past, occupational, family, personal and social history, thorough clinical examination was performed. Anthropometric measurements like weight, height, mid arm circumference (MAC) and maximum calf circumference (MCC) were recorded and BMI was calculated. Sample size- sample size calculation was done by calculator of open epi statical website.500 sample was taken in this study.

Statistical analysis

Data was statistically analyzed using SPSS for windows version 10. Z-test was performed to evaluate normality of distribution. Chi-squared test or χ^2 test was used for comparing groups of data. A p value of <0.05 was taken to indicate statistical significance.

RESULTS

The present study shows that 500 subjects in which 58 (11.6%) elderly were malnourished 230 (46%) were at risk of malnutrition and only 212 (42.4%) were well nourished and male were 315 and female were 183 (Table 1). Prevalence of malnutrition and risk of malnutrition was more common in female 90 (48.64%), 28 (15.13%) than male 140 (44.44%), 30 (9.52%) respectively. (Table 2.) Urban and rural patients

Table 1. Prevalence of nutritional status

	No Malnutrition (%)	At risk of Malnutrition (%)	Malnourished (%)
Total (500)	212(42.40)	230(46.0)	58(11.6)

Table 2. Prevalence of nutritional status male and female…

	No malnutrition (%)	At risk of malnutrition (%)	Malnourished (%)
Male (316)	146(46.34)	140(44.44)	30(9.52)
Female (184)	66(35.67)	90(48.64)	28(15.13)
Total (500)	212(42.40)	230(46.0)	58(11.6)

Table 3. Prevalence of nutritional status urban and rural…

	No malnutrition (%)	At risk of malnutrition (%)	Malnourished (%)
Urban (315)	178(56.5)	126(40.0)	11(3.49)
Rural (185)	34(18.37)	104(56.21)	47(25.40)
Total (500)	212(42.40)	230(46.0)	58(11.6)

were 315 and 185 respectively. Malnutrition and risk of malnutrition was more common in rural 104 (52.21%), 47 (25.41%) than urban 126 (40%), 11 (3.49%) respectively. (Table 3) Malnourished was more in lower class (BPL) 28 (36.84%) than upper class (lower middle) 5 (10.20%) (χ^2=10.87, p=0.03). At risk of malnutrition was increasing with decreasing socio economic classes significantly (χ^2=40.80 P=0.001). Prevalence of malnutrition in smokers, ex-smokers, tobacco- chewers and non-addicts was 20.25%, 13.38%,0% and 8.30% respectively . At risk malnutrition in smokers , ex-smokers , tobacco-chewers and non addicts was 48.10% , 47.88%,50.0% and 44.40% respectively .Smokers were more at risk of malnutrition compared to non-smokers (χ^2=9.11 P=0.01). Prevalence of malnutrition according to financial status, self dependent and depend on others was 6.85% and 17.48% respectively which was significant. (χ^2=13.42 P=0.0001). (Table 4) Malnutrition according to occupation as cultivator, labour, skilled labour, own business, service and other was 25.0%, 14.28%, 3.12%,2.77%,3.70%,and 0% respectively which was significantly (χ^2=45.37 P=0.001). At risk of malnutrition according to occupation as cultivator, labour, skilled labour, own business, service and other was 55.26%,58.44%, 53.12%, 55.55%, 25.92% and 40.0% respectively which was significantly difference (χ^2=39.70 P=0.001). (Table 5) Prevalence of malnutrition according to literacy status as Illiterate, literature, primary, middle, secondary, college and professional was 26.03%, 8.47%, 0%,6.15%, 3.89%, 2.06% and 0% respectively which was significantly different (χ^2=41.92 P=0.001). At risk of malnutrition according to literacy status as Illiterate, literature, primary, middle, secondary, collage and professional was 53.25%, 59.32%, 64.28%, 55.38%, 38.96%, 20.61%, and 20.0% respectively which was significantly difference (χ^2=41.92 P=0.001). Malnutrition more in illiterate than educated. (Table 6). Prevalence of malnutrition in relation to BMI <19, 19-23, >23kg/m^2 was 49 (47.11%), 9 (9.67%), 0 (0%) respectively. Prevalence of at risk of malnutrition was 54 (51.92%), 46 (49.46%), 130 (42.90%). thus as BMI increases risk of malnutrition decreases. (Table 7).

Table 4. Prevalence of nutritional status in relation to Financial status

		No malnutrition(%)	At risk of malnutrition (%)	Malnourished (%)
Rural (185)	Self dependent (53)	13 (24.53)	30 (56.60)	10 (18.86)
	Depend on others (132)	22 (16.66)	73 (55.30)	37 (28.03)
Urban (315)	Self Dependent (224)	142 (63.39)	73 (32.58)	9 (4.01)
	Depend on others (91)	36 (39.56)	53 (58.24)	2 (2.19)
Total (500)	Self dependent (277)	155 (55.95)	103 (37.18)	19 (6.85)
	Depend on others (223)	57 (26.00)	126 (56.50)	39 (17.48)

χ^2=18.85 P=0.0001 χ^2=13.42 P=0.0001

Table 5. Prevalence of nutritional status in relation to occupation

		No malnutrition (%)	At risk of malnutrition (%)	Malnourished (%)
Rural (185)	Cultivator	18 (13.95)	75 (58.13)	36 (27.90)
	Labour	8 (23.52)	17 (50.0)	9 (26.47)
	Skilled Labour	1 (33.33)	1 (33.33)	1 (33.33)
	Own business	4 (28.57)	11 (71.42)	0 (00.0)
	Service	3 (60.0)	1 (20.0)	1 (20.0)
Urban (315)	Cultivator	12 (52.17)	9 (39.13)	2 (8.69)
	Labour	13 (30.23)	28 (65.11)	2 (4.65)
	Skilled Labour	13 (44.82)	30 (51.72)	0(00.0)
	Own business	26 (44.82)	30 (51.72)	2 (3.44)
	Service	111 (70.70)	41 (26.11)	5 (3.18)
	Other	3 (60.0)	2 (40.0)	0 (00.0)
Total (500)	Cultivator	30 (19.73)	84 (55.26)	38 (25.0)
	Labour	21 (27.27)	45 (58.44)	11 (14.28)
	Skilled Labour	14 (43.75)	17 (53.12)	1 (3.12)
	Own business	30 (41)	40 (55.55)	2 (2.77)
	Service	114 (70.37)	42 (25.92)	6 (3.70)
	Other	3 (0.0)	2 (40.0)	0 (00.0)

χ^2 = 39.70 P=0.001 χ^2= 45.37 P=0.001

Table 6. Prevalence of nutritional status in relation to education

		No malnutrition (%)	At risk of malnutrition (%)	Malnourished (%)
Rural (185)	Illiterate	19 (15.07)	66 (52.38)	41 (32.58)
	Literate	6 (16.66)	25 (69.44)	5 (13.88)
	Primary	1 (20.0)	4 (80.0)	
	Middle	5 (45.45)	6 (54.54)	
	Secondary	1 (25.0)	2 (50.0)	1 (25.0)
	College	2 (66.66)	1 (33.33)	
Urban (315)	Illiterate	16 (37.20)	24 (55.81)	3 (6.97)
	Literate	13 (56.52)	10 (43.47)	
	Primary	9 (64.28)	14 (60.86)	
	Middle	20 (37.03)	30 (55.55)	4 (7.40)
	Secondary	43 (58.90)	28 (38.35)	2 (2.73)
	College	73 (77.65)	19 (20.21)	2 (2.12)
	Professional	4 (80.0)	1 (20)	
Total	Illiterate	35 (20.71)	90 (53.25)	44 (26.03)
	Literate	19 (32.20)	35 (59.32)	5 (8.47)
	Primary	10 (35.71)	18 (64.28)	
	Middle	25 (38.46)	36 (55.38)	4 (6.15)
	Secondary	44 (57.14)	30 (38.96)	3 (3.89)
	College	75 (77.31)	20 (20.61)	2 (2.06)
	Professional	4 (80.0)	1 (20.0)	

χ^2 = 41.92 P=0.001 χ^2= 46.70 P=0.001

Table 7. Prevalence of nutritional status in relation to BMI

BMI (kg/m^2)	No malnutrition (%)	At risk of malnutrition (%)	Malnourished (%)
<19	1 (00.96)	54 (51.92)	49 (47.11)
19-23	38 (40.86)	46 (49.46)	9 (9.67)
>23	173 (57.09)	130 (42.90)	0 (0)
Total (500)	212 (42.40)	230 (46.00)	58 (11.60)

χ^2=33.12 P=0.0001

DISCUSSION

The present study analyzed the nutritional status of elderly people in the Indian population. The MNA score showed that approximately that 11.6% elderly were malnourished while 46% were at risk of malnutrition and only 42.4% were well nourished. The major reason for these findings may be attributed to the various causes of malnutrition in elderly patients which are also more prevalent in elderly and increases with age. An overall reduction in appetite, alteration in taste, smell and subsequent decrease in the intake of nutrients are parts of aging, In addition to its other factors malnutrition include oral health, physical impairments, early satiety, and chronic diseases; poor dentition and physical immobility can cause difficulty with food acquisition chewing food and swallowing, leading to a decrease in nutrient intake, early satiety and physiological appetite loss. Another study carried out in Chinese Inpatients by Lei *et al*. (2009) using the 18 items of the MNA scale, found that 19.6 % of the elderly were malnourished (vs. 11.6% in the present study), with 53.2% at risk of malnutrition (vs. 46 % in the present study), and 27.2 % with a good nutritional status (vs. 42.4 % in the present study). Possible reasons for the discrepancy are that the socioeconomic conditions are quite different. Similar trends of malnutrition were present in study by (Maliheh Aliabadi *et al*., 2008). Present study revealed that prevalence of malnutrition and at risk of malnutrition was more common in female than male (15.13% vis 9.52%) and (48.64% vis 44.44%) respectively. More females were found with malnutrition than males. we strongly feel that the higher prevalence of malnutrition in women in the present study could partly be a result of the effect of the traditional habits of eating. In many families, men usually eat before women. Women first serve the men. Women are the last people to eat, and share the remaining food. As their portions are smaller, this might result in poor nutrition. Similar trends of malnutrition were present in study by (Maliheh Aliabadi *et al*., 2008; Rodriguez *et al*., 2005).

Present study revealed that Rural elderly were more malnourished (25.4%) and at risk of malnutrition (56.21 %) than urban elderly (3.49% and 40.0% respectively). Similar trends of malnutrition were present in study by Aliabadi *et al.* (Maliheh Aliabadi *et al*., 2008) and Baweja *et al*. (2008) in western Rajasthan, Nutritional status of urban elderly population was comparable with that of developed countries while that of rural population was worse. We feel that rural population are more physical hardworking than urban and their diets are limited in variety. Present study revealed that prevalence of malnutrition and at risk of malnutrition was more common in those dependent on others than self dependent (17.56% v/s 6.94%) and (68.85% v/s 40.0%) respectively. There is mostly elderly are living in India are separately or living with family but avoid by their family members. Similar trends of malnutrition were present in study by (Maliheh Aliabadi *et al*., 2008), and (Tamanna Ferdous *et al*., 2009)

Among elderly having BMI <19 significantly higher ($p<0.0001$) was the prevalence of malnutrition (47.11 %) than those having BMI 19 to < 23 (9.67%) or > 23 (0%). At risk of malnutrition were also more among those having BMI < 19 (51.92%) than those with BMI 19 to < 23 (49.46%) or > 23 (42.90%). Similar relationship between nutritional status and BMI was also found by Baweja *et al.* (2008) in their studies. This needs further studies and immediate attention in terms of lifestyle modification and health education.

Present study revealed that prevalence of malnutrition according to occupation as Cultivator, Labour, Skilled labour, own business, service and others were 25.0%, 14.28%, 3.12%, 2.77%, 3.70% and 0% respectively. Prevalence of at risk or malnutrition according to occupation as Cultivator, Labour, Skilled Labaur. Own business, Service and Others was 55.26%, 58.44%, 53.12%, 55.55%, 25.92% and 40.0 % respectively. More risk of malnutrition in Cultivator and Labour than others. Cultivator and labour are more physical hardworking and less aware to their diet than own business and service persons. Similar trends of malnutrition were present in study by (Maliheh Aliabadi *et al*., 2008). Present study revealed that prevalence of malnutrition according to literacy status as Illiterate, Literate, Primary, Middle, Secondary, College and Professional was 26.03%, 8.47%, 0%, 6.15%, 3.89%, 2.06% and 0% respectively). Thus prevalence of malnutrition more in illiterate than educated. Similar trends of malnutrition were present in study by (Maliheh Aliabadi *et al*., 2008) and (Tamanna Ferdous *et al*., 2009).

Conclusion

The overall prevalence of malnutrition and at risk of malnutrition in our study was 11.6% and 46% respectively. There was a difference in prevalence by gender (9.52% v/s 44.44%) were men and (15.13% vis 48.64%) were women. The overall prevalence of malnutrition and at risk of malnutrition in urban was (3.49% vis 40%) and in rural was (25.40% v/s56.21%) respectively. The prevalence tend to increase with age in our study. Prevalence tend to increase in depend on others than self dependent by financial status. Female sex, illiterate, cultivator, labour and low BMI were associated with higher prevalence of malnutrition in our study.

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