

## Nutritional Status and Associated Factors among the Elderly People in Mandavi Rural Municipality of Pyuthan District, Nepal

Chetana Acharya,<sup>1</sup> Alisha Dhungana,<sup>2</sup> Chiranjeebi Shah<sup>1</sup>

<sup>1</sup>Department of Public Health, CiST College, Sangamchowk, New Baneshwor, Kathmandu, Nepal

<sup>2</sup>Department of Public Health, La Grandee International College, Simalchour, Pokhara, Nepal

### ABSTRACT

**Introduction:** The geriatric population is increasing throughout the world. With the increase in age, people suffer from various chronic diseases and conditions. Nutrition-related problems are also common in elderly people. This study was conducted to assess the nutritional status and associated factors among elderly people.

**Methods:** A community-based cross-sectional descriptive and quantitative study was carried out among 124 elderly people of Mandavi Rural Municipality, Pyuthan, Nepal from September 2019 to November 2019. The study population was selected using a convenient method. Data collection was carried out through a structured questionnaire using the standard tool, mini nutritional assessment (MNA). Ethical approval was taken from Nepal Health Research Council (NHRC). Chi-square test was used to identify the association between independent variables and nutritional status.

**Results:** More than 1/4th of the total respondents had weight loss in the last three months. More than 1/4th of the participants had neuropsychological problem and psychological stress. Out of the studied population, 22.6 % had hypertension and 8.9% had diabetes. 18.5% were smokers while 40.3% were alcohol users. 40.3% were at risk of malnutrition and 4.0% were malnourished (MNA < 17.23). Sex ( $p = 0.04$ ), smoking ( $p = 0.014$ ), decline in food intake ( $p = 0.042$ ), psychological stress ( $p = 0.03$ ) and neuropsychological problem ( $p = 0.01$ ) were found significantly associated with the nutritional status ( $p$ -value < 0.05).

**Conclusion:** A significant proportion of participants were at the risk of malnourishment. Effective intervention should be designed to promote healthy aging among elders dwelling in rural areas.

**Keywords:** *Elderly, Ageing, Mini nutritional assessment, Nutritional status*

### INTRODUCTION

Globally, there has been a rapid upsurge in the population of elderly people. It is estimated that 12% of the global population is covered by the elderly population. The world's population aged 60 years and older are forecasted to soar up to 2 billion by 2050 of which 80% of them will be living in developing countries. According to the census of Nepal, the population of the elderly grew from 1.5 million in 2001 to 2.2 million in 2011. Major factors contributing to an increased proportion of the elderly population is the increase in life expectancy and decline in fertility.<sup>1</sup> This is observed in many developing countries including Nepal.<sup>2-4</sup>

Malnutrition is a common problem among the elderly people because of deteriorative changes such as impaired oral health, decreased appetite, loss of taste and smell, etc.<sup>3,5</sup> Nutrition status among elders doesn't only depend entirely upon dietary intake because it is a multifactorial causality. Studies have shown that the nutritional status of elder population depends upon physical condition, environment, and socio-demographic factors.<sup>6</sup> Malnutrition among

elder people results in an increased risk of multiple organ failure, morbidity, and mortality.<sup>7</sup> Therefore, assuring better quality of life to the rising population density of elders is a major public health challenge.<sup>8</sup> Assessing factors related to aging is important as it would help concerned authorities to design interventions matching the need of elderly people. This can benefit the aging population to gain better quality of life during advancing age.<sup>3,4</sup>

Many studies have only focused on the nutrition status of either mother or child. There are also some studies that have focused on elderly people living in old-age homes. Prevalence and factors associated with the elderly living in a rural community have not been well established in literatures.<sup>9, 10</sup> This study was conducted with an aim to study nutritional status and its associated factors among the elderly population.

**Correspondence:** Chetana Acharya, CiST College, Kathmandu, Nepal, Email: [chetana.acharya99@gmail.com](mailto:chetana.acharya99@gmail.com)

## METHODS

This is the community based cross-sectional study carried out in Mandavi Rural Municipality of Pyuthan district, Nepal. The study was conducted from September 2019 to November 2019. Out of five wards, 2 wards were selected using the lottery method. After this, the probability proportional to size method was used to determine the number of respondents that will be taken from each ward. A convenient method was used to select the household through information obtained from health facilities. The study population included the elderly population was above 60 years from the selected study area. The sample size was calculated by using decision analyst software, where, universe sample size was 1223, the maximum acceptable percentage points of error was 5%, estimated percentage level was 10, and desired confidence level: 95%. Thus, 124 was the sample size of this study. Data were collected using the interview method and anthropometric measurements were obtained. This study included elder people with Non-Communicable Diseases (NCDs) such as hypertension and diabetes and elders with the habit of smoking and drinking alcohol. Data collection was conducted from July 2019 to August 2019. A structured questionnaire was used to collect the data on demographic, socio-economic, diet, health, and lifestyle-related characteristics. Anthropometric measurements such as height (cm), weight (kg), calf circumference, and mid-arm circumference were collected using weighing machine, stature meter, and MUAC tape respectively. To assess the nutritional status, Mini Nutrition Assessment (MNA) was used. It is a recognized and valid tool to determine the nutritional status of elder population.<sup>9</sup> MNA score is used to categorize nutritional status as follows:

- Adequate nutritional status: MNA  $\geq 24$ .
- At risk of malnutrition: MNA between 17 and 23.5.
- Frank malnutrition: MNA  $< 17$ .

The decimal values with 5 and above were rounded off. Dietary assessment was done by questionnaire tool in which questions related to the number of meals were asked. Verbal consent was obtained from the participants prior to the study. Ethical approval was obtained from Nepal Health Research Council.

Data entry was done in Epi Data and analysis was done in Statistical Package for Social Sciences (SPSS). Chi-Square and Cramer's V were used to studying the association between variables.

## RESULTS

Table 1 shows that of the participants (50.8%) belonged to age group 60-70 years, 43.5% belonged age group 70-80 and 5.6% belonged to the age group 80 and above. The majority of the respondents were female (60.5%). A dominant proportion of the respondents were Janajati (37.1%) followed by Chhetri (29.8%), Brahmin (15.3%), Dalit (15.3%) and 2.4% were of another caste (Lohani, Dashnami, Barahi). Most of the respondents were illiterate (66.9%). 9.7% of the respondents had family income of less than Rs.10,000 per month and 13.7 % had family income of more than Rs.30,000 per month. The result also showed that 54.8% of respondents received the old-age allowance.

Table 1: Socio-demographic characteristics

	Frequency(n)	Percentage (%)
Age		
60-70	63	50.8
70-80	54	43.5
80 and above	7	5.6
Ethnicity		
Brahmin	19	15.3
Chhetri	37	29.8
Janajati	46	37.1
Dalit	19	15.3
Others	3	2.4
Educational status		
Illiterate	83	66.9
Literate	20	33.1

Table 2 shows the nutritional status of the respondents according to MNA. Regarding nutrition status, 55.6% of the people had normal nutritional status, whereas 40.3% were at risk of malnutrition and 4.0% were malnourished.

Table 2: Nutrition status according to MNA

	Frequency(n)	Percentage (%)
Nutritional status		
Normal nutritional status	69	55.6
At risk of malnutrition	50	40.4
Malnourished	4	5

Table 3 shows that 15.3% of the respondents had a moderate/severe decrease in food intake in the last three months (due to lack of appetite, digestive problem, chewing or swallowing difficulties). Out of the studied population, 24.2% of the respondents consumed at least one serving of dairy products (milk, cheese, and yogurt) per day and 64.5% of the respondents consumed two or more servings of legumes or eggs per week. The results have shown that 13.7% of the participants consumed meat, fish, or poultry every day.

Table 3: Nutrition and diet related characteristics

	Frequency (n)	Percentage (%)
Decline in food intake		
Severe/moderate decrease	19	15.3
No decrease	105	84.7
At least one serving of dairy products (milk, cheese, yoghurt) per day		
Yes	30	24.2
No	94	75.8
Two or more servings of legumes or eggs per week		
Yes	80	64.5
No	44	35.5
Meat, fish or poultry every day		
Yes	17	13.7
No	107	86.3

Table 4 shows that, 37.1% of the respondents had severe/mild dementia, followed by respondents with psychological stress or acute disease (25.8%), Hypertension (22.6%) and Diabetes (8.9%). Similarly, 11.3% had done health insurance and 10.5% of the respondents used 3 or more prescribed drugs daily.

Table 4: Health related characteristics

	Frequency (n)	Percentage (%)
Neuropsychological problem		
Severe/mild dementia	46	37.1
No psychological problems	78	62.9
Psychological stress or acute disease		
Yes	32	25.8
No	92	74.2

Use of 3 or more prescribed drugs per day		
Yes	13	10.5
No	111	89.5
Hypertension		
Yes	28	22.6
No	96	77.4
Diabetes		
Yes	11	8.9
No	113	91.1

Table 5 shows that 18.5% of the respondents were current smokers. Among 23 smokers, 34.78% used more than 10 cigarettes per day (average) while 56.17% used 1-5 cigarettes per day. Similarly, 40.3% were alcohol users. Among them, 20% were regular alcohol users and 80% were occasional users.

Table 5: Lifestyle related characteristics of the respondents

	Frequency (n)	Percentage (%)
Smoking		
Smokers	23	18.5
Non-smokers	101	81.5
Average number of cigarettes per day		
1-5	12	56.17
5-10	3	13.04
More than 10	8	34.78
Alcohol consumption		
Yes	50	40.3
No	74	59.7
Alcohol frequency		
Occasionally	40	80
Everyday	10	20

Table 6 shows the nutritional measurements of the respondents. According to the results, 36.3% of the participants were not known about their nutritional status, 39.5% of the respondents had normal BMI. Likewise, 33.9% of the respondents had calf circumference less than 31 which indicates poor muscle mass whereas 66.1% had normal measurement with calf circumference of more than 31.

Table 6: Anthropometric measurement of participants

	Frequency (n)	Percentage (%)
BMI		
Less than 19	42	33.9
19-21	26	21

21-23	23	18.5
23 or greater	33	26.6
Calf circumference		
Less than 31	42	33.9
More than 31	82	66.1
Mid arm circumference		
Less than 21	1	0.8
21 to 22	8	6.5
More than 22	115	92.7

Table 7: Association between socio-demographic variables and nutritional status

Factors	Nutritional status		P- value	Cramer's V
	Normal (n=69)	Risk/malnourished (n=55)		
Age group				
60-70 years	38 (55.1%)	26 (47.3%)	0.641	
70-80 years	27 (39.1%)	26 (47.3%)		
80-Above years	4 (5.8%)	3 (5.5%)		
Sex				
Male	35 (50.7%)	14 (25.5%)	0.004	0.257
Female	34 (49.3%)	41 (74.4%)		
Educational status				
Illiterate	44 (63.8%)	40 (72.7%)	0.289	
Literate	25 (36.2%)	15 (27.3%)		

In table 7, there was a significant association between sex and nutritional status (p-value 0.004 and crammers' V 0.257) with medium effect.

According to table 8, psychological stress or acute

disease (p-value 0.003 and crammers' V 0.270), neuropsychological problem (p-value 0.001 and crammers' V 0.289) and hypertension (p-value 0.003 and Cramer's V was significantly associated with nutritional status with medium effect.

Table 8: Association between health related characteristics and nutritional status

Factors	Nutritional status		P- value	Cramer's V
	Normal (n=69)	Risk/malnourished (n=55)		
Psychological stress or acute disease				
Yes	11 (15.9%)	22 (40%)	0.003*	0.270
No	58 (84.1%)	33 (60%)		
Neuropsychological problem				
Severe/mild dementia	17 (24.6%)	29 (52.7%)	0.001*	0.289

No psychological problem	52 (75.7%)	26 (47.3%)		
Hypertension				
Yes	16 (23.2%)	13 (23.6%)	0.003*	0.005
No	53 (76.8%)	42 (76.4%)		
Diabetes				
Yes	7 (10.1%)	4 (7.3%)	0.753	
No	62 (89.9%)	51 (92.7%)		

(\*) variables are significantly associated.

In table 9, smoking and the nutritional status were found to be significantly associated (p-value 0.014 and crammers' V 0.220).

Table 9: Association between lifestyle related factors and nutritional status

Factors	Nutritional status		P-value	Cramer's V
	Normal (n=69)	Risk/malnourished (n=55)		
Smoking				
Yes	8 (11.6%)	16 (29.1%)	0.014*	0.220
No	61 (88.4%)	39 (70.9%)		
Alcohol consumption				
Yes	29 (42%)	21 (38.2%)	0.664	
No	40 (58%)	34 (61.8%)		

(\*) variables are significantly associated.

As shown in Table 10, there was a significant association between low consumption of regular diet in last three months and nutritional status (p-value 0.042 and crammers' V 0.182) with small effect.

Table 10: Association between diets related factors and nutritional status

Factors	Nutritional status		P-value	Cramer's V
	Normal (n=69)	Risk/malnourished (n=55)		
Low consumption of regular diet				
Severe/mild decrease	7 (10.1%)	13 (23.6%)	0.042*	0.182
No decrease	62 (89.9%)	42 (76.4%)		
At least one serving of dairy products per day				
Yes	21 (30.4%)	9 (16.4%)	0.069	
No	48 (69.6%)	46 (83.6%)		
Two or more servings of legumes or eggs per week				
Yes	45 (65.2%)	35 (63.6%)	0.769	

No	24 (34.8%)	20 (36.4%)	
Meat, fish or poultry everyday			
Yes	12 (17.4%)	5 (9.1%)	0.172
No	56 (82.6%)	50 (90.9%)	

(\*) variables are significantly associated.

## DISCUSSION

In this study, 4% of the respondents were malnourished. This finding is similar to the studies conducted in Isfahan<sup>11</sup> and southwest China<sup>12</sup> with 3.8% and 3.2% respectively. In contrast, a study conducted in old-age homes of Kathmandu found that 15.5% of the respondents were malnourished.<sup>3</sup> Studies show a higher prevalence of malnutrition among elder people residing in old-age homes as compared to people residing in their own house.<sup>13,14</sup> These findings indicates malnutrition as one of the serious public health concern among the old-age population.

In the present study, 40.3% of the participants were at risk of malnutrition which is in line with the findings of the study conducted in Malaysia that showed 42.5% of the respondents were at risk of malnutrition.<sup>15</sup> The reason for being most of the people at risk of malnutrition in this study may be the lack of access to a nutritious diet. This study shows that more than half of the participants (55.6%) had a normal nutritional status that is nearly similar to the study conducted in Pakistan (48.7%).<sup>16</sup> Both Nepal and Pakistan are low-level economic countries with many similarities and almost the same type of diet pattern that may be one of the reasons for such similarity. Nutritional status was found to be significantly associated with sex of the respondents (p-value 0.005) and almost three-quarter of females were malnourished or at the risk of malnutrition consistent with the study done in India.<sup>17</sup> In many male-dominated societies, women do not get food in enough

proportion which decreases their overall nutrition status. This research shows no association between age group and nutritional status but studies conducted in old-age homes, there was a statistically significant association between neuropsychological problem and nutritional status (p-value 0.001).<sup>3,18</sup> This result is supported by the study conducted in Saudi Arabia.<sup>16</sup> In this study, dementia and other neuropsychological problem were significantly associated with nutritional status. This might be due to fact that patients with dementia can have a probability of forgetting to eat and cook. A study conducted in Nepal also found the significant association between elder people with depression.<sup>18</sup>

Nutritional status was significantly associated with the smoking status (p-value 0.021). This is similar to the study conducted in southern Brazil.<sup>19</sup> Current study reported that nutritional status and the decline in food intake were statistically significant (p-value = 0.042) which is consistent with a study conducted in south India in 2010.<sup>20</sup> This might be because the decline in food intake leads to the deficiency of various types of nutrition which can cause malnutrition. Similarly, this study found hypertension to be significantly associated with malnutrition which is similar with the study conducted in Kathmandu.<sup>3</sup> High salt consumption among the studied population who were malnourished might be the contributing factor for hypertension. There was no significant association between educational level and nutritional status in this study. However, the prevalence of malnutrition/at risk was higher among the illiterate participants than literate participants which is consistent with a study done in India.<sup>21</sup> Also, there was no significant association between alcohol consumption and nutritional status. This finding is not consistent with a study conducted in southern Brazil which shows the association of nutritional status with these factors.<sup>19</sup>

## CONCLUSION

In conclusion, many modifiable risk factors such as having low consumption of a regular diet and smoking were significantly associated with malnutrition. Such modifiable risk factors should be prevented through early invention. Similarly, the nutrition of elder people with health factors such as psychological stress and the neuropsychological

problem should be prioritized. These factors should be considered to promote healthy aging of the old population in rural places.

## REFERENCES

1. Amarya S, Singh K, Sabharwal M. Changes during aging and their association with malnutrition. *Journal of Clinical Gerontology and Geriatrics*. 2015;6.
2. World Health Organization (WHO). *Ageing and Health*: Geneva. 2018.
3. Singh D, Shrestha S. Nutritional status of senior citizens living in old age homes of Kathmandu metropolitan municipality. *International Journal of Community Medicine and Public Health*. 2016;3(7):1707-15.
4. Ghimire S, Baral B, Callah K. Nutritional assessment of community-dwelling older adults in rural Nepal. *PloS One*. 2017;12(2):e0172052.
5. Churak P, Praditsorn P, Meenongwah J, Wimonpeerapattana W. Factors Associated with Nutritional Status of Elderly in Ubon Ratchathani, Thailand. *Asia-Pacific Journal of Science and Technology*. 2019;24.
6. Hays N, Roberts S. The anorexia of aging in humans. *Physiology & Behavior*. 2006;88(3):257-66.
7. Kabir Z, Ferdous T, Cederholm T, Khanam M, Streatfield K, Wahlin A. Mini Nutritional Assessment of rural elderly people in Bangladesh: the impact of demographic, socio-economic and health factors. *Public Health Journal*. 2006; 9(8): 968-74.
8. Drewnowski A, Evans W. Nutrition, Physical Activity, and Quality of Life in Older Adults: Summary. *The Journals of Gerontology: Series A*. 2001;56(2):89-94.
9. Nestle Nutrition Institute. *Mini Nutritional Assessment*. 2009
10. World Health Organization (WHO). *Keep Fit for Life: Meeting the Nutritional Needs of Older Persons*. Geneva. WHO and Tufts University School of Nutrition Science and Policy. 2002.
11. Vafaei Z, Mokhtari H, Sadooghi Z, Meamar R, Chitsaz A, Moeini M. Malnutrition is associated with depression in rural elderly population. *J Res Med Sci*. 2013;18(Suppl 1):S15-S9.

12. R Shi R, Duan J, Deng Y, al. e. Nutritional status of an elderly population in Southwest China: A cross-sectional study based on comprehensive geriatric assessment. *The journal of nutrition, health & aging*. 2015;19(1):26-32.
13. Khole C. V, Soletti A. Nutritional Status of Elderly in the Old Age Homes: A Study in Pune City. *Curr Res Nutr Food Sci*. 2018;6 (1):234-40.
14. Payette H, Coulombe C, Boutier V, Gray-Donald K.. Nutrition Risk Factors for Institutionalisation in a Free-living Functionally Dependent Elderly Population. *Journal of Clinical Epidemiology*. 2000; 53(6):579-87.
15. Suazana S, Earland J, Suriah A, Warnes A. Social and health factors influencing poor nutritional status among rural elderly Malays. *The journal of nutrition, health & aging*. 2002;6(6):363-9.
16. Ahmad A, Ronis K. Nutritional status of Pakistan's elderly population: a comparative review with low to middle income countries. *Pakistan Journal of Public Health*. 2015;5(2):22-5.
17. Meena S, Singh V.B, Meena B.L, Singh K, Meena N, Sharma D, Beniwal S. Study Of Nutritional Status In Elderly In Indian Population. *Int J Current Res*. 2014;6(11):2014.
18. Ghimire S, Baral B, Pokhrel B, Pokhrel A, Acharya A, Amatya D, et al. Depression, malnutrition, and health-related quality of life among Nepali older patients. *BMC Geriatrics*. 2018;18(1):191.
19. Boscatto E, Duarte M, Coqueiro R, Barbosa A. Nutritional status in the oldest elderly and associated factors. *Revista da Associação Médica Brasileira*. 2013;59(1):40-7.
20. Vedantam A, Subramanian V, Rao NV, John KR. Malnutrition in free-living elderly in rural south India: prevalence and risk factors. *Public health nutrition*. 2010;13(9):1328-32.
21. Ramya M, Ranganath T, Jadhav J, Swetha N. 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*. 2017;4(5):1727-32.