NUTRITIONAL STATUS AND ITS ASSOCIATED FACTORS OF ELDERLY POPULATION LIVING IN OLD AGE HOMES OF KATHMANDU METROPOLITAN CITY

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ABSTRACT

Nutrition plays an important role in the overall well-being of human beings more so in the elderly. Elderly living at old age homes have a different nutritional status as compared to those living with their families. Thus, this study was conducted to assess the nutritional status of the elderly living in old age homes of Kathmandu Metropolitan City (KMC). A descriptive cross-sectional study was carried among 133 elderly residing in all six old age homes of KMC by using Nepali-translated Nestle's Mini Nutritional Assessment Tool (MNA). Further collected information was analyzed using chi square test. Regarding nutritional status, 30.8% of the participants had normal nutritional status, whereas 52.7% were at risk of malnutrition and 16.5% were malnourished. Lifestyle related factors such as smoking and physical activity were found to be the factors affecting the nutritional status of elderly people. Significant association was seen between nutritional status and age (p =0.001) and past occupation (p =0.021). A significant proportion of elderly people living in old age homes are at risk of malnutrition or are malnourished.

KEYWORDS

Nutritional status, elderly, old age homes, MNA, Nepal

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INTRODUCTION

Advancements in public health and medical care have contributed to the significant reduction in infant and childhood mortality rates during the first half of the 20th century. With increased longevity in adults, there is now a larger population of individuals aged 60 and above in developed countries.[1] The global population of people aged 60 or above will increase from 900 million to 2 billion by 2050, thereby making up a larger percentage of the total population, moving from 12.0% to 22.0%.[2] The aging of the world's population has brought significant attention to the matter of elderly care.[3]

Nutrition influences the overall well-being of all humans, not to mention its role in the elderly population.[4] Malnutrition ranges from severe undernutrition to overweight and obesity. In 2016, there was an increase in the number of people worldwide who are chronically undernourished, estimated to be 815 million, up from 777 million in 2015.[5] Elderly are particularly vulnerable to malnutrition, especially among the elderly living in the community in care homes.[6] The prevalence of malnutrition as rated by the Mini Nutritional Assessment short form (MNA-SF) among the elderly reported 0-8% for living in the community and 0-74% for those who are hospitalized or living in institutions.[7]

The aging process is often accompanied by various changes that can pose challenges in meeting nutritional needs. These changes can be classified into categories: physical/physiological and psychosocial.[8] The elderly population may experience malnourishment due to several factors, including a decrease in food consumption resulting from a decline in physical activity and resting metabolic rate that occurs as part of the aging process,[9] underlying medical conditions, gender (with women being at a greater risk), and economic vulnerability.[10]

Undernutrition, particularly in the elderly population, is a prevalent public health concern that can lead to increased mortality rates and economic challenges, particularly in developing countries.[11] Nutritionally inadequate diets can contribute to chronic and acute diseases and accelerate the development of degenerative diseases such as cardiovascular and cerebrovascular disease, diabetes, osteoporosis, and cancer associated with aging.[12] The recent increase in the prevalence of undernourished people is of great concern and poses a significant challenge to international commitments to end hunger by 2030.[5] However, it is known that 85.0% of chronic disease and disability in older adults can be prevented or mitigated with proper nutrition.[13]

A cross-sectional study conducted on 237 senior citizens living in old age homes in Kathmandu Metropolitan City showed 15.5% of them were malnourished and 61.0% at risk of malnutrition as per MNA scores.[14] Similarly, another study conducted in rural areas of Nepal, revealed 38.7% had normal nutritional status, 49.7 were at risk of malnutrition, and 11.6% were malnourished.[15] This has shown that the higher proportion of malnourished elderly individuals found among those who stayed in the old age homes as compared to people who live in their own houses.[16] Recognizing and addressing the nutritional requirements of elderly individual is essential in fostering optimal aging and enhancing their overall status.[17]

Thus, this study was carried out to assess the nutritional status and its associated factors among elderly people living in old age homes of Kathmandu Metropolitan City.

MATERIALS AND METHODS

This was a descriptive cross-sectional study conducted at old age homes in Kathmandu Metropolitan City from June to September 2022. All old age homes registered in Kathmandu Metropolitan City was included in the study, namely; Samaj Kalyan Kendra Sangh, Nishaya Sewa Sadan, Satpryash, Bouddha Briddha Ashram, Dhumbarahi Lion Briddhashram and Shree Janak Baba Aashrit Mandir. There were 99, 37, 8, 7, 6, and 5 elderly individuals of 60 years and above in the listed old age homes, respectively. Of the total 162 elderly people, 133 were eligible owing to the inclusion criteria. To be specific, elderly people with disabilities, inabilities to listen and respond and those residing for less than 3 months in the old age homes, were not included in the study. Thus, it was a complete enumeration of elderly residing in all the old age homes.

Data was collected using a semi-structure questionnaire. The technique of face-to-face interview was carried out with each participant in selected old age homes in Kathmandu Metropolitan City. Additional data was collected using the structured questionnaire known as Nestle's Mini Nutritional Assessment Tool (MNA), and the tool demonstrated 96.0% sensitivity and 98.0% specificity in various institutional study. It consisted of 18 items and was translated from English to Nepali. The tool

consists up of four components: anthropometric, general, dietary, and subjective. Cumulative scores range from 0 to 30. For the assessment of nutritional status, the cumulative score was categorized into three types:

1. An MNA score of less than 17 indicates malnutrition,

2. Scores between 17and 23.5 indicate the subject is at risk of malnutrition, and

3. Any score of 24 or higher is considered normal nutritional status.[18]

In anthropometric assessments, height was measured using a stadiometer. The measurements were taken without any footwear, with the participant standing on a flat surface, placing their feet together with their knees straight, and facing the interviewer. The recorded height was in centimeters. The weight was measured using a digital weighing scale placed on a flat surface. The measurement was taken with the participant wearing minimal clothes and no footwear, and it was recorded in kilograms. The Body Mass Index (BMI) was calculated by dividing the weight in kilograms by height in meters squared. Furthermore, Mid Upper Arm Circumference (MUAC) and calf circumference were measured using a non-stretchable measuring tape, with the measurement recorded to the nearest 0.1cm.

To ensure the liability of information, pretesting was done in the 10.0% of the participants with similar characteristics as the study population. An old age home, Dyomma Old Age of Bhaktapur was the selected site and necessary corrections in lagging area were made. Complete enumeration performed enhances reliability.

The collected data were analyzed using SPSS-17, and chi-square test was applied to measure the association between two categorical variables: dependent and independent variables. Ethical considerations were taken into account, with permission obtained from the Institutional Review Committee (IRC) of Nobel College (IRC: 38/022/023). Informed consent was taken from each old age home and from each participant for interview and assessment. All information was kept confidential i.e., respondent's privacy was highly maintained.

RESULTS

Table 1 shows the distribution of respondents according to their socio-demographic characteristics lifestyle, health related factors and anthropometric measurements of the

Table 1: Socio-demographic, lifestyle, health related factors and anthropometric measurements of the participants (n = 133)	
Variables	**n (%)**
Age (years)	
60-69	36 (27.1)
70-79	53 (39.8)
≥80	44 (33.1)
Mean ± SD	74.82± 8.764
Gender	
Male	28 (21.1)
Female	105(78.9)
Religion	
Hindu	125 (94.0)
Buddhist	8 (6.0)
Ethnicity	
Brahmin/Chhetri	68 (51.1)
Janajati	62 (46.6)
Muslim	1 (0.8)
Dalit	2 (1.5)
Educational status	
Illiterate	103 (77.4)
Informal education	17 (12.7)
Below high school	3 (2.3)
High school	7 (5.3)
University level or above	3 (2.3)
Past occupation	
Homemaker	44 (33.1)
Agriculture	56 (42.1)
Service	17 (12.8)
Business	16 (12)
Marital status	
Unmarried	30 (22.6)
Married	30 (22.6)
Widow/ Widower	73 (54.8)
Duration of stay	
5 years or less	59 (44.4)
More than 5 years	74 (55.6)
Smoking status	
Non-smoker	77 (57.9)
Current smoker	12 (9.0)
Former-smoker	44 (33.1)
Alcohol consumption status	
Used to before	23 (17.3)
Never	110 (82.7)
Physical activity	
Yes	94 (70.7)
Type of Physical activity (n=94)	
Light activity	71(75.5)
Moderate intensity activity	23 (24.5)
Presence of co-morbidities	
Yes	113 (85.0)
Presence of different co-morbidities	
Hypertension	61 (44.9)
Diabetes	18 (13.2)
Respiratory diseases	26 (19.1)
Arthritis	31 (22.8)
Body Mass Index	
Underweight	16 (12.0)
Normal weight	74 (55.6)
Pre-obesity	31(23.4)
Obesity	12 (9)
Mean ± SD	23.64±4.515
Mid-arm circumference(cm)	
MAC less than 21	2 (1.5)
MAC 21 to 22	15 (11.3)
MAC greater than 22	116 (87.2)
Calf circumference in (cm)	
CC less than 31	42 (31.6)
CC 31 or greater	91 (68.4)

participants. With a mean age of 74.82 years and 8.764 SD, 27.1 % belonged to the age group 60-69 years, 39.8% to the age group 70-79 years, and 33.1% to the age group 80 and above. Female participants were dominant as they were almost eight out of ten (78.9%). There were relatively more Hindus, (94.0%) among the surveyed population. A dominant

| Table 2: Distribution of general and dietary assessment of the respondents (n=133)	
Variables	n (%)
Food intake declined over past 3 months	
Severe decrease in food intake	13 (9.8)
Moderate decrease in food intake	51 (38.3)
No decrease in food intake	69 (51.9)
Weight loss	
Weight loss greater than 3 kg	8 (6.0)
Weight loss between 1 and 3 kg	2 (1.6)
No weight loss	18 (13.5)
Does not know	105 (78.9)
Mobility	
Bed or chair bound	2 (1.5)
Able to get out of bed/chair but does not go out	39 (29.3)
Goes out	92 (69.2)
Psychological stress	
No	83 (62.4)
Neuropsychological problems	
Mild dementia	12 (9.0)
No psychological problems	121 (91.0)
Took more than 3 prescription drugs per day	
No	96 (72.2)
Pressure sores	
No	119 (89.5)
Self-view of nutritional status	
Views self as being malnourished	2 (1.5)
Is uncertain of nutritional state	57 (42.9)
Views self as having no nutritional problem	74 (55.6)
Consider his/her health status	
Not as good	26 (19.5)
Does not know	35 (26.4)
As good	50 (37.6)
Better	22 (16.5)
Full meals per day	
2 meals	13 (9.8)
3 meals	120 (90.2)
At least one serving of dairy products	
Yes	118 (88.7)
Two or more servings of legumes or eggs	
Yes	90 (67.7)
Meat, fish or poultry everyday	
No	124 (93.2)
Two or more servings of fruit or vegetables per day	
Yes	123 (92.5)
Fluid consumed per day	
Less than 3 cups	8 (6.0)
3 to 5 cups	40 (30.1)
More than 3 cups	85 (63.9)
Mode of feeding	
Self-fed with some difficulty	39 (29.3)
Self-fed without any problem	94 (70.7)
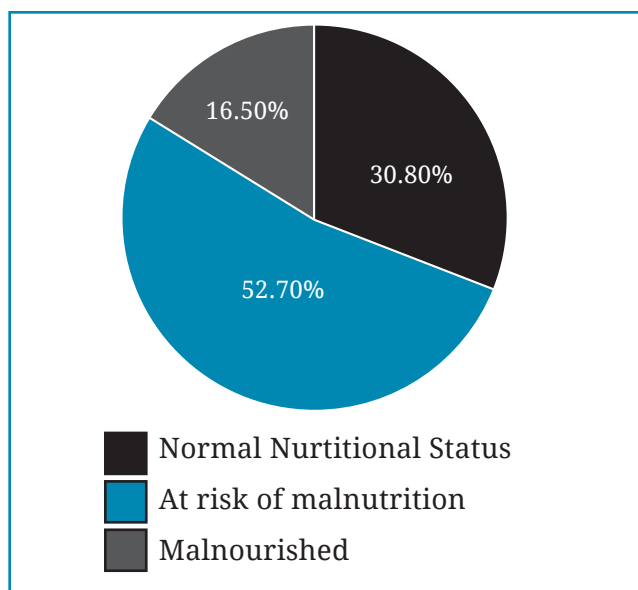
Fig. 1: Distribution of nutritional status of respondents according to MNA score

proportion of the respondents were *Brahmin/ Chhetri*, (51.1%) followed by *Adibasi-Janajati* (46.6). Most of the respondents were illiterate (77.4%). The result also showed that 42.1% were engaged in agriculture. Almost one out of ten (9.0%) were current smokers whereas one out of three (33.1%) had smoked in the past. Similarly, 17.3% used to consume alcohol. The study also showed that 70.7% of participants were engaged in physical activity. Among the 94 respondents, 75.5% were found to perform light activity. Majority 113 (85.0%) of participants were reported to have co-morbidities. Among the total respondents, 44.9% reported having hypertension. Talking about anthropometric measurements of the respondents, with the mean BMI of participants being 23.64±4.515 SD. There were 87.2% of the participants with a mid-arm circumference greater than 22 cm. Likewise, 31.6% of the respondents had a calf circumference less than 31, which indicates poor muscle mass.

Distribution of general and dietary assessment is shown in Table 2. Almost four out of ten (38.3%) had experienced a moderate decrease in food intake, and almost one out of ten (9.8%) had experienced a severe decrease in food intake over past three months due to loss of appetite, digestive problems, chewing, and swallowing difficulties. Almost four-fifth of the participants (78.9%) didn't know about their weight loss. Similarly, 69.2% of participants, were able to go outside the old age homes. A significant proportion (62.4%) didn't suffer from psychological stress. This study also showed that 9.0% were reported to have mild dementia. Almost three-quarters of

Table 3: Association between demographic, lifestyle health's related factors and general assessment with nutritional status

Variables	Nutritional status		P-value
	Normal n (%)	At risk/malnourished n (%)	
Age			
60-69 years	18 (51.4)	17(48.6)	0.001*
70-79 years	18 (34.6)	34 (65.4)	
≥80 years	5 (10.9)	41 (89.1)	
Gender			
Male	5 (17.9)	23 (82.1)	0.111
Female	36 (34.3)	69 (65.7)	
Educational status			
Illiterate	28 (27.2)	75 (72.8)	0.116
Literate	13 (43.3)	17 (56.7)	
Past occupation			
Homemakers	9 (20.5)	35 (79.5)	
Agriculture	17 (30.4)	39 (69.6)	0.021*
Service	5 (29.4)	12 (70.6)	
Business	10 (62.5)	6 (37.5)	
Marital status			
Unmarried	11 (36.7)	19 (63.3)	0.417
Married	11 (36.7)	19 (63.3)	
Widow/widower	19 (26.0)	54 (74.0)	
Duration of stay			
5 years or less	17 (28.8)	42 (71.2)	0.708
More than 5 years	24 (32.4)	50 (67.6)	
Smoking status			
Non-smoker	29 (37.7)	48 (62.3)	0.031*
Current smoker	5 (41.7)	7 (58.3)	
Former smoker	7 (15.9)	37 (84.1)	
Physical activity			
Yes	36 (38.3)	58 (61.7)	0.004*
No	5 (12.8)	34 (87.2)	
Presence of co-morbidities			
Yes	33 (29.2)	80 (70.8)	0.431
No	8 (40.0)	12 (60.0)	
Hypertension			
Yes	16 (26.2)	45 (73.8)	0.535
No	17 (32.7)	35 (67.3)	
Diabetes			
Yes	8 (44.4)	10 (55.6)	0.158
No	25 (26.3)	70 (73.7)	
Respiratory disease			
Yes	5 (19.2)	21 (80.8)	0.230
No	28 (32.2)	59 (67.8)	
Arthritis			
Yes	10 (32.3)	21 (67.7)	0.651
No	23 (28.0)	59 (72.0)	
Psychological stress			
Yes	13 (26.0)	37 (74.0)	0.439
No	28 (33.7)	55 (66.3)	
Took more than 3 prescription drugs per day			
Yes	9 (24.3)	28 (75.7)	0.403
No	32 (33.3)	64 (66.7)	
Full meals per day			
2 meals	4 (30.8)	9 (69.2)	1.000
3 meals	37 (30.8)	83 (69.2)	
Two or more servings of legumes or eggs			
Yes	33 (36.7)	57 (63.3)	0.045*
No	8 (18.6)	35 (81.4)	
Mode of feeding			
Self-fed with some difficulty	5 (12.8)	34 (87.2)	0.004*
Self-fed without any problem	36 (38.3)	58 (61.7)	

(*) variables are significantly associated.

the participants, (72.2%) didn't take more than three prescription drugs per day. Likewise, 10.5% had pressure sores. It was also observed that more than half of the respondents, (55.6%) viewed themselves as having no nutritional problem. Similarly, 37.6% of them considered their health status good in comparison with other people of the same age. Nine out of ten (90.2%) consumed three meals per day. The results showed that 6.8% of the participants consumed meat, fish, or poultry every day. Likewise, 92.5% of them consumed two or more servings of fruit or vegetables per day. In addition, 63.9% of participants consumed more than three cups of fluid per day. The study also showed slightly more than seven out of ten (70.7%) of the participants self-fed without any problem.

Fig. 1 shows the nutritional status of the respondents according to the MNA score. Regarding nutritional status, 30.8% of the participants had normal nutritional status, whereas 52.7% were at risk of malnutrition and 16.5% were malnourished.

Table 3 shows that the proportion of elderly people at risk or malnutrition or malnourished are more in the age group of 80 years and above (89.1%) than in the age group of 70-79 (65.4%) and in the age group of 60-69 (48.6%). In order to measure the association between age and nutritional status, the chi-square test was applied. The test showed a highly significant association between age and nutritional status (p =0.001). In this study, a significant association was observed between past occupation of participants and nutritional status (p =0.021). The test showed a statistically significant association between smoking status and nutritional status (p =0.031). In this study, a significant association was found between physical activity and nutritional status (p =0.004). Furthermore, a statistically significant association was found between consumption of two or more servings of legumes or eggs, mode of feeding and nutritional status (p =0.045 and 0.004, respectively).

DISCUSSION

Using the MNA tool, 30.8% of the respondents had normal nutritional status, 16.5% of them were malnourished with an additional 52.7% at risk of malnutrition in this study. This finding similar to the study conducted in old age homes of Kathmandu: 15.5 % of the elderly were malnourished and 61% were at risk of malnutrition.[14] These findings indicate a significant prevalence of malnutrition among

older individuals in Nepal. Other studies using the MNA tool conducted in different parts of South Asia suggest a similarly high prevalence of malnutrition among the elderly. Two studies conducted in India found prevalence of malnutrition at 15.0% and 14.0%. However, both had at least 30.0% of the population in the normal nutritional status range which is slightly higher than the current study.[19,20] In contrast, a study conducted in Bangladesh in 2006[10] revealed 26.0% prevalence of malnutrition and 62.0% at risk of malnutrition.

Present study shows the association between age and nutritional status of participants. Older age was associated with the lower MNA scores in our population. Similar findings has been observed in some previous studies as individuals age, their nutritional status appears to deteriorate.[21,22] In addition, a statistically significant association was observed between past occupation of the participants and nutritional status (p =0.021) in the present study. Similarly, an association between past occupation and nutritional status was observed in the studies conducted in Nepal.[23]

Nutritional status was significantly associated with the smoking status (p =0.031). This is similar to the study conducted in Pyuthan District of Nepal[24] and southern Brazil.[25] The association between smoking and nutritional status can be attributed to various impacts that smoking has on altering metabolic regulation and thyroid gland.[26] Those at risk of malnutrition or malnourished were seen in higher proportion among those who did not perform any physical activity (91.2%). A significant association was found between physical activity and nutritional status in this study (p =0.004). This findings is consistent with the study conducted in Morang district.[27] This can be explained by the fact that lack of physical activity can lead to lifestyle disease including both physical and mental health problems. It is well documented that physical inactivity, or a decreased physical activity level is an underlying mechanism of sarcopenia[28] and therefore, promotion of physical activity with nutrition intervention could be important for improving the well-being of elderly's. This study shows that mode of feeding was significantly associated with nutritional status, which is similar with the study conducted at Gokarneshwor Municipality in Kathmandu.[29]

In this study, no significant association was observed between educational level and nutritional status. The proportion of malnourished/ at risk was higher among the illiterate participants than literate participants

which is consistent with the study conducted in India[30] and Iran,[31] which indicate that the nutritional levels of elderly people are influenced by their literacy levels.

The study reveals a significant proportion of elderly individuals are at risk of malnutrition or being malnourished while living in old ages. Furthermore, nutritional status of elderly was significantly associated with explanatory variables: age (p =0.001), past occupation (p =0.021), smoking status (p =0.031), physical activity (p =0.004), two or more servings of legumes or eggs (p =0.045) and mode of feeding (p =0.004). These findings emphasize the importance of regularly monitoring the nutritional and health status of elderly people residing in such facilities. By implementing timely interventions, the nutritional well-being and quality of life for elderly individuals can be greatly improved.

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