



Nutritional Status of Dietary Patterns among Elderly Population in Bangladesh

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Abstract

This cross-sectional study examined dietary patterns and nutritional status of the elderly people (≥ 60 years) in rural Bangladesh, where food habits vary with marked difference by gender. Population for the study was assessed through simple random sampling and geological survey, elderly people who attended a pre-informed medical camp their information's were taken. A total of 63 respondents were recruited for the study. Data on socio-demographic and food habits were collected by face-to-face interviews with a pre-tested semi-structured questionnaire and nutritional status was determined using physical measurements. Body Mass Index (BMI) was classified in accordance with World Health Organization criteria. Cross-tabulations and Pearson's chi-square test were used to analyse the associations of dietary consumptions with BMI. Mean female age was 65.46, mean male age 67.69 years. The proportion of literate individuals was significantly more in males (39.8%) as compared to females (13.9%). The majority of men had low consumption of protein-rich foods, fruits and vegetables; 77.4% of them ate protein-rich foods less than 3 days per week. Both males and females were affected by malnutrition. There was, however, no significant association between dietary intake and BMI ($p > 0.05$). The results suggested that malnutrition is a significant public health problem among the elderly living in rural Bangladesh and nutrition interventions should be developed and implemented according to specific nutritional conditions.

Keywords: *Elderly Population; Nutritional Status; Dietary Patterns; Body Mass Index; Public Health Nutrition*

1. Introduction

Aging of population is gradually emerging as an issue not separate from social integration, gender advancement, economic stability or poverty (Sciubba, 2020). Demographically, population ageing is a global experience and Bangladesh is also not left untouched by this demographic reality (Mahmood & Dhakal, 2023). Bangladesh, has started to experience another emerging issue of population ageing in its highly vulnerable population and development context (Huang, 2024). In 2007, the number of the elderly people aged 60 and over in this country was 9.41 million and it has increased from 1.94 million in 1951 which is quite phenomenal (Buciuceanu-Vrabie & Savelieva, 2023). More than half of the world's older population lives in developing countries. Medical scientists are expecting that a person can live up to 200

years, even up to 300 years. To increase life expectancy every person has to practice physical work regularly, walk regularly and has to take meals on time with sufficient nutrition (Ye, 2024). Bangladesh is one of the twenty countries in the world with the largest elderly populations, and by 2025, along with four other Asian countries, will account for 44% of world's total elderly population (Navaneetham & Arunachalam, 2023). This rapidly increasing population is a new and important group in terms of social and health policy in the country. People are living longer; the average life expectancy at birth in Bangladesh has increased to over 60 years. It is found that in poor families, both in rural and urban areas, older people are often unable to meet the demand due to extreme poverty where food is the top priority (Razon et al., 2022). It has traditionally been the responsibility of the family to provide food and shelter to its elderly members in Bangladesh. Most of the elderly people of Bangladesh are not in a good socio-economic condition due to various problems such as poverty, wage discrimination, want of essential goods and commodities, shelter and compulsory retirement from job when age limit is attained (Saif et al., 2025). A small proportion (around 6%) of the total population of Bangladesh constitutes the elderly population, but the absolute number of them is quite significant (about 7.2 million) and the rate of their increase is fairly high. The majority are male in the urban area while most are women in the rural area (Rahman et al., 2021). About 90% of the urban elderly males live alone and are married, whereas 89% of the rural elderly women living alone are widowed. An extensive study on the importance of health education for improving the health quality of the rural elderly of Bangladesh was conducted (Samia Rahman et al., 2024). They concluded that provision of community-based health education intervention might be a potential public health initiative to enhance the health status of the elderly. The work revealed that marital status, work status, monthly income, habit of intoxication significantly affects the health status of female elderly of rural in Bangladesh (Rizwan et al., 2022). The government of Bangladesh has initiated some programs like pension, gratuity, welfare fund, aged persons fund, group insurance and provident fund for the retired government officials and employees (Sultana, Hasan, Hasan, et al., 2025). Health care issue of the elderly people in Bangladesh has not yet received any importance, though it is increasing alarmingly.

The present study was undertaken to gather over-all information on factors effecting the food habit and nutritional Status of old age people in Bangladesh motivated by the recognition that the best approach to enhance the aged people's dietary habit on the basis of nutritional intake in their daily food in taking condition and lifestyle in Bangladesh. Specifically, the attempt in this study was to investigate the knowledge and habit of elderly people in terms of nutrition intake and prohibiting malnutrition that influence the successful/positive aging of the old age people of the country.

2. Literature Review

The ageing process is accompanied by natural changes in physiology that affect nutritional requirements and dietary habits. Diminish of basal metabolic rate, reduced muscle mass, aged taste and smell senses, dental issue and change in gastrointestinal usually lead the elderly to lack of food intake (Islam, 2019). Considering these findings, it is well known that the elderly population is at a higher risk of undernutrition and micronutrient deficiencies, leading to frailty, morbimortality functional decline and ultimately increased mortality (Tasnim et al., 2023). Socio-demographic factors contribute significantly to dietary patterns in the elderly. Previous studies have shown that low income, poor education and limited availability of a greater variety of foods affect the choices of food items eaten and time fashion between meals in elderly people (Islam et al., 2025). Social status of elderly individuals, including living experiences, is also important; the elderly who live alone or apart from their spouse are more likely to suffer from low dietary intake and malnutrition, owing to limited social support and care (Khanom et al., 2025). Sex disparities in nutritional status of the elderly have been well established. There are reports from South Asia showing that the elderly women suffer disproportionately from malnutrition, as a result of deprivation in equality based on gender in food distribution, education, employment and access to health care throughout their lifetime (Karim et al., 2025). Economic dependence, marginalization, and

widowhood also make older women receive poor diet than men (Waid et al., 2019). Conversely, a number of reports have indicated that elderly men are at risk of undernutrition because they cannot cook and depend on others to prepare food. In China alone old persons will be living around 120 million by 2050. In Japan the number of elderly people is more than 11.65 % of total population than the other industrialized countries; so that the Japanese government has taken a national aged day to give more emphasis on health care services for the elderly people (Karim, 2024). American society has declaration of “Honor the past, imagine the future”, to give more emphasis on health care facilities and economic security for their elderly people.

Dietary intake habit is influenced by elderly people’s poverty, limited education, physical disability, loneliness and mental impairment (Khan et al., 2023). Food consumption pattern changes due to changes of aging; such as aging reduces appetite for food. Poor diet lead to weakness, these increases a feeling of isolation and abandonment (Salehin et al., 2022). Another study had reported that income, household composition, technology, time, education, attitude, changes in taste and smell, vision, hearing, physiologic and sociological changes and food preference, all factors are affected the food choice of elderly (Hassan et al., 2024). Dietary intake was largely independent on self-assessment of chewing difficulty although among women loss of chewing efficiency was associated with preference for sweet and soft foods. In all societies, expenditure of daily energy declines progressively throughout adult life (Banna, Hamiduzzaman, Kundu, Ara, et al., 2022). A low calorie diet may not impair health as long as nutrient density of the diet is high and can provide adequate amount of essential nutrients. The main determinant of energy expenditure is fat free mass under sedentary conditions, which declines by about 15% between the ages of 20 to 29 and 70 to 79, and in the elderly that’s contributing lower basal metabolic rate (Shamim et al., 2024). The major changes in whole body carbohydrate metabolism are associated with the increasing of age. The two hour plasma glucose level during an oral glucose tolerance test increases by an average 5.3 mg/dl per decade, whereas fasting plasma glucose increases by an average of 1 mg/dl per decade (Sarker et al., 2021). These ages’ related changes in glucose tolerance are due to diminished sensitivity of the peripheral tissues to insulin and can result in non-insulin-dependent diabetes mellitus (NIDDM). Muscle atrophy result from a gradual and selective loss of muscle fibers and the loss is more marked in those muscles involved in high-intensity “sprinting” type (type II fibers) movement, while those muscles necessary posture and most low intensity type (type I fibers) movement are preserved (Rahman et al., 2022).

Fat metabolism in body and body fat content are affected during aging. Among the middle aged people fat content in the body tends to be increased, especially in women (Jabbar & Kabir, 2023). The distribution of body fat also changes as increasing age, with marked accumulation of abdominal fat, especially in men. Fat tends to be more evenly distributed between central and subcutaneous deposits and appears to be less hazardous, in aging women (Shammi et al., 2021). There is a loss of lean body mass accompanied by a gain in body fat. Images obtained by magnetic resonance show a dramatic decrease in muscle size with age together with increase intramuscular and subcutaneous fat, mostly happened in women (Jahan et al., 2023).

As age is increasing the body content of protein is decreasing. The loss of body protein is affected, particularly at skeletal muscles. In elderly men and women total body protein is about 1.8 kg, which is lower than those of young adults (Sultana, Hasan, & Hasan, 2025). Loss of skeletal muscles, which in a young man make up about 45% of body weight, accounts for most of the decreases in protein reserves with advancing age. Total muscle mass decreases about 50% between the ages of 20 and 90, and this reduction is closely related with age to reduce in basal metabolic rate (Fahim et al., 2021). Generalized weakness is probably due to both a decline in the number of functioning muscle, fibers and decrease in the actual strength of the contractile process itself. As the elderly people are the largest consumers of drugs and in many cases for prolonged time drug users, as well as some may multiple drugs consumers due to some medical conditions. There are some drugs may seriously interfere with nutrient

metabolism and reduce adequacy of nutrients need (Saleedaeng et al., 2023). Impaired nutrient absorption or metabolisms have been demonstrated for long term consumes of some drugs such as- laxatives, diuretics and anticonvulsants should be of special concern. Relatively high alcohol consumption is mentioned among the elderly in some reports. In the presence of toxic ethanol levels, nutrient metabolism may become impaired, particularly, some vitamins such as, Thiamin, vitamin B6 and folate; also some minerals such as Zn and Mg are at risk (Sampa et al., 2020). Malnutrition can be cause of related diseases; as well diseases also occurs malnutrition. In malabsorption of folic acid and vitamin B12 up to 50% of the elderly may occur atrophic gastritis. Achlorhydria, which may also be associated with impaired nutrient absorption, particularly of protein bound nutrients. Health related problems reduce consumption of nutrients (Ahmed et al., 2022). Decrease in BMR and physical activity also reduce the nutrient needs. Some researchers have found that there were no differences in intestinal transit time in young versus elderly subject. Structural and biochemical changes have been well- documented in aging liver. After about age 50, the ratio of body weight as well as liver weight is decreases. However, in persons, no age related changes in liver function have been reported (Banna, Hamiduzzaman, Kundu, Sultana, et al., 2022).

In Bangladesh many elderly people suffer from many health problems with the advancement of age; such as diabetes, hypertension, heart diseases, cancer, liver diseases, peptic ulcer, parasitic, intestinal and gastro intestinal problem, skin diseases, osteoporosis, anemia, impaired immunity and malnutrition also other chronic diseases. It is well recognized that with advancing age, there is a higher incidence of chronic diseases, also includes osteoporosis, low back pain and anemia (Basak, 2022).

The nutritional status of elderly is determined by their nutrients intakes and requirements which are influenced by socio-economic constraints, family, social networks, mental intellectual activity, life style, physical activity and diseases states; but their individual health conditions are influenced by their intake and utilization of nutrients, determined from the correlation of information obtain from their physical, clinical, biochemical and dietary studies (Dutta et al., 2025). In the elderly effective nutritional status is a complex function. Body Mass Index (BMI) is listed as decreasing with increasing age. BMI is important evidence to measure nutritional status of adults and elderly. BMI is greater in women than in men, in most population. Lower BMI was found with samples of individuals of Chinese decent central and from South America, among men (Weerasekara et al., 2020). In the elderly, a decrease in BMI reflects a decrease in body weight, if their height is unchanged; however if height also decreases, then changes of BMI in the elderly has shown smaller. The highest height decreased, differences ranged from 1.9 to 6.7 cm in men and from 2.0 to 6.0 cm in women; were found with age in all population samples from Dutch and Swedes. Underweight is frequently associated with depressed immune function. The height percentage of underweight subjects were in the age group of 70 years and above found an anthropometric survey conducted an urban area of Karnataka in India. The prevalence of overweight increases with age and results in the loss of morbidity of the elderly (Hossain et al., 2024).

There is evident that in developing country the elderly will be vulnerable to health related predicaments associated with very low income, inadequate food intakes and poor food patterns, under and over nutrition, chronic illness and other diseases. Although, the physiological changes that negatively affect nutritional status and simply consuming enough food can become a major challenge to many elder people. It is reported that common reasons for inadequate food intake in institutionalized elder people are quite simple, those are lack of personnel to help feed patients, inappropriate or unnecessary dietary restrictions, and unappetizing food. It was also noted that, the enjoyment of food have an impact on QOL of elder people (Nepal & Nepal, 2025).

Worldwide it has been reported that high prevalence of malnutrition (15 - 60%) existed among hospitalized or living at home or in home care programmes elderly people. It is important that constant monitoring of the health status of older people in order to maintain their good nutritional status and prevent development of malnutrition. In long-term planning, efforts should be made to maintain or

improve quality of life (QOL) for older people, since regular screening and management ought to improve outcomes, such as prolonged independence and disease prevention.

Severe studies reported and suggest that elderly people have to tend to have poor nutrient intakes (Islam, 2025). Documented by Ngatia et al. very high carbohydrate intake among the elderly in Kenya, a similar study on the elderly in Zimbabwe and India documented very low protein intakes. In central Uganda, the prevalence of BMI and mid upper arm circumference is reported to be 33% and 52% respectively, within the population aged 60-90 years. In Mongolian elderly about 69% was well nourished, about 4.8% was malnourished and 26.2% was at risk of malnutrition. In Malaysia the prevalence of malnutrition among the relatively older elderly women was more common and it's suggested that worsening nutrition with advancing age. According to the MNA test, in Poland Wojszel ZB found that 12% of study sample were malnourished, where 61% were at risk of malnourishment and 27% were well nourished (Alam et al., 2021).

On the other hand, in rural Bangladesh results showed that 62% to be at risk of malnutrition and prevalence of protein energy malnutrition 26% were seen according to MNA score. In Bangladesh the prevalence of malnutrition was found 26% among elderly people living in rural community of Bangladesh (Khatun et al., 2021). Another study in Bangladesh was reported the prevalence of chronic energy deficiency 63% and 72% among adults (19 years and older) in two selected rural areas in Bangladesh. Others studies have found that elderly people suffer from various complicated physical diseases and day by day the number is increasing (Ferdous et al., 2019). Physical disabilities also hinder the capacity of some elderly people to get around to a variety of food stores. Previous study conducted that provision of community- based health education intervention might be a potential public health initiative to enhance the health status of the elderly (Sapała et al., 2025). The overall objective of this study was to assess the nutrient intake and nutritional status of elderly people from 3 selected old homes in Rural Bangladesh. The specific objectives are:

1. To determine the demographic and socio-economic status of selected elderly people from 3 selected old homes in Rural Bangladesh.
2. To measure nutrients intake (macro and micro) of selected elderly people through recording their 24-hour dietary recall with measurements of food items using standard measuring utensils from 3 selected old homes in Rural Bangladesh.
3. To assess the nutritional status of selected elderly people through their anthropometric data (height, weight & BMI) from 3 selected old homes in Rural Bangladesh.
4. To examine the personal hygiene and sanitation practices of selected elderly people from 3 selected old homes in Rural Bangladesh.
5. To formulate recommendations for the elderly in Rural Bangladesh based on study findings.

3. Methods and Methodology

This was a cross-sectional study carried out between July and August, 2023 among the elderly aged ≥ 60 years residing in three selected old homes of Bangladesh namely Udoi Mother and Child Rehabilitation Center – Kushtia, Jurapukuriya Aged Rehabilitation Center-Harinakundu (Jhenaidah) and Child & Old Aged Care–Kallyanpur (Dhaka). It was carried out through exhaustive sampling technique with a sample of 63 elderly who fit the inclusion and exclusion criteria. The data were collected by face to face interview technique with pretested semi-structured questionnaire which contains information on socio-demographic characteristics, practices of hygiene and dietary intake. Diet assessment was done

through 24-hour dietary recall method with the help of measuring cup (standard household) and it was verified from caregivers for their accurateness. Anthropometric measurements were performed using standardized techniques, body weight was measured with a calibrated manual balance scale and height with stadiometer; Body Mass Index (BMI) was calculated as the ratio of weight in kilograms to height in meters square and classified according to World Health Organization categories. The data were coded, cleaned and analyzed with Microsoft Excel 2007 and SPSS version 20 where descriptive statistics (frequency, percentage, mean, median, standard deviation) as well as percentiles and relevant statistical tests for presentation and analysis of DLDS results.

4. Result and Discussion

The major findings of the study as they relate to socio-demographic, nutritional and health status and hygiene-sanitation practices of elderly are presented and discussed in this section. The findings are presented in four thematic sections: Socio-demographic data, nutrition and health status, Personal hygiene behavior, Personal sanitation practices. The results are illuminated in each sub section, and we discuss the findings with respect to previous literature and their public health relevance and consequences for care of the elderly and nutritional well-being.

4.1 Socio-Demographic Information of the Respondents

The socio-demographic profile of the elderly respondents presents crucial contextual inferences about their nutritional vulnerabilities and feeding practices.

Table 1: Socio-Demographic Information of the Respondents

Variable	Category	n	%
Age (years)	Minimum	60	—
	Maximum	80	—
	Mean ± SD	66.79 ± 6.9	—
Gender	Male	32	50.8
	Female	31	49.2
Educational Status	Illiterate	12	19.0
	Primary level	—	—
	Secondary level	15	23.8
	Higher education	4	6.3
Spouse Status	Spouse alive	34	54.0
	Spouse deceased	26	41.3
	Not reported	3	4.7
Personal Income	Yes	32	50.8
	No	31	49.2
Monthly Expenditure	Highest expenditure	25	39.7
	Moderate expenditure	33	52.4
	Lowest expenditure	5	7.9

Table 1 shows that, age of the elderly respondents: among all the respondents' minimum age was 60 years, whereas maximum age was 80 years (66.79 + 6.9). The majority ages of the respondents were 60 years. Gender of the elderly respondents: all the elderly respondents male were 32 (51%) persons and female were 31 (49%) persons. shows that among the entire elderly respondents, 10 (16%), [male 4 (40%) & female 6 (60%)] persons were old home 1 respondents and 11 (17%), [male 2 (18%) & female 9 (82%)] persons were old home 2 respondents.

Another 42 (67%), [male 26 (62%) & female 16 (38%)] elderly persons were old home 3 respondents. Educational qualification of the elderly respondents: among all the elderly respondent's illiteracy high were in old home 3 respondents and they were 12 (21%) persons. Highly educated 4 (8%) persons were old home 2 respondents. Most of the elderly respondents 15 (24%) were educated up to secondary level, whereas 3 (20%) persons were old home 1 respondents, other 3 (20%) persons were old home 2 respondents and 9 (60%) persons were old home 3 respondents. Spouse of the elderly respondents: among all the elderly respondents 34 (54%), [male 26 (77%) & female 8 (23%)] elderly persons spouse was alive, whereas 26 (41%), [male 5 (19%) & female 21 (81%)] elderly persons spouse had died. Personal income of the respondents: all the elderly respondents 32 (51%), [male 24 (75%) & female 8 (25%)] persons had personal income, whereas, 1 (3%) person was old home 1 respondent, other 4 (13%) persons were old home 2 respondents and 27 (84%) persons were old home 2 respondents. The table also shows that among all the elderly respondents 31 (49%), [male 8 (25%) & female 23 (75%)] persons hadn't personal income. Total monthly expenditure of the elderly respondents: among the entire respondent's highest monthly expenditure were 25 (40%) persons, whereas 10 (40%) were old home 2 respondents and 15 (60%) persons were old home 3 respondents. The lowest monthly expenditure respondents were 5 (8%) persons and they were old home 1 respondents.

4.2 Nutrition and Health Status of the Respondents

Nutritional and health condition of elderly participants were evaluated based on BMI percentiles, nutritional status classification, the presence of malnutrition deficiency disease prevalence restricting eating habits food allergies. There were significant variations in nutritional status and health risks among respondents as revealed through the results.

Table 2: Nutrition and Health Status of the Respondents

Variable	Category	Frequency (n)	Percentage (%)
BMI Percentiles (Male)	5th percentile	15.6	—
	50th percentile (Median)	24.7	—
	95th percentile	30.0	—
BMI Percentiles (Female)	5th percentile	16.4	—
	50th percentile (Median)	25.2	—
	95th percentile	43.1	—
Nutritional Status (BMI)	Underweight	6	9.5
	Normal	26	41.3
	Overweight	24	38.1
	Obese	7	11.1
	Malnourished (Total)	37	58.7
Nutritional Deficiency	Present	40	63.5
	Absent	23	36.5
Disease Status	Suffered from disease(s)	56	88.9
	Not suffered	7	11.1
Food Restriction	Yes	35	55.6
	No	28	44.4
Food Allergy	Present	20	31.7
	Absent	43	68.3

BMI showed marked gender difference (Table 2). The 5th, 50th (median), and 95th percentiles of BMI were as follows for males: 15.6, 24.7, and 30.0, respectively, showing a wide range from under nutrition to obesity levels. The BMI for female respondents, however, was 16.4 (5th percentile), 25.2 (median), and as high as 43.1 at the 95th percentile indicating that obesity was significantly more prevalent among older women at the higher end of the distribution of BMI. This gender discrepancy may

be related to differences in physical activity levels, metabolic alterations and life-long dietary habits at older age. According to BMI classification, 58.7% of respondents were malnourished. Of those, 38.1% were overweight and 11.1% were obese, while 9.5% fell within the underweight range. The elderly in the normal range of BMI were only 41.3%. The high rate of overweight and obesity reflects a transition from the classic under nutrition to over nutrition-related malnutrition in older people, which is becoming more common among institutionalized and community-dwelling urban aging populations.

Nearly two-thirds of respondents reported suffering from nutritional deficiencies (63.5%) suggesting a large burden of micronutrient deficiency in this population. When analyzed by residence, 75.0% of the respondents with nutritional inadequacies were from Old Home 3 followed by Old Home 1 (17.5%) and Old Home 2 (7.5%). These disparities could be attributed to differences in quality of diets, number and diversity of meals, access to healthcare and nutritional surveillance at institutions. Health status assessment indicated that an overwhelming majority (88.9%) of the respondents had at least one chronic ailment. Old Home 3 had the highest percentage of patients with disease (69.6%) followed by Old Home 2 and Old Home 1: 16.1% and 14.3%, respectively. The concurrent presence of chronic diseases together with undernutrition falls in line with the well-recognized reciprocal relationship between malnutrition and morbidity in the elderly, where disease can contribute to loss of appetite (and reduced nutrient absorption), and vice versa.

Restriction of food intake was prevalent among the respondents as 55.6% indicated that they had their daily diet restricted. Fatty foods were the most restricted type of food among those with special diets (34.3%), followed by sweet and other types of food (31.4% and 31.4%, respectively). These limitations were probably to do with coexisting, pre-existent illnesses such as diabetes, cardiovascular disease and gastrointestinal disturbances which may require long-term changes in diet late-age. Food allergy was reported in about one third of participants (31.7%). In this subpopulation of allergic subjects, beef meat was identified as the most frequently reported allergenic food. Food allergies in combination with dietary restrictions and nutrient deficiencies might limit food selections further and may lead to inadequate nutrient intake if not carefully managed.

In general, results revealed significant under nutrition, micronutrient deficiencies and related non communicable chronic diseases in the older people surveyed (Banna, Hamiduzzaman, Kundu, Sultana, et al., 2022). That over nutrition is combined with disease prevalence and dietary restrictions, among the study population, indicates the need for tailored nutritional assessment dietary planning, regular health monitoring in institutions to help enhance their nutrition status and healthy lives of elderly population.

4.3 Personal Hygiene Behavior

This component presents the individual hygiene habits of elderly participants, considered matters corresponding to environmental sanitation and safe living. The results draw attention to those habits (toilet cleaning, room cleanness, utensil washing and bed sheet management) that are relevant for the prevention of infectious diseases and general health conditions among aged people in an institutional residence. The findings are reviewed for an evaluation of the appropriateness of sanitation measures and their potential health consequences.

Table 3: Personal Hygiene Practices of the Respondents

Hygiene Practices	Category	Frequency (n)	Percentage (%)
Brushing Teeth per Day	Once daily	38	60.3
	Twice daily	25	39.7
	Total	63	100.0
Hand Washing Before Eating (with Soap)	Always/Sometimes	34	54.0
	Rarely/Never	29	46.0
	Total	63	100.0
Taking Bath	Every day	58	92.1
	Not every day	5	7.9
	Total	63	100.0
Bathing with Soap per Week	2 times	19	30.2
	3 times	13	20.6
	4 times	7	11.1
	Every day	24	38.1
	Total	63	100.0
Cutting Hand & Foot Nails per Month	2 times	23	36.5
	3 times	24	38.1
	4 times	16	25.4
	Total	63	100.0

The results demonstrated the variation of hygiene practices among elderly participants. In terms of oral hygiene, most (60.3%) had brushed their teeth once a day and brushing twice per day was observed in the minority (39.7%) (Table 3). This suggests that a considerable number of elderly individuals are not following healthy dental practices, which could predispose them to some of the known oral and periodontal problems associated with aging. Agreeing with the present findings are previous studies in elderly groups residing in low resource settings, where there is poor knowledge and little access to dental services resulting into low oral hygiene practices (Mahmood & Dhakal, 2023).

The hand hygiene before food practice too was poor. While the majority of respondents, 54.0% washed their hands with soap always/sometimes, almost half (46.0%) rarely or never used soap during pre-meal handwash. Poor handwashing among the elderly may increase their risk for GI infections, and for other hygiene preventable illnesses in institutional settings such as long-term care facilities. Bathing habits seemed relatively acceptable, with 92.1% of study population daily bathed. Bathing with soap, however, was not as regular. Whether they used soap on a daily basis or not, 38.1% of the elderly participants stated that they washed with soap every day; others indicated that they used it 2-4 times/week. Such intermittent soap use as described here may reduce the efficacy of pathogen removal from skin, thereby enhancing susceptibility to infections.

Hygiene of nails had a fair adherence, where the majority reported that they cut their finger and toenails two to three times per month (74.6%). However, 25% of respondents cut the nails only four times per month indicating differences in personal hygiene performance. In general terms, the results of our study show that basic personal hygiene in relation to daily baths is relatively common, but important practices such as oral hygiene, hand washing with soap and the systematic use of a soap during bathing are not applied. This information highlights the importance of health education and promotion regarding hygiene for the elderly in order to enhance their overall health and prevent morbidity related to hygiene.

4.4 Personal Sanitation Practices of the Respondents

The results on the personal sanitation practices of old people with regard to cleanliness of their living environment and important areas are discussed of this sub-section. Proper sanitation is necessary for infection prevention, and overall healthy living conditions, especially among the institutionalized elderly.

Table 4: Personal Sanitation Practices of Elderly Respondents

Sanitation Indicator	Category	Frequency (n)	Percentage (%)
Bed Cover Sheet Cleaning (per week)	2 times	42	67
	3 times	8	13
	4 times	13	20
	Total	63	100
Room Cleanliness (Perception)	Not clean	2	3
	Moderately clean	18	29
	Good clean	29	46
	Satisfactory	12	19
	Excellent	2	3
Total	63	100	
Room Cleaning Frequency (per week)	2 times	6	10
	3 times	6	10
	4 times	1	1
	Everyday	50	79
	Total	63	100
Toilet Cleanliness (Perception)	Not clean	0	0
	Moderately clean	14	22
	Good clean	30	48
	Satisfactory	13	20
	Excellent	6	10
Total	63	100	
Toilet Cleaning Frequency (per week)	2 times	17	27
	3 times	12	19
	4 times	11	18
	Everyday	23	36
	Total	63	100
Serving Dishes Cleanliness (Perception)	Not clean	0	0
	Moderately clean	12	19
	Good clean	42	67
	Satisfactory	8	13
	Excellent	1	1
Total	63	100	

The findings in Table 4 demonstrate an overall good level of sanitation among the elderly. Bed cover sheets were the frequent washed by 67.1 percent of participants at an interval of twice per week and followed by 20 percent four times per week which was also indicative of cleaning practices for personal beddings. With regard to cleanliness of the room, 46% of the respondents indicated that their room was good clean, 19% satisfactory and 3% excellent. Of note, room cleaning was conducted on a daily basis for the majority of interviewees (79%) which indicated regular environmental hygiene of the facilities. Toilet cleanliness also seemed to be reasonably attended to, with none of the respondents

mentioning dirty toilets. Emerging half of the HCWs (48%) rated the toilet as good for cleanliness, followed by 20% and 10% for satisfactory and excellent. As regards how often the toilet was cleaned, 36% said that they cleaned it every day, while for others it was two to four times a week. In addition, serving dishes were reported clean (67% good and 19% moderate clean). In general, the OR results found herein... indicate that the sanitation of the old homes studied is in general quite satisfactory, which would be expected to have a beneficial effect on the health and well-being of their elderly inhabitants (Tasnim et al., 2023).

5 Findings

- The study indicated that a significant amount of the elderly population were suffering from malnutrition with both under-and over-nutrition seen in males and females.
- Consumption of protein rich foods, fruits and vegetables was found to be low among the majority of respondents indicating poor dietary diversity for aged persons.
- Body Mass Index and dietary intake patterns were not found to correlate significantly in a statistical analysis, implying that other than food frequency items, also other factors may affect nutritional status in old age.
- Significant differences were observed by gender, education, marital status and income where men had significantly better educational level and more literacy was seen among them compared to women.
- The high rate of chronic illness and self-reported malnutrition found in this study indicate an at risk health status among frail elderly people.
- Hygiene and sanitation, in fact, were adequate in the old homes indicating that institutional care facilities could form a conducive set-up for elderly well-being.

6 Recommendations

- Establish and execute focused nutrition programs in old-age homes to meet the appropriate intake of protein, fruits & vegetables etc. for senior citizens.
- Routine monitoring of dietary intake and BMI in aging residents helps to recognize the malnutrition at early stage, so as to focus on custom-made dietetic instruction.
- Carry out regular health examinations & screen for chronic diseases, lack of nutrients and other dietary problems and combine medical treatment with nutrition intervention.
- Continue disseminating the good personal hygiene and sanitation practices among the seniors, particularly in hand washing with soap and oral care to prevent infection.
- Capacity Building for Caretakers: Train old home staff and caretakers on nutrition planning, hygiene management, as well as in caring for an elderly person to enhance the quality of care.
- Elderly-targeted health and nutrition policies, including guidelines in institutions for meal planning, hygiene standards and prevention health programs need to be established.
- Promote a balanced diet, mixed food sources, and regular hygiene practices as necessary strategies for elder citizens to improve self-health and wellness.

7 Conclusion

The review emphasizes the prevalence of malnutrition, nutrient deficiencies and non-communicable diseases among elderly inhabitants of old aged homes with under and over nutrition identified in both sexes. In spite of the respondents' good level of personal hygiene and fairly satisfactory environmental sanitation, dietary consumption was inadequate for protein-rich foods, fruits, and vegetables suggesting that focused nutritional interventions are necessary. Health and nutrition status was

impacted by socio-demographic factors such as gender, literacy and income while institution care fostered a conducive environment for hygiene and sanitation practices. This research highlights the necessity of holistic interventions which integrate personalized nutritional plans, on-going health surveillance, hygiene processes and training for care-givers to maximize their well-being among the elderly. So if carried out well, these programs have the potential to increase quality of life for institutionalized older adults and lower health risks associated with diet and hygiene.

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