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Dietary pattern and lifestyle factors among elderly individuals: A cross-sectional study

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Abstract

Ageing is associated with physiological, psychological, and social changes that significantly influence dietary intake and lifestyle practices. Inadequate nutrition and unhealthy lifestyle behaviours among the elderly increase the risk of malnutrition, non-communicable diseases, and functional decline. The present study aimed to assess the dietary habits and lifestyle practices among elderly individuals, with emphasis on food consumption patterns, physical activity, and health-related behaviours. A cross-sectional study was conducted among 360 elderly participants, equally comprising males and females. Data were collected using a structured questionnaire that included information on socio-demographic characteristics, frequency of food group consumption, dietary habits, physical activity patterns, and lifestyle behaviors such as substance use. Descriptive statistics were used to analyze the data and results were expressed as frequencies and percentages. The findings revealed that vegetables and staple cereals were the most frequently consumed food groups to be consumed daily, whereas fruits, dairy products, nuts, and animal-source foods were consumed less regularly. Tea/coffee and sugar intake was high among both genders. Lifestyle assessment showed limited engagement in regular and high-intensity physical activity, with males more involved in structured exercises and females relying largely on household work. Substance use such as smoking and alcohol consumption was reported mainly among males. Only a small proportion of participants followed any dietary or lifestyle intervention. The study highlights imbalanced dietary patterns and suboptimal lifestyle practices among the elderly, particularly inadequate intake of protective and protein-rich foods and insufficient physical activity. These findings emphasize the need for targeted nutrition education and lifestyle modification programs to promote healthy ageing and improve the overall well-being of the elderly population.

Keywords: Elderly, dietary assessment, lifestyle practices, nutrition, healthy ageing, cross-sectional study.

Introduction

The global population is undergoing a significant demographic transition, with the number and proportion of elderly individuals steadily increasing due to improvements in healthcare, nutrition, and life expectancy. This rise in the elderly population brings complex health challenges, as ageing is accompanied by physiological, psychological, and social changes that directly affect nutritional needs and lifestyle behaviors. Age-associated changes include alterations in metabolism, reduced energy expenditure, loss of lean body mass, and compromised nutrient absorption, all of which increase the risk of malnutrition and diet-related chronic diseases among older adults.

Proper nutrition is a cornerstone of healthy ageing because it supports physical functioning, immune competence, and disease prevention. Elderly individuals are susceptible to inadequate intake of essential macronutrients and micronutrients, which can contribute to sarcopenia, osteoporosis, cardiovascular diseases, and metabolic disorders. Moreover, behavioural and lifestyle factors such as physical activity patterns, sleep quality, social engagement, and habits related to substance use have a profound impact on overall health and quality of life. (Gothe *et al.*, 2020) [2] According to research on lifestyle components among older adults, nutritional knowledge, dietary quality, and other modifiable behaviours interact closely and collectively influence health outcomes in the ageing population.

Despite the well-known importance of diet and lifestyle in maintaining health in later life, there remains a paucity of comprehensive data on the dietary patterns and lifestyle practices of elderly people in many settings.

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Studies have shown that diet quality among older cohorts can vary widely and is influenced by a range of social, economic, and household factors. These variations underscore the necessity for systematic assessment to inform targeted interventions that can improve nutritional status and promote healthier lifestyle behaviours.

A cross-sectional assessment of diet and lifestyle practices among the elderly provides essential evidence to identify gaps in nutritional intake and lifestyle behaviors. Understanding these factors is critical for developing effective public health strategies, nutrition education programs, and lifestyle modification interventions that aim to enhance functional ability, reduce disease burden, and improve the well-being of older adults.

Objectives

- To assess dietary patterns of the elderly.
- To evaluate lifestyle practices among elderly people.

Materials and Method

Study Design: A community-based cross-sectional study was conducted to assess dietary patterns and lifestyle practices among elderly people.

Study Area: The study was carried out in two cities (Bhubaneswar & Cuttack). These cities were selected to represent urban settings with diverse socio-demographic characteristics of the elderly population.

Study Population: The study population comprised elderly individuals aged 60 years and above residing in the selected cities during the study period.

Sample Size: A total of 360 elderly participants were included in the study, with 180 participants from each city. The sample size was determined to ensure adequate representation and statistical reliability.

Sampling Technique: A simple random sampling technique was employed. In the first stage, wards/areas from each city were selected randomly. In the second stage, households with eligible elderly individuals were identified. One elderly participant from each selected household was chosen using simple random sampling. If more than one eligible participant was present, one was selected by lottery method.

Inclusion Criteria

- Elderly persons aged 60 years and above
- Permanent residents of the selected cities
- Willing to participate and provide informed consent

Exclusion Criteria

- Elderly individuals who were seriously ill or bedridden
- Those with cognitive impairment affecting reliable response
- Individuals unwilling to participate in the study

Data Collection Tools and Techniques: Data were collected using a semi structured and pre-tested questionnaire through face-to-face interviews. The questionnaire included sections on:

- Socio-demographic characteristics
- Dietary patterns and meal frequency
- Food consumption habits and dietary diversity
- Lifestyle practices including physical activity, substance use and physical activities

Dietary intake was assessed using a 24-hour dietary recall method and a food frequency questionnaire (FFQ) to evaluate habitual food consumption.

Assessment of Lifestyle Practices: Lifestyle practices were assessed based on physical activity level, daily routine, smoking and alcohol consumption, and participation in social activities. Physical activity patterns were categorized as moderate, vigorous, or a combination of moderate and vigorous exercise based on self-reported activities.

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee prior to the commencement of the study. Informed written consent was obtained from all participants. Confidentiality and anonymity of the respondents were maintained throughout the study.

Statistical Analysis: The collected data were coded and entered in statistical software for analysis. Descriptive statistics such as frequencies and percentages were used to summarize the data.

Table 1: Frequency of consumption of food among the elderly ($n = 1360$)

Frequency / Food Groups	Daily		Weekly Once		Weekly Twice		Fortnightly		Never	
	Male ($n = 180$)	Female ($n = 180$)	Male ($n = 180$)	Female ($n = 180$)	Male ($n = 180$)	Female ($n = 180$)	Male ($n = 180$)	Female ($n = 180$)	Male ($n = 180$)	Female ($n = 180$)
	f(%)									
Fruits	50 (27.77)	31 (17.22)	39 (21.66)	45 (25.00)	43 (23.88)	18 (10.00)	27 (15.00)	45 (25.00)	21 (11.66)	41 (22.77)
Vegetables	155 (86.11)	120 (66.66)	16 (8.88)	10 (5.55)	10 (5.55)	29 (16.11)	-	21 (11.66)	-	-
Rice	109 (60.55)	88 (48.88)	21 (11.66)	17 (9.44)	45 (25.00)	34 (18.88)	5 (2.77)	41 (22.77)	-	-
Dhal	78 (43.33)	65 (36.11)	29 (16.11)	49 (27.22)	20 (11.11)	29 (16.11)	21 (11.66)	7 (3.88)	32 (17.77)	30 (16.66)
Flour	91 (50.55)	107 (59.44)	22 (12.22)	20 (11.11)	33 (18.33)	16 (8.88)	10 (5.55)	5 (2.77)	24 (13.33)	32 (17.77)
Egg	-	-	57 (31.66)	22 (12.22)	48 (26.66)	16 (8.88)	46 (25.55)	95 (52.77)	29 (16.11)	47 (26.11)
Poultry Meat	-	-	43 (23.88)	25 (13.88)	30 (16.66)	15 (8.33)	77 (42.77)	80 (44.44)	30 (16.66)	60 (33.33)
Fish	-	-	40 (22.22)	50 (27.77)	45 (25.00)	29 (16.11)	69 (38.33)	69 (38.33)	26 (14.44)	16 (8.88)
Meat	-	-	28 (15.55)	10 (5.55)	-	-	85 (47.22)	59 (32.77)	67 (37.22)	88 (48.88)
Sea Food	-	-	22 (12.22)	16 (8.88)	19 (10.55)	34 (18.88)	81 (45.00)	89 (49.44)	58 (32.22)	41 (22.77)
Tea/ Coffee	129 (71.66)	95 (52.77)	18 (10.00)	15 (8.33)	10 (5.55)	20 (11.11)	12 (6.66)	33 (18.33)	11 (6.11)	17 (9.44)
Milk & milk products:	65 (36.11)	30 (16.66)	46 (25.55)	21 (11.66)	33 (18.33)	22 (12.22)	19 (10.55)	79 (43.88)	17 (9.44)	28 (15.55)
Sugar	96 (53.33)	77 (42.77)	33 (18.33)	44 (24.44)	49 (27.22)	33 (18.33)	6 (3.33)	15 (8.33)	23 (12.77)	11 (6.11)
Nuts & Oil seeds	45 (25.00)	29 (16.11)	29 (16.11)	15 (8.33)	40 (22.22)	20 (11.11)	17 (9.44)	85 (47.22)	49 (27.22)	31 (17.22)

(Figures in parenthesis indicate percentage)

Results and Discussion

The table presents gender-wise frequency of consumption of different food groups and reveals clear differences in dietary patterns between males and females. Overall, vegetables and rice were the most frequently consumed foods, particularly among males, while animal-based foods and nuts were largely consumed infrequently by both genders.

Daily consumption of vegetables was very high, especially among males (86.11%) compared to females (66.66%), indicating better routine vegetable intake among men. Fruit consumption was moderate and irregular; only 27.77% of males and 17.22% of females consumed fruits daily, while a considerable proportion of females reported fortnightly or no fruit intake, suggesting inadequate fruit consumption, particularly among women.

Rice and flour, as staple foods, were commonly consumed daily or weekly, with males reporting higher daily rice intake (60.55%) and females showing slightly higher daily flour consumption (59.44%). Dhal intake was moderate, with daily consumption reported by about one-third of participants in both genders, though a notable proportion reported weekly or no consumption, indicating variability in plant-based protein intake. Eggs, poultry, fish, meat, and

seafood were not consumed daily by either gender and were mainly taken weekly or fortnightly. Females showed higher fortnightly consumption and non-consumption of eggs, meat, and seafood compared to males, reflecting lower intake of animal-source proteins. Meat and seafood showed particularly high levels of fortnightly and never consumption, especially among females.

Tea/coffee consumption was high, with males (71.66%) reporting higher daily intake than females (52.77%). Milk and milk products were consumed more frequently by males, while a large proportion of females consumed them fortnightly, indicating less regular dairy intake among women. Sugar intake was high in both genders, though daily consumption was higher among males. Nuts and oilseeds were least consumed, with a high proportion of females reporting fortnightly or no intake.

In summary, the findings indicate a diet dominated by staple cereals, vegetables, sugar, and beverages, with limited daily intake of fruits, dairy, nuts, and animal-based foods, particularly among females. This pattern suggests potential gaps in micronutrient and high-quality protein intake, especially among women.

Table 2: Dietary habit of the elderly people ($n = 360$)

Dietary Habits	Male ($n = 180$)	Female ($n = 180$)	Total
	f (%)		
Vegetarian	57 (31.66)	79 (43.88)	136 (37.77)
Non-vegetarian	123 (68.33)	101 (56.11)	224 (62.22)
Food Allergy	96 (53.33)	42 (23.33)	138 (38.33)
Consuming fast food	100 (55.55)	91 (50.55)	191 (53.05)
Not consuming fast food	80 (44.44)	89 (49.44)	169 (46.94)
Skipping meals	35 (19.44)	66 (36.66)	101 (28.05)
Following Intervention	45 (25.00)	20 (11.11)	65 (18.05)

(Figures in parenthesis indicate percentage)

The table indicates that non-vegetarian dietary habits were more common (62.22%) than vegetarianism (37.77%), with a higher proportion of females following a vegetarian diet compared to males. Food allergy was reported by 38.33% of participants, notably higher among males. Fast-food consumption was prevalent (53.05%) in both genders, with

slightly higher intake among males. Meal skipping was more common among females (36.66%) than males, indicating gender differences in eating patterns. Overall, a relatively small proportion of participants (18.05%) followed any dietary or lifestyle intervention, suggesting limited engagement in structured health practices.

Table 3: Assessment of physical Activity among the elderly ($n = 360$)

Categories	Male ($n = 180$)	Female ($n = 180$)	Total
	f (%)		
Regular exercise	80 (44.44)	45 (25.00)	125 (34.72)
Walking	95 (52.77)	45 (25.00)	140 (38.88)
Yoga	56 (31.11)	30 (16.66)	86 (23.88)
Aerobic exercise	21 (11.66)	-	21 (5.83)
Moderate Intensity	59 (32.77)	10 (5.55)	69 (19.16)
Vigorous Intensity	20 (11.11)	-	20 (5.55)
Combination of Moderate and Vigorous	45 (25.00)	21 (11.66)	66 (18.33)
Performing household work	55 (30.55)	89 (49.44)	144 (40.00)
Using energy saving devices	100 (55.55)	77 (42.77)	177 (49.66)

(Figures in parenthesis indicate percentage)

Overall, 34.72% of participants engaged in regular exercise, with higher participation among males than females. Walking was the most common physical activity (38.88%), particularly among males. Practices such as yoga and aerobic exercise were followed by a smaller proportion of participants, and aerobic exercise was reported only by males. Engagement in moderate- and vigorous-intensity activities was predominantly higher among males, while

females showed limited participation in higher-intensity exercises.

In contrast, performing household work was more common among females (49.44%) compared to males, contributing significantly to daily physical activity, with 40.00% reporting this practice overall. Nearly half of the participants (49.66%) reported using energy-saving devices, with slightly higher usage among males. Overall, the findings

suggest that while males are more involved in structured and higher-intensity physical activities, females primarily engage in physical activity through household work,

indicating differing patterns of energy expenditure between genders.

Table 4: Addiction Practices among the elderly ($n = 360$)

Categories	Male ($n = 180$)	Female ($n = 180$)	Total
	f(%)		
Smoking	41 (22.77)	-	41 (22.77)
Alcohol	34 (18.88)	-	34 (18.88)
Tobacco	12 (6.66)	19 (10.55)	27 (7.50)
Betel	54 (30.00)	67 (37.22)	121 (33.61)
Drugs	-	-	-

(Figures in parenthesis indicate percentage)

The table shows that smoking (22.77%) and alcohol consumption (18.88%) were reported only among males, while no female participants reported these habits. Betel chewing was the most common substance use (22.50%),

with a higher prevalence among males than females. Tobacco use was observed in both genders, slightly higher among females (10.55%) compared to males. No drug use was reported among the study participants.

Table 5: Frequency of consumption of substances ($n = 360$)

Categories	Daily		weekly		monthly		Rarely	
	Male ($n = 180$)	Female ($n = 180$)	Male ($n = 180$)	Female ($n = 180$)	Male ($n = 180$)	Female ($n = 180$)	Male ($n = 180$)	Female ($n = 180$)
f(%)								
Smoking	12 (6.66)	-	5 (2.77)	-	10 (5.55)	-	14 (7.77)	-
Alcohol	-	-	4 (2.22)	-	11 (6.11)	-	19 (10.55)	-
Tobacco	2 (1.11)	9 (5.00)	5 (2.77)	3 (1.66)	3 (1.66)	7 (4.44)	2 (1.11)	-
Betel	8 (4.44)	22 (12.22)	9 (5.00)	10 (5.55)	16 (8.88)	18 (10.00)	21 (11.66)	16 (8.88)
Drugs	-	-	-	-	-	-	-	-

(Figures in parenthesis indicate percentage)

The table shows gender-wise frequency of substance use among participants. Smoking and alcohol consumption were reported only among males, occurring mainly on a rare or monthly basis, with very few daily users. Tobacco use was present in both genders, though daily and monthly use was higher among females, while males showed lower and less frequent use. Betel chewing was the most used substance in both males and females, with use spread across daily, weekly, monthly, and rarely categories, indicating regular habitual use. No drug use was reported by either gender. Overall, substance use was generally infrequent, except for betel chewing, which emerged as the predominant habit.

Discussion

The present study provides important insights into the dietary habits and lifestyle practices of the elderly, highlighting patterns that have direct implications for nutritional adequacy, functional health, and prevention of non-communicable diseases (NCDs). Overall, the findings suggest a diet predominantly based on staple cereals and vegetables, coupled with low and irregular intake of fruits, dairy products, nuts, and animal-source foods, along with marked gender differences in lifestyle behaviours.

A notably high proportion of elderly participants reported daily consumption of vegetables, which is a positive finding, as regular vegetable intake is associated with improved micronutrient status and reduced risk of chronic diseases (WHO, 2015) [6]. However, fruit consumption was comparatively low and inconsistent, especially among females, with a substantial proportion consuming fruits only weekly, fortnightly, or not at all. Similar patterns have been reported in other Indian studies, where economic constraints, dental problems, and limited awareness were identified as barriers to adequate fruit intake among older

adults (Salehi *et al.*, 2010) [4]. Insufficient fruit intake may contribute to deficiencies of vitamin C, antioxidants, and dietary fiber, increasing susceptibility to infections and metabolic disorders.

Cereal-based foods such as rice and flour constituted the core of the daily diet, reflecting traditional dietary practices. While cereals provide energy, overreliance on refined grains, combined with inadequate intake of protective foods, may predispose the elderly to poor glycemic control and micronutrient dilution (Newby *et al.*, 2007) [3]. Dhal consumption, though present, was not universal, and a notable proportion of participants reported no intake, which may compromise plant-based protein adequacy.

The study also revealed low frequency of consumption of animal-source foods, including eggs, meat, fish, and seafood. These foods were largely consumed weekly or fortnightly, and non-consumption was common, particularly among females. This pattern may be influenced by cultural practices, affordability, and health beliefs. However, animal-source foods are rich in high-biological-value protein, vitamin B12, iron, and omega-3 fatty acids, which are critical for preventing sarcopenia, anemia, and cognitive decline in the elderly (Sheffield *et al.*, 2024) [5]. The limited intake observed in the present study raises concerns regarding protein-energy malnutrition and micronutrient deficiencies.

High daily consumption of tea or coffee and sugar was observed, especially among males. Excessive intake of caffeinated beverages may interfere with iron absorption, while high sugar intake has been linked to increased risk of obesity, diabetes, and dental problems in older adults (WHO, 2015) [6]. Conversely, nuts and oilseeds, which are valuable sources of healthy fats, protein, and antioxidants, were among the least consumed food groups, consistent

with findings from other community-based studies among elderly populations in India (Rusu *et al.*, 2019) ^[8].

Lifestyle practices showed gender-based differences. Males were more likely to engage in structured physical activities such as walking, yoga, and moderate-to-vigorous exercise, whereas females predominantly contributed to physical activity through household work. Although household activities do contribute to energy expenditure, they may not always meet the recommended intensity needed for cardiovascular and musculoskeletal health (WHO, 2020) ^[7]. Additionally, substance use such as smoking and alcohol consumption was reported mainly among males, aligning with national trends, and poses added health risks in older age, including cardiovascular disease and functional decline (CDC, 2019) ^[1].

Overall, the findings of this study underscore the need for targeted nutrition education and lifestyle interventions for the elderly, with special emphasis on improving fruit, protein-rich food, dairy, and nut intake, reducing excessive sugar and caffeine consumption, and promoting age-appropriate physical activity for both genders. Community-based programs and geriatric nutrition policies should address these gaps to enhance healthy ageing and quality of life.

Conclusion

The present study concludes that the dietary pattern of the elderly is largely dominated by staple cereals, vegetables, and beverages, while the regular intake of fruits, dairy products, nuts, and protein-rich animal foods remains inadequate. Although daily vegetable consumption was satisfactory among most participants, the low and irregular consumption of fruits and high-quality protein sources raises concerns regarding micronutrient deficiencies, poor protein adequacy, and increased risk of age-related health problems. Gender differences were evident, with females showing comparatively lower intake of fruits, dairy, and animal-source foods. Lifestyle assessment revealed that physical activity was limited and unevenly distributed, with males more engaged in structured exercises and females primarily relying on household activities for physical movement. Substance use such as smoking and alcohol consumption was mainly observed among males, while high consumption of tea/coffee and sugar was common in both genders. A relatively small proportion of participants followed any form of dietary or lifestyle intervention, indicating limited awareness or access to preventive health practices. Overall, the findings highlight the need for comprehensive, community-based nutrition education and lifestyle modification programs tailored to the elderly population. Emphasis should be placed on promoting balanced diets rich in fruits, pulses, dairy, nuts, and protein-dense foods, along with regular age-appropriate physical activity and reduction of unhealthy habits. Such targeted interventions are essential to improve nutritional status, prevent non-communicable diseases, and support healthy and active ageing among the elderly population.

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