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Tanmayee Mousumee Maharana
PhD. Scholar, Department of Home Science, Rama Devi Women's University, Bhubaneswar, Odisha, India

Dr. Suryamani Patro
Associate Professor, Department of Home Science, Rama Devi Women's University, Bhubaneswar, Odisha, India

Corresponding Author:
Tanmayee Mousumee Maharana
PhD. Scholar, Department of Home Science, Rama Devi Women's University, Bhubaneswar, Odisha, India

Assessment of anthropometry and physical well-being among the elderly people

Tanmayee Mousumee Maharana and Suryamani Patro

Abstract
The unprecedented rise in global population due to advance health care facilities presents complex challenges related to health, nutrition, and quality of life in developing countries. age-related physiological changes often result in a decline in physical well-being, increased vulnerability to disease, and nutritional deficiencies in elderly population. Therefore, assessment of the elderly people's physical and nutritional health is crucial for motivating healthy ageing and in preventing age-related health issues. This study adopts a cross-sectional approach to assess the physical and nutritional health of 360 elderly people aged 60 years or above, selected randomly from different locations of Bhubaneswar and Cuttack city. Socio demographic profile of the samples was collected through personal interview method using a pre-tested semi-structured questionnaire. Anthropometric measurements like height, weight, waist and hip circumference were taken by using standard measuring tools. Their morbidity pattern was also recorded as reported by the samples and from the recent medical records. Findings revealed that, most of the study participants had increased BMIs as well as greater waist circumference and lifestyle diseases such as diabetes, hypertension, and obesity. In order to guarantee early intervention and enhanced quality of life, the study focuses on the importance of routine nutritional monitoring and physical fitness assessments. In order to improve lifespan and general health outcomes, the study pays attention to the necessity of focused dietary and physical health initiatives.

Keywords: Elderly people, nutritional status, physical health, urban area

Introduction
Ageing is a complex bodily process that brings about a number of physiological, metabolic, and functional changes that have a big impact on the elderly people's physical and nutritional health.

According to Gedrich (2024) [4], keeping one's independence, keeping away from chronic diseases, and upgrading one's general quality of life all depend on eating well and staying physically well. Reduced appetite, poor digestion, long-term diseases, adverse drug reactions, and socioeconomic limitations are some of the issues older persons frequently deal with, and they all lead to malnutrition and deteriorating physical function (Amarya *et al*., 2015) [1].

Evaluation of nutritional and health status of the elderly people is crucial in order to recognize the inadequacies and put early remedies in place. Dietary intake analysis, biochemical indicators, clinical assessments, and anthropometric measures (such as height, weight, and body mass index) are the integral components of this examination. Malnutrition, in both forms, over nutrition and under nutrition, raises the risk of immune system weakness, muscle loss, and other health issues (Bourke *et al*., 2016) [3]. Healthcare providers can create individualised dietary regimens to enhance health outcomes with the aid of proper evaluation.

Similar to this, evaluating physical well-being emphasises total functional ability, muscle strength, endurance, flexibility, and mobility. Osteoporosis, sarcopenia (muscle loss), and decreased physical activity are age-related disorders that increase the risk of falls, cause frailty, and cause a loss of independence (Greco *et al*., 2019) [5]. Assessments including physical fitness tests, balancing tests, and grip strength measurements offer important information about a person's functional state.

In order to encourage good ageing, thorough evaluations of physical well-being and nutritional health status are essential. Elderly people can retain their best health and well-being by addressing lifestyle variables, promoting regular physical exercise, and putting customised

nutritional solutions into practice. This study emphasises how important physical examinations are for extending life expectancy, preventing age-related illnesses, and raising older individuals' general quality of life.

Materials & Methods

Study Design: The present study is a cross-sectional study conducted at different locations of Bhubaneswar and Cuttack city, Odisha.

Study Population: Individuals (both male and female) aged ≥60 years were included as respondents in this study.

Inclusion criteria

1. Older adults aged 60 years or above.
2. Individuals who were residents of the sample area and showed willingness to participate.

Exclusion criteria

1. Individuals not within the age range of ≥60 years.
2. Individuals who were absent during the time of survey and who were not willing to participate.

Ethical considerations

Ethical guidelines were followed, ensuring informed consent from participants, confidentiality, and adherence to ethical standards in data collection and analysis.

Sampling Method

Bhubaneswar and Cuttack city in Odisha, were chosen as the study locations for their diverse population and accessible healthcare facilities. A simple random sampling technique was employed to select 360 older adults, equal representation from both the genders, (180 males and 180 females), aged ≥60 years. The samples were selected from different areas of Bhubaneswar and Cuttack city.

Data Collection Tools and Procedure

A pre-tested semi-structured questionnaire was used to collect data on the socio demographic profile which consisted of age, sex, marital status, family type, socio economic status and living arrangement of the elderly population. Anthropometric measurements like height, weight, waist and hip circumference were taken by using standard measuring tools. Socio-economic status was determined using Kuppuswamy's scale. Their morbidity profile was also recorded.

Data Analysis

Data were analyzed using SPSS software. Descriptive statistics like frequency, percentage and mean were employed to interpret the results.

Results and Discussion

Table 1: Socio Demographic Status of the Elderly Samples

(n= 360)

Specifications	Categories	Total	Male (n= 180)	Female (n= 180)
		Frequency (%)		
Age	60-69 Years	155 (43.06)	85 (23.62)	70 (19.45)
	70-79 Years	107 (29.73)	50 (13.89)	57 (15.84)
	≥80 Years	98 (27.22)	45 (12.50)	53 (14.72)
Marital Status	Married	326 (90.56)	163 (45.28)	163 (45.28)
	Unmarried	34 (9.45)	13 (3.62)	21 (5.84)
	Divorced	8 (2.23)	8 (2.23)	-
	Widowed	58 (16.12)	7 (1.95)	51 (14.17)
Family Type	Joint	58 (16.12)	32 (8.89)	26 (7.23)
	Nuclear	302 (83.89)	148 (41.12)	154 (42.78)
Socio economic Status	Upper	54 (15.00)	24 (6.67)	30 (8.84)
	Upper middle	110 (30.56)	58 (16.12)	44 (12.23)
	Lower middle	196 (54.45)	98 (27.23)	98 (27.23)
Living Arrangement	Living alone	83 (23.06)	68 (18.89)	15 (4.17)
	Living with spouse	226 (62.78)	83 (23.05)	143 (39.73)
	Living with relatives	51 (14.17)	29 (8.05)	22 (6.12)

Table 1 provides information about the socio-demographic status of elderly people. The table shows that the maximum number of samples (43.06 %) belonged to 60-69 years of age group, followed by about 30.00 % in the group of 70-79 years and 27.00 % in the age range of above 80 years. In the age range of 60-69 years, male representation was more in comparison to their female counterparts, whereas in all other age groups reverse is the case. While, considering their marital status, majority (90.56%) of the elderly population were found to be married, with an equal distribution between males and females (45.28% in each category). A small number of elders were unmarried, with 3.62% males and 5.84% females. The unmarried category was quite small, but there were more females who were unmarried compared to males. Only 2.23% people in the sample were divorced, all of whom were male. A notable portion of the samples were widowed, with 14.17% females and only 1.95% males. A significantly higher number of widows indicate the higher life expectancy of women compared to men. A small proportion of elderly people lived in joint families, with 8.89% males and 7.23% females. The majority of elderly people lived in nuclear families, with 41.12% males and 42.78% females. The study records a high prevalence of nuclear family setups among the elderly population in the selected areas. Only 15.00% elderly people belonged to the upper socio-economic class, with 6.67% males and 8.84% females. A significant number of elderly people in this sample fell into the upper middle class, with 16.12% males and 12.23% females. Majority of the elderly people fell into the lower middle class, with an equal distribution of 27.23% among both males and females. A total of 23.06% elderly individuals lived alone, with 18.89% males and 4.17% females. Interestingly, a higher proportion of males lived alone compared to females in this sample. The majority of elderly individuals lived with their spouse, with 23.05% males and 39.73% females. A small number of elderly people lived with relatives (possibly

children or extended family), with 8.05% males and 6.12% females.

Table 2: Nutritional Status of the Elderly Samples

(n= 360)

Nutritional Status (BMI) (Kg/m^2)	Total	Male (n=180)	Female (n=180)
	Frequency (Percentage)		
Underweight (<18.5)	66 (18.34)	47 (13.06)	19 (5.28)
Normal (18.5-22.9)	54 (15.00)	36 (10.00)	18 (5.00)
Overweight (23-24.9)	84 (23.34)	31 (8.62)	53 (14.73)
Pre-obese (25-29.9)	128 (35.56)	55 (15.28)	73 (20.28)
Obese (≥30)	28 (7.78)	11 (3.06)	17 (4.73)

Table 2 breaks down the nutritional status based on BMI for a group of sample size of 360 elders (180 males and 180 females). The data is categorized by BMI ranges, and it shows the number of elders falling into each BMI category. There were more males (13.06%) than females (5.28%) in the underweight category. This might suggest that underweight is slightly more prevalent in men within this group, which can be concerning because it may indicate issues like malnutrition or muscle loss. Underweight individuals face increased risks, such as frailty and weakened immunity (Rietman *et al*., 2018) [8]. The normal BMI range seems to be the most common category, with a slight preference for females than their male counterparts (10.00% and 5.00% respectively). Being in the normal range is generally considered the healthiest for both males and females and indicates a lower risk of chronic diseases like cardiovascular diseases and diabetes. More females (14.73%) than males (8.62%) fell into the overweight category. This suggests a higher prevalence of being overweight among females in this group. Overweight individuals may face an increased risk of developing chronic conditions like hypertension and diabetes (Keramat *et al*., 2021) [7]. Under the pre-obese category, a larger number of women (20.28%) were found as compared to the males (15.28%) which is similar to the findings of the study conducted by Saha *et al*. 2023 [6]. The number of obese individuals was relatively small, and the gender distribution was fairly even, with a slight edge for females (4.73% females & 3.06% males). Obesity carries significant health risks, including heart disease, stroke, diabetes, and joint issues. This data suggests that a significant portion of this group is at risk of moving toward obesity, especially females.

Table 3: Waist to Hip Ratio among the Elderly Samples

(n= 360)

WHR	Range	Frequency (Percentage)
Male (n= 180)	<1.0	29 (8.06)
	1.0	54 (15.00)
	>1.0	97 (26.95)
Female (n= 180)	<0.8	25 (6.95)
	0.8	27 (7.50)
	>0.8	128 (35.56)

From Table 3 it was observed that the elderly women (26.95%) showed a higher frequency of elevated WHR compared to men (35.56%) revealing a higher prevalence of central obesity among elderly women, which could be due to post-menopausal fat redistribution (Tang *et al*., 2022) [10], reduced physical activity (Asp *et al*., 2017) [2], or dietary changes. Both genders show significant risk, but women appear slightly more vulnerable based on this measure.

Table 4: Morbidity Status among the Elderly Samples

(n= 360)

Morbidities	Total	Male (n=180)	Female (n=180)
	Frequency (Percentage)		
Diabetes	191 (53.06)	73 (20.28)	118 (32.78)
Hypertension	223 (61.94)	89 (24.73)	134 (37.23)
Arthritis	228 (63.34)	72 (20.00)	156 (43.34)
Cardio Vascular Disease	118 (32.78)	54 (15.00)	64 (17.78)
Respiratory Disease	102 (28.34)	64 (17.78)	38 (10.56)
Neurological Disorder	168 (46.67)	93 (25.84)	75 (20.84)
Gastro Intestinal Disorder	237 (65.84)	131 (36.39)	106 (29.45)
Vision/ Hearing Impairment	279 (77.50)	153 (42.50)	116 (32.23)

Table 4 presents the morbidity status of the elderly males and females. Vision/Hearing impairment was the most common complaint, affecting 77.50% elders (42.50% males, 32.23% females). Arthritis was the second most common complaint with 63.34% cases, heavily skewed towards females (43.34%). Hypertension and Gastrointestinal Disorders were also prevalent, with 61.94% and 65.84% cases respectively. Males suffered more from Vision/Hearing Impairment (42.50%), Gastrointestinal Disorders (36.69%), and Neurological Disorders (25.84%). They also lead in Respiratory Diseases (17.78%). Females had significantly higher Arthritis (43.34%) and Hypertension rates (37.23%). They also showed higher numbers in Diabetes (32.78%) and Cardiovascular Diseases (17.78%). Cardiovascular Disease had a low total count (32.78%), with males at 15.00% and females at 17.78%. Certain diseases (like arthritis and hypertension) appeared to disproportionately affect elderly women, possibly due to hormonal changes during post-menopausal phase and longer life expectancy (Kamińska *et al*., 2023) [9]. Elderly men seemed to be more affected by vision/hearing issues and neurological or gastrointestinal problems, which might suggest lifestyle-related risk factors or delayed healthcare-seeking behaviour.

Conclusions

The assessment of nutritional status and physical well-being among the elderly is essential for promoting healthy aging, preventing disease, and improving overall quality of life. Aging-related changes, combined with factors such as poor dietary intake, chronic illnesses, reduced physical activity, and socio-economic challenges, can lead to malnutrition, frailty, and functional decline. Regular evaluation of dietary patterns, anthropometric measurements, biochemical markers, and physical fitness indicators helps in identifying potential health risks and implementing timely interventions. A comprehensive approach that includes balanced nutrition, regular physical activity, and lifestyle modifications can significantly enhance longevity and well-being. Proper nutritional intake supports muscle strength, immune function, and overall health, while physical activity improves mobility,

balance, and independence. Early detection of nutritional deficiencies and physical limitations allows healthcare professionals to design targeted strategies to prevent complications such as sarcopenia, osteoporosis, and chronic diseases. In conclusion, regular assessment of nutritional and physical status in elderly individuals is crucial for ensuring a better quality of life. Through appropriate interventions, healthcare providers, caregivers, and policymakers can contribute to the well-being of older adults, enabling them to lead healthier and more independent lives. Promoting awareness and implementing supportive programs can further enhance the overall health and longevity of the aging population.

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