

Assessment of Nutrient Intake and Anthropometric Indicators among Elderly Individuals in Sukinda Block, Odisha

Ananya Jati¹, Subhalaxmi Barad², Heleena Jati³ and Dr. Roja Ghosh⁴

¹Pg Student, Department of Home science, Rama Devi Women's University, Bhubaneswar, Odisha

²Pg Student, Department of Home science, Rama Devi Women's University, Bhubaneswar, Odisha

³Assistant Professor, Department of Home science, Rama Devi Women's University, Bhubaneswar, Odisha

⁴Faculty of Home Science, Shailabala Women's (Auto) College, Cuttack, Govt. of Odisha

ABSTRACT

The present study aimed to assess the nutrient intake, nutritional status, and dietary gaps among the elderly population of Sukinda block in Jajpur district, Odisha. A descriptive cross-sectional research design was adopted, and 75 elderly individuals aged 55 years and above were selected using purposive sampling. Data were collected through a semi-structured interview schedule that included socio-demographic details, dietary assessment using 24-hour recall and food frequency questionnaire, and anthropometric measurements such as height, weight, body mass index (BMI), mid-upper arm circumference (MUAC), and calf circumference. The findings revealed that the mean intake of energy, protein, calcium, iron, and essential vitamins was below the recommended dietary allowances (RDA), indicating significant dietary inadequacies. Anthropometric assessment showed the coexistence of undernutrition and overweight, reflecting a dual burden of malnutrition. A considerable proportion of participants exhibited low MUAC values and were at risk of chronic diseases such as diabetes and osteoarthritis. Socioeconomic dependency, limited dietary diversity, poor awareness regarding balanced diets, and age-related physiological changes were identified as major contributing factors. The study highlights the urgent need for targeted nutritional interventions, strengthened geriatric healthcare services, and community-based awareness programs to improve dietary practices and promote healthy aging among the elderly population.

Keywords: elderly, nutritional status, dietary intake, anthropometric assessment

INTRODUCTION

Ageing is a normal and typical process for everyone. The term "old age" refers to the later years of a person's existence. The elderly population cut off age, according to the United Nations, is 60 years or older. Older individuals are becoming more prevalent everywhere. There will be 1.2 billion persons over the age of 60 in the world by 2025, and that number will rise to 1.9 billion by 2050. The old population's share of the overall population was 5.0% in 2000, and by 2025 and 2050, those numbers were projected to rise to 10.3 % and 15.0%, respectively. Approximately 138 million senior people will live in India in 2021 (67 million men and 71 million women), according to the Technical Group on Population Projections for India and States 2011-2036 report. Odisha's geriatric population is 11.8%. Geriatric folks are

often referred to as aged and elderly people. The Greek words “geron” (old man) and “iatros” (healer) are where the name “geriatric” originates.

Aging is a natural process that occurs to all of us. As we get older, there is a gradual decline in physical ability, but there are some factors contributing to how different people will show signs of age. Biological, psychological, and social factors can all contribute to how we age. Although all individuals are affected by aging, the effects of aging may differ between persons and may appear in different parts of the body. The aging process is characterized by significant changes physically and psychologically and how we utilize food and nutrients over time.

There is a gradual decline in bodily functions as individual ages. The rate and amount of decline for each person vary (Shock, 1970). Examples of age-related physical changes include changes in skin, hair, height, weight, teeth, and body composition. Aging skin generally becomes drier, will lose elasticity, become wrinkled, and have uneven pigmentation (these changes tend to become more apparent in women after menopause as their skin has decreased oil production). As people age, they usually lose some hair (which also usually turns gray) and lose the ability to eat properly due to missing teeth (this will decrease the amount of food consumed). Additionally, people lose some muscle mass and lose bone density over time; these losses contribute to height (both loss of height and strength) and also lower basal metabolic rate (BMR) (Sardesai, 1998; Eastwood, 2003).

Age-related deterioration of the gastrointestinal system leads to reduced secretion of saliva, digestive enzymes, and gastric acid, impairing digestion and nutrient absorption. Similarly, cardiovascular changes such as arterial stiffening, reduced cardiac output, and increased blood pressure decrease circulatory efficiency. These physiological changes, along with chronic conditions such as diabetes, arthritis, osteoporosis, dementia, depression, and gastrointestinal disorders, further compromise nutritional status in the elderly. Socio-economic factors, particularly financial insecurity following retirement, significantly affect food availability and quality. Declining income and savings often limit access to nutritious foods, especially in developing countries like India, where poverty, illiteracy, and chronic disease increase the prevalence of undernutrition among older adults.

Nutrition plays a critical role in healthy ageing. Adequate nutrition can delay the onset of age-related disorders, while poor nutrition accelerates ageing and increases the risk of morbidity, mortality, frailty, and reduced quality of life. Malnutrition among the elderly is a growing global concern that often remains undiagnosed despite its profound impact on individuals, families, and healthcare systems. Nutritional status reflects the relationship between nutrient intake, utilization, and health (Robinson and Lawler, 1982). It ranges from normal nutrition to excess nutrition, poor nutrition, latent malnutrition, and clinical malnutrition. In older adults, reduced energy requirements due to decreased physical activity and muscle mass must be balanced with adequate intake of nutrient-dense foods to prevent deficiencies.

Key nutrients essential for the elderly include calcium and vitamin D for bone health; protein to prevent muscle wasting and osteoporosis; dietary fibre to reduce constipation, cardiovascular

disease, and diabetes risk; potassium for blood pressure regulation; iron and folic acid for hematological health; vitamin B12 for neurological function; healthy fats for cardiovascular protection; and adequate fluids to prevent dehydration. Understanding these nutritional needs and the factors influencing food intake is crucial for promoting healthy ageing and improving the overall quality of life of the elderly population.

OBJECTIVES

- To assess the nutrient intake of elderly.
- To access the nutritional status using the anthropometric and dietary assessment.
- To assess the gap in dietary intake as per RDA.

SIGNIFICANCE OF THE STUDY

The elderly population in Jajpur district of Odisha faces a complex nutritional challenge shaped by socioeconomic, cultural, and health-related factors, with many individuals experiencing moderate to severe malnutrition due to inadequate dietary intake, limited access to healthcare, poverty, illiteracy, lack of awareness, and age-related physiological changes. Globally, the elderly population is expanding rapidly; particularly in developing countries like India, with projections estimating 1.2 billion people over 60 years by 2025 and 1.9 billion by 2050, while the proportion of elderly in the total population continues to rise significantly. Older adults require nutrient-dense diets rich in calcium, micronutrients, and fiber, including adequate intake of cereals, pulses, 200–300 ml of milk or milk products, and about 400 g of fruits and vegetables daily to support health and prevent deficiencies. Against this backdrop, the present dissertation aims to assess the nutritional and health status of elderly individuals in Jajpur district and to determine the prevalence of malnutrition and its associated risk factors in this population.

REVIEW OF LITERATURE

Rychlik et al, (2024) conducted a study on nutritional status elderly in Poland. The study include 604 participants where 300 were men and 304 were women aged 65 years and above. The nutritional status was assessed on the basis of anthropometric measurement: body weight, height waist and hip circumference. Based on BMI (Body Mass Index) the prevalence of underweight (≤ 20.0) overweight (25.0-29.9) and obesity (≥ 30.0) was assessed underweight was found in 1.3% of men and 4.3% of women. 55.3% of men and 40.1% of women were overweight, 20.3% and 21.7% were obese respectively. Waist circumference indicating an increased risk of metabolic complications was found in 44.1% of men and 67.5% of women.

Ricardo et al, (2023) surveyed on nutritional status, dietary habits and physical activity in older adults from Manta, Manabi defining the nutritional status and physical activity level of older adults makes it possible to guide them toward healthy lifestyles. Objective: The aim of this study was to evaluate dietary habits, nutritional status, and physical activity engagement in older adults living in the city of Manta, Manabi. Methods: An observational, descriptive and cross-sectional study of 130 older adults was conducted to determine nutritional status via anthropometry; self-reported frequency of the consumption of foodstuffs, calculation of the

healthy eating index (IAS) and physical activity patterns. Results: Average age was 71.62 ± 4.34 years, whilst 83.07% of participants were at nutritional risk due to being overweight or obese. Dietary habits in males were characterized by the consumption of three meals a day, as well as greater intake of cereals, roots, tubers and milk and its derivatives, whilst females consumed more fruits and vegetables. Meat was widely consumed, although females consumed more fish and seafood than males. Eggs were hugely popular foods, In contrast to legumes. Pasta was a dietary staple in females. Visible fats and luncheon meats were consumed little. IAS values reflected the "need to change", whilst physical activity engagement was found to be low. Conclusions: The nutritional status of the present study population was characterized by a tendency toward increasing overweight, particularly amongst females, with the predominance of class-1 obesity, low physical activity and a healthy eating index requiring change toward more healthy habits.

Acharya et al, (2022) conducted a study on Nutritional status and associated factors among the elderly people in Madavi rural municipality of python District, Nepal A community based-cross-sectional descriptive and questionnaire study was carried out among 124 elderly people. This study started from 2019 to November 2019. Data collection was carried out through a structured questionnaire using the standard tool, mini nutritional assessment. Ethical approval was taken from Nepal health research council. Chi-square test was used to identify the association between independent variables and nutritional status more than $\frac{1}{4}$ nth of the total respondents had weight loss in the last three months. 8.9% had diabetes. 40.3% were at risk of malnutrition and 4.0% were malnourished.

Patwardhan (2019) nutritional status of old age people in Marthwada region. Total 500 samples were selected by purposive random sampling method and out of them 30samples were selected by specific purpose random sampling. This study was combination of survey by interview schedule and evaluation of NEP. Data was collected by primary and secondary methods. For health and nutritional assessment, recall method, dietary patterns and habits by questionnaire, anthropometric measurement, clinical observations, biochemical test and bio-physical test were conducted. 30 samples, each 10 from hypertension, diabetes and heart trouble.

Shakersain et al, (2019) conducted a study on nutritional status and survival among old adults: 11 year population- based longitudinal study, all the participants, 51 (1.7%) had malnutrition and 751 (24.7%) were at risk for malnutrition. The multi-adjusted hazard ratio (95% confidence interval) of mortality was 2.40 (1.56-3.67; $P \leq 0.001$) for malnutrition and 1.49 (1.29-1.71; $P \leq 0.001$) for risk for malnutrition. The median ages at death of participants with malnutrition and risk for malnutrition were 3 and 1.5 years shorter than those with normal nutritional status, respectively, whereas malnutrition or risk for malnutrition together with abnormal biomarker (hemoglobin and albumin) levels was related to 1 year more shortened survival. Conclusions: Malnutrition and risk for malnutrition are highly prevalent and significantly associated with a shorter survival. Poor nutritional status in combination with abnormalities in the biomarkers is associated with even more shortened survival.

Shresth L, Bastola.P, (2019) nutritional health status assessment of geriatric people of one rural district in Nepal. The sample size was 380 people age. A community based cross sectional data was collected by face-to-face interview technique. They use anthropometric measurement of height using measurement tape and weight using weighting machine and calculated BMI. They use SPSS version.16 for data analysis. Among 380 samples participants information from 364 participants was included for analysis as the remaining didn't give complete information. Out of 364, 33 were severely underweight 57 were under weight and 20 were obese. 85.9% had health problem, mainly of respiratory, hypertension and diabetes. This study was done within a period of six months (November, 2017 to April, 2018).

RESEARCH METHODOLOGY

Research Design:- The descriptive or survey research strategy chosen for the study's execution is one in which an attempt is made to describe and explain current conditions by gathering information from a large number of individuals using questionnaires to completely describe a phenomenon.

Selection of area:- The present study was conducted in Jajpur district, where there is a considerable number of elderly. Information on the approximate number of households in these wards were collected and subsequently, households with persons above fifty five years of age was identified. In case the old person was not available, the next house was visited till the elderly was contacted. A total of 55 households were selected. Similarly, a total number of 75 elderly above the age of 55 was selected from these old age homes for the study. The area selected for the study is presented.

Statistical analysis:-The collected data was compiled into various simple and complex frequency tables.

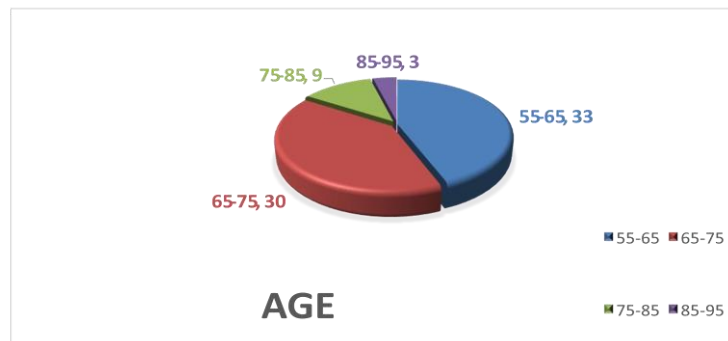
RESULT AND DISSCUSSION

4.1. AGE: -

Distribution of the elderly based on age

Age group	Frequency (n=75)	Percentage (%)
55-65	33	44
65-75	30	40
75-85	9	12
85-95	3	4
Total	75	100

4.1.1



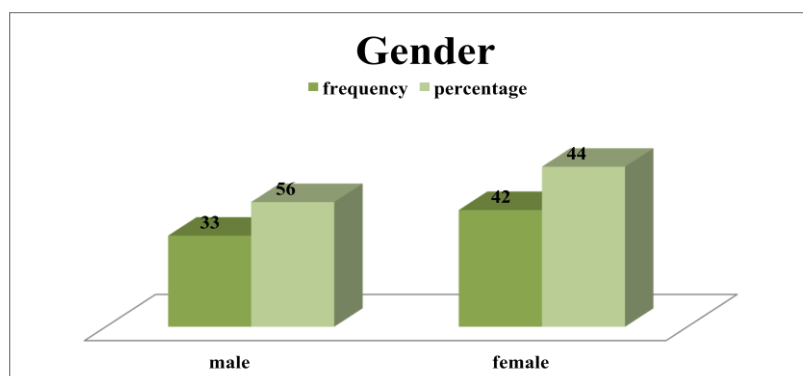
Interpretation- The above table indicates about the age category of the respondents selected. The table shows that 44% of respondent are in 55-65 age group, 40% are in 65-75 age group, 12% are in 75-85 age group, 4% are in 85-95 age group. Graphical representation shown in graph.

4.2. GENDER: -

Distribution of the elderly based on gender

Gender	Frequency (n=75)	Percentage (%)
Male	33	56
Female	42	44
Total	75	100

4.2.2



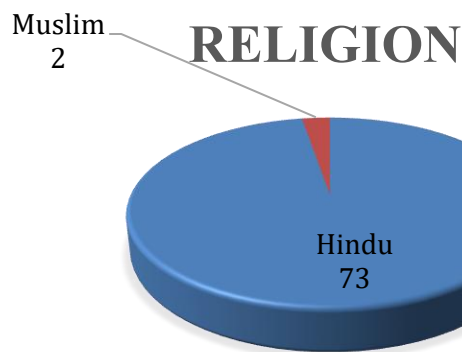
Interpretation - The above table indicates about the gender of the selected respondents. The table shows that 56% of the respondents were male, 44% were female. Graphical representation shown in graph.

4.3. RELIGION: -

Distribution of the elderly based on religion

Religion	Frequency (n=75)	Percentage (%)
Hindu	73	97.3
Muslim	2	2.7
Total	75	100

4.3.3



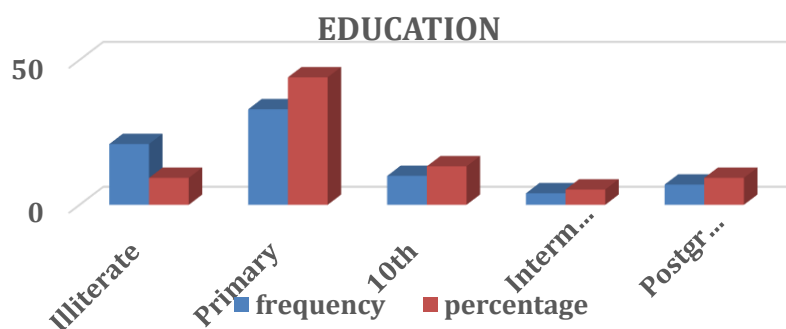
Interpretation - The above table shows that 97.3% of the respondents were Hindu, 2.7% were Muslim. Graphical representation shown in graph.

4.4. EDUCATION: -

Distribution of the elderly based on education

Education	frequency (n=75)	Percentage (%)
Illiterate	21	9.3
Primary	33	44
10th	10	13.3
Intermediate	4	5.3
Post graduate	7	9.3
Total	75	100

4.4.4

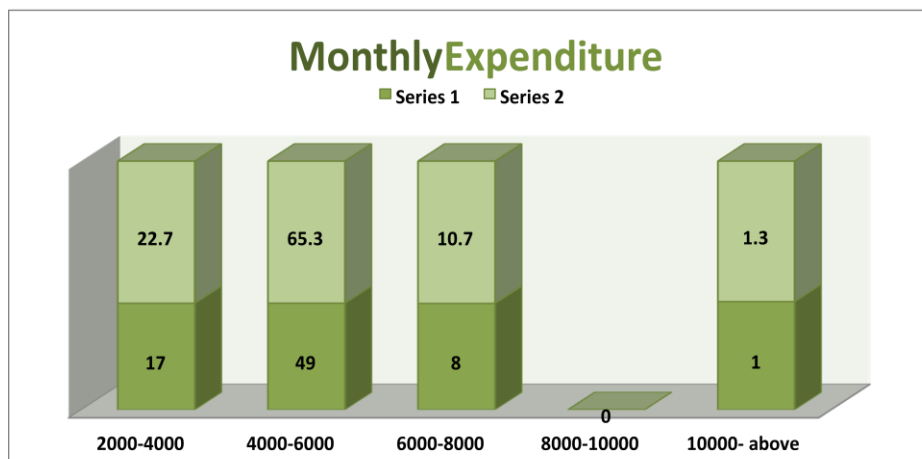


Interpretation- The above table shows that 9.3% of the elderly were illiterate with about 44% of them were having primary qualification. 13.3% of them had done 10th and 5.3% of respondents were intermediate and 9.3% respondents were having post-graduation level educational qualification. Graphical representation shown in graph.

4.5. MONTHLY EXPENDITURE: -

Distribution of the elderly based on monthly expenditure

monthly expenditure	Frequency (n=75)	Percentage (%)
2000-4000	17	22.7
4000-6000	49	65.3
6000-8000	8	10.7
8000-10000	0	0
10000-above	1	1.3
Total	75	100



4.5.5

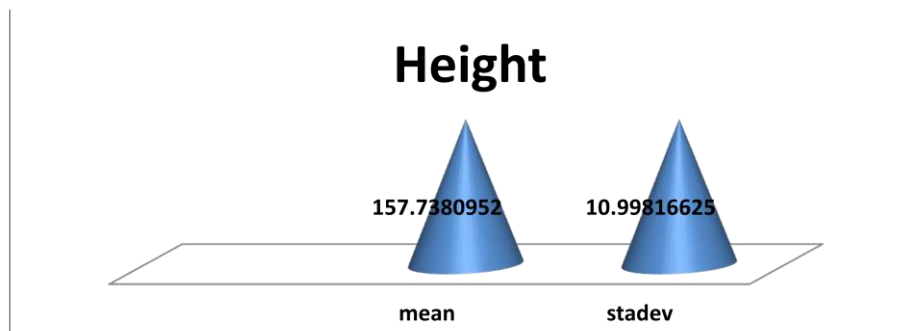
Interpretation - The above table shows that 22.7% of the of old people spent 200-4000 in one month and 4000-6000 rupees was spent by 65.3% of the old people 10.7% spent 60000 to 8000 rupees and only 1.3% old people spent 10000 and above in a month. Graphical representation shown in graph.

4.6. HEIGHT: -

Distribution of the elderly based on mean height

	mean (CM)	stdev
Height	157.70667±	10.993577

4.6.6



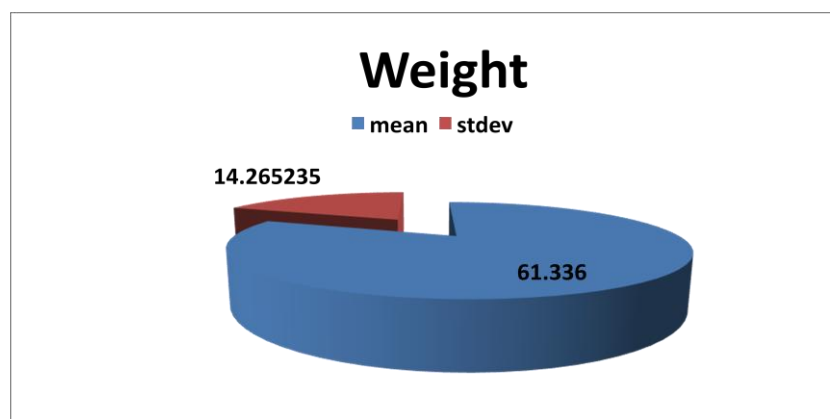
Interpretation - The above table shows that, the average height of the all-selected age group is 157.70 ± 10.99 . The height of the males was more than females' height. Graphical representation shown in graph.

4.7. WEIGHT: -

Distribution of the elderly based on mean weight

	mean (KG)	stdev
weight	61.336±	14.265235

4.7.7



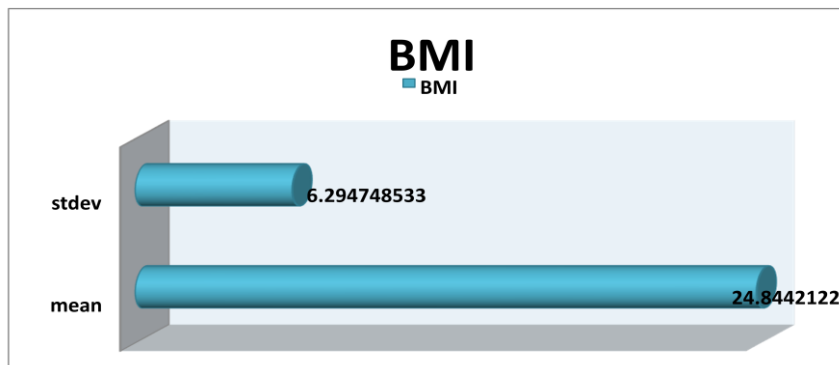
Interpretation- The above table shows that, the total average weight for elderly men and women was (61.336 ± 14.26523) . Graphical representation shown in graph.

4.8. BMI: -

Distribution of the elderly based on BMI

	mean (wt in kg/ht 2 (meter))	stdev
BMI	24.844212±	6.2947485

4.8.8

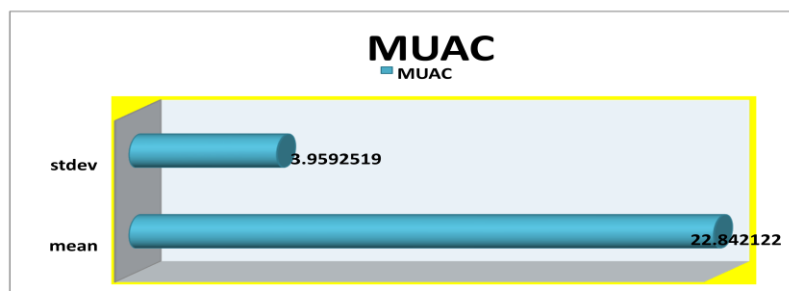


Interpretation- The above table shows that, the average BMI for the elderly men and women was $(24.844212 \pm 6.2947485)$. Graphical representation shown in graph

4.9. MUAC: -

Distribution of the elderly based on MUAC

	mean (CM)	stdev
MUAC	22.8±	3.9592519



4.9.9

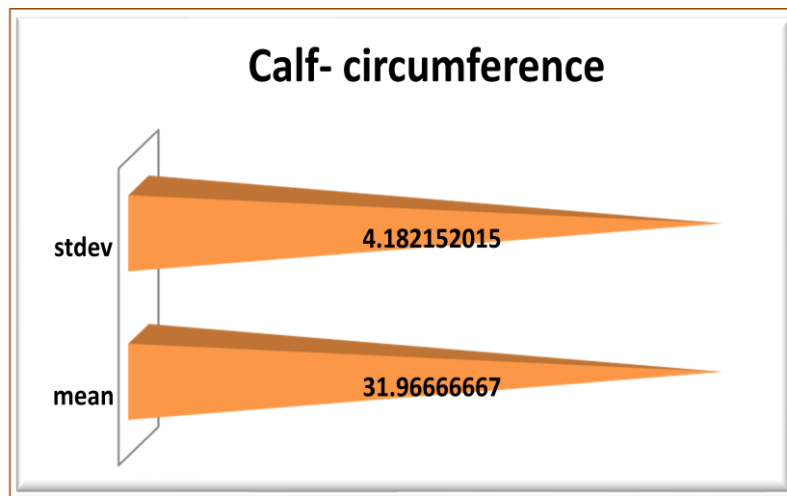
Interpretation- The above table shows that, the average MUAC of male and female selected group was (22.8 ± 3.95) . Graphical representation shown in graph.

4.10. CALF CIRCUMFERENCE: -

Distribution of the elderly based on Calf circumference

	mean (CM)	stdev
CC	31.966667	4.182152

4.10.10



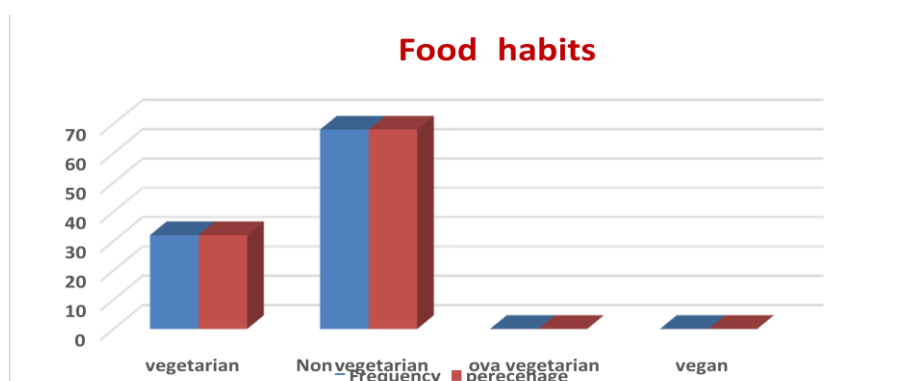
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4.11. FOOD HABITS:-

Distribution of the elderly based on food habits

food habits	Frequency (n=75)	Percentage (%)
Vegetarian	24	32
Non-vegetarian	51	68
Ova vegetarian	0	0
Vegan	0	0
Total	75	100

4.11.11



Interpretation- The above table shows that 32% were vegetarian, 68% respondent are non-vegetarian. Graphical representation shown in graph.

4.12. CONSISTENCY OF FOOD: -

Distribution of the elderly based on consistency of food

Consistency of food	Frequency (n=75)	Percentage (%)
Solid	75	100
Liquid	0	0
Semi liquid	0	0
Total	75	100

4.12.12



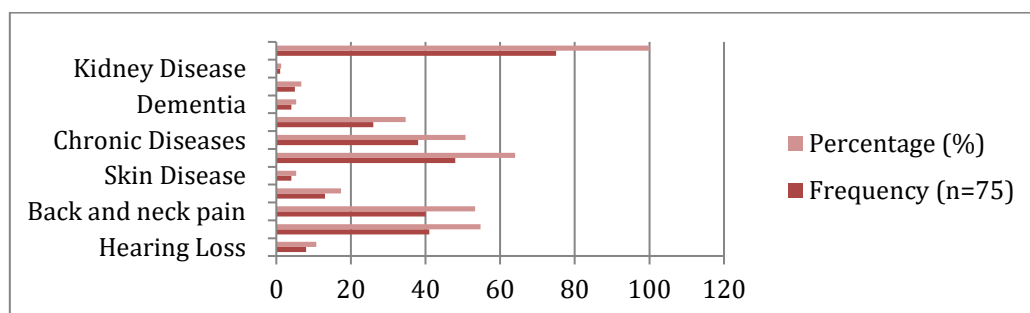
Interpretation- The above table shows that all the participants were taking solid food. Graphical representation shown in graph.

4.13. COMPLICATIONS: -

Distribution of the elderly based on Complications they have

Complications	Frequency (n=75)	Percentage (%)
Hearing Loss	8	10.7
Vision loss	41	54.7
Back and neck pain	40	53.3
Oral and Dental Problem	13	17.3
Skin Disease	4	5.3
Osteoarthritis	48	64
Chronic Diseases	38	50.7
Diabetes	26	34.7
Dementia	4	5.3
Urinary Tract Infection	5	6.7
Kidney Disease	1	1.3
Total	75	100

4.13.13



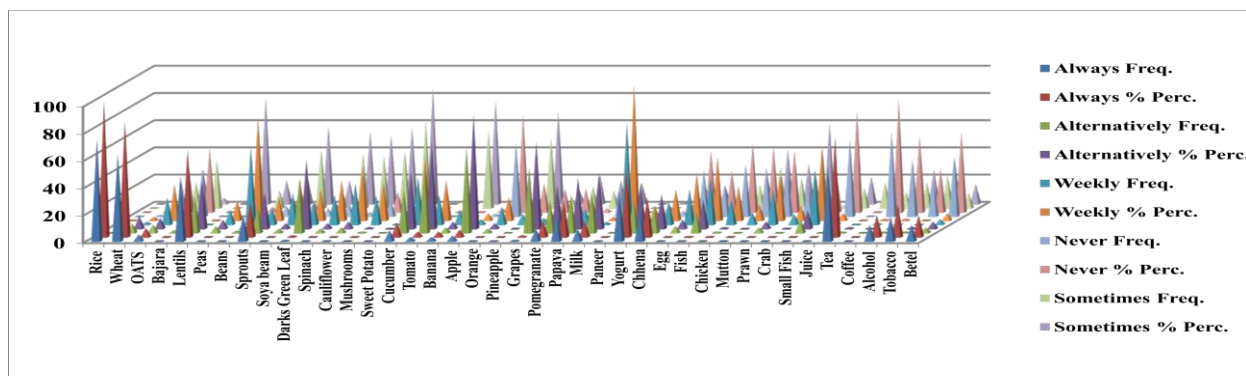
Interpretation- The above table shows that, 54.7% of the elderly people had vision loss, 53.3% had back and neck pain, 50.7% of the elderly people had chronic diseases, 34.7% had Diabetes, 5.3% had Dementia and 64% had Osteoarthritis. Graphical representation shown in graph.

4.14. FOOD CONSUMPTION PATTERN OF ELDERLY PEOPLE:

Sl. No	Food stuffs	Always		Alternatively		Weekly		Never		Sometimes	
		Fre q.	% Perc.	Freq .	% Perc.	Fre q.	% Perc.	Fre q.	% Perc.	Fre q.	% Perc.
1.	Cereals										
	Rice	75	100	0	0	0	0	0	0	0	0
	Wheat	64	85.33	7	9.33	2	2.66	1	1.33	1	1.33
	OATS	5	6.66	6	8	20	26.66	25	33.33	19	25.33
	Bajara	0	0	2	2.66	3	4	35	46.66	35	46.66
2.	Pulses										
	Lentils	48	64	27	36	0	0	0	0	0	0
	Peas	0	0	5	6.66	11	14.66	0	0	59	78.66
	Beans	0	0	2	2.66	57	76	3	4	13	17.33
	Sprouts	19	25.33	20	26.66	13	17.33	8	10.66	15	20
	Soya beam	0	0	3	4	23	30.66	6	8	43	57.33
3.	Vegetables										
	Darks Gree n Leaf	1	1.33	38	50.66	17	22.66	6	8	13	17.33
	Spinach	0	0	3	4	22	29.33	10	13.33	40	53.33
	Cauliflower	0	0	4	5.33	30	40	3	4	38	50.66
	Mushrooms	0	0	1	1.33	21	28	11	14.66	42	56
	Sweet Potato	0	0	0	0	0	0	11	14.66	64	85.33
	Cucumber	8	10.66	32	42.66	35	46.66	0	0	0	0
	Tomato	3	4	48	64	22	29.33	0	0	2	2.66

4.	Fruits										
	Banana	3	4	4	5.33	11	14.66	0	0	57	76
	Apple	4	5.33	63	84	4	5.33	2	2.66	2	2.66
	Orange	0	0	3	4	13	17.33	54	72	5	6.66
	Pineapple	0	0	0	0	8	10.66	16	21.33	51	68
	Grapes	1	1.33	48	64	5	6.66	13	17.33	8	10.66
	Pomegranate	9	12	24	32	5	6.66	13	17.33	16	21.33
	Papaya	20	26.66	28	37.33	12	16	2	2.66	13	17.33
5.	Dairy Products										
	Milk	9	12	30	40	2	2.66	22	29.33	12	16
	Paneer	0	0	0	0	75	100	0	0	0	0
	Yogurt	37	49.33	25	33.33	8	10.66	4	5.33	1	1.33
	Chhena	22	29.33	19	25.33	17	22.66	4	5.33	13	17.33
6.	Non -Veg										
	Egg	0	0	5	6.66	26	34.66	34	45.33	10	13.33
	Fish	0	0	16	21.33	35	46.66	23	30.66	1	1.33
	Chicken	0	0	1	1.33	19	25.33	38	50.66	17	22.66
	Mutton	0	0	0	0	9	12	36	48	30	40
	Prawn	0	0	4	5.33	26	34.66	34	45.33	22	29.33
	Crab	0	0	0	0	8	10.66	23	30.66	44	58.66
	Small Fish	0	0	10	13.33	40	53.33	23	30.66	2	2.66
7.	Other										
	Juice	0	0	0	0	4	5.33	56	74.66	15	20
	Tea	55	73.33	1	1.33	0	0	0	0	19	25.33
	Coffee	0	0	0	0	1	1.33	62	82.66	12	16
	Alcohol	12	16	1	1.3333	1	1.3333	42	56	19	25.333
	Tobacco	18	24	1	1.3333	0	0	24	32	24	32
	Betel	12	16	4	5.3333	4	5.3333	44	58.667	11	14.667

4.14.14



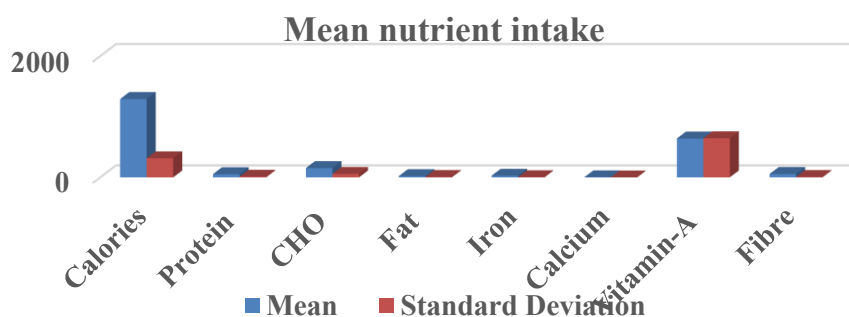
Interpretation- The above table shows that the food consumption pattern of the old population. They consume more rice than other food. Rice was consumed everyday by the older people. The wheat consumed by the elderly people was 85.3% and the 64% people eat wheat in an everyday basis, 7 people were eating wheat in alternative days, and 2 people were eating in weekly basis.

4.15. NUTRIENT INTAKE: -

Mean nutrient intake among the elderly

Nutrient	Mean	Standard Deviation
Calories	1292.37 kcal	314.544
Protein	53.30 gm	11.35
CHO	153.20 gm	56.56
Fat	21.45467 gm	6.4997774
Iron	27.57 mg	3.859
Calcium	0.9812 mg	0.136
Vitamin-A	640.92 ug	646.09
Fibre	55.79 gm	6.265

4.15.15



Interpretation- The above table shows that, the average nutrient intake of the elderly people is less than the RDA.. Graphical representation shown in graph.

CONCLUSION

The present study highlights that a considerable proportion of the elderly population in Sukinda Block of Jajpur district, Odisha, is experiencing significant nutritional inadequacies and are at risk of malnutrition. The assessment of nutrient intake demonstrated that the mean consumption of energy, protein, calcium, iron, and essential vitamins was below the Recommended Dietary Allowances (RDA), indicating substantial dietary gaps. Anthropometric indicators such as BMI, MUAC, and calf circumference revealed the coexistence of undernutrition and overweight, reflecting a dual burden of malnutrition among the elderly. Furthermore, the high prevalence of anemia, calcium deficiency, and chronic diseases suggests a strong association between inadequate dietary intake and compromised health status. These findings underscore the complex interplay between aging, nutritional deficiencies, and disease burden in this vulnerable population.

The nutritional challenges observed among the elderly in Jajpur are influenced by multiple socioeconomic and health-related factors, including poverty, illiteracy, limited access to healthcare, social isolation, and age-related physiological changes. Undernutrition was particularly more prevalent among females and those lacking adequate family support. Poor dietary diversity, reduced appetite, and chronic illnesses further aggravated the risk of malnutrition. Addressing these issues requires a comprehensive and multi-sectoral approach involving targeted nutrition supplementation programs, strengthened geriatric healthcare services, community-based awareness initiatives, and social support mechanisms. Promoting balanced diets, routine health monitoring, and inclusive welfare schemes will be crucial to ensuring healthy aging and improving the overall quality of life of the elderly population.

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