Research Paper

Comparative Study of Nutritional Status of the Old Age with Gender Variation Using Mini Nutritional Assessment (MNA)

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ABSTRACT
OBJECTIVES
To find out the nutritional status in elderly people, with the age group of >60years and to compare the nutritional status between male and female.
BACKGROUND OF THE STUDY
Nutrition is the one which is most important for human being to carry out their daily physical activity. Nutrition declines when there is increase in the age. Inadequate nutrition is called malnutrition. Malnutrition can lead to reduced immunity, impaired physical and motor development. It is very difficult for an individual to meet out their daily nutritional requirements. According to nutrition survey, conducted by V.S. Natarajan et al concluded that in India there are more than 50% of elderly population are suffering from malnutrition and more than 90% have less than recommended intake. Hence this study deals with the evaluation of nutritional status on gender variation among elderly people.
METHODOLOGY
The comparative study was conducted on 100 subjects [Group A (Male):50, Group B(Female):50] based on area selected (community-based population). The subject was selected with age group of > 60 years. Both gender (Male & Female) was included in the study. The samples were segregated into groups using random sampling method. The study duration was 3 months. The subjects included in this study are people who are willing to participate, both gender male and female, people who are having Diabetes Mellitus, people who are having Hypertension, elderly with the age group >60years, people those who are willing to reveal about their nutritional status. The subjects excluded in this study are people who are not willing to participate, mentally retarded people, Non-co-operative people, people who are not willing to reveal about their nutritional status. The materials required are weight machine, Height measuring tape, Mini Nutritional Assessment (MNA) questionnaire. The outcome measure used was Mini Nutritional Assessment (MNA).
PROCEDURE:
The study was conducted on 100 Subjects with the age group more than 60 years was included in the study. Group-A includes male elderly with the sample size of 50 and Group-B includes female elderly with the sample size of 50. Each person will be assessed individually using Mini Nutritional Assessment (MNA) questionnaire.
RESULT:
Result of this study shows that both the genders are at equal risk of malnutrition. There is no significant difference of nutritional status between genders.
KEYWORDS: Nutrition, Mini Nutritional Assessment (MNA), Elderly people.

I.   INTRODUCTION

Nutrition is the process of taking in food and using it for growth, metabolism and repair. Most nutritional sources such as protein, energy, carbohydrates, fats and most minerals can be obtained by food sources. However, some individual take dietary supplements on a daily basis to ensure their nutritional level.

The World Health Organization (WHO), defines health is a state of physical, mental and social wellbeing and not merely an absence of disease. Health of any individual depends on various factors like

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physical, physiological, psychological, social and nutritional factors. Nutrition plays an important role in determining the quality of life of an individual. It can be stated that health of the population is determined by economic and human development of the place where they live in. [1]

Good nutrition aids in keeping the body healthy [2]. Balanced nutrition is very important to lead a healthy life and it is important for overall wellbeing. Poor nutritional status refers to an inadequate nutrition or excessive intake of nutrition to meet the body's requirements. [3]

The Centers for Disease Control (CDC) and other groups have carried out substantial research for proving a significant relationship between nutritional choice (intake) and health ailments like hyperinsulinemia, hypertension, dyslipidemia, coronary heart disease and type 2 diabetes. This proves that nutrition is now acknowledged as an important aspect in determining the health status of the individual. [1]

Aging is an art, as people age increases; it requires a lot of awareness about oneself and requires more motivation and support physically, mentally and socially. The adequate nutrition in elderly people propels or enhances the maintenance of health and wellbeing and physical activities of day to day life. [3] Aging is defined as the physiological and developmental changes that occur in an individual. This aging results in a problem like reduced functioning, increased vulnerability to disease and reduced viability. Aging is classified as primary aging and secondary aging. Primary aging is referred as age-related changes independent of diseases processes. Secondary aging includes interaction of the primary aging with disease processes [4]

As per the WHO guidelines people 60-74 years of age are called elderly and those between 75 and 85+ years of age as old. [5]. Elderly people (aged 65 years and older) made up 7.7% of the global population in 2013, and it is estimated that this will have increased to 10.2% by 2023, to 20.8% by 2050 and 27.7% by 2075. [6]

The time when older people will outnumber younger people is rapidly approaching, it is estimated that by the year 2025 the number of people worldwide aged 60 and over will exceed 1.2 billion [7] and this figure will reach two billion by 2050, with 80% of the elderly population in the world living in developing countries [6]. This projected growth in the older population will create significant additional demands on healthcare and support services. [7]

The National Sample Survey Office (NSSO) reported about three fourth of the elderly are supported by their own children, 7 percent and 11 percent of women were supported by their spouses and 8 percent and 12 percent were supported by institutional care. According to the population census carried out in 2011, the elderly in India comprises of about 103.9 million out of which 51.1 million and 52.8 million are males and females respectively. The elderly contributes of about 8.6 percent of the entire population, out of which 8.2 percent are males and 9 percent females. [1].

The few studies that have been done shown that more than 50% of the older population is underweight and more than 90% has an energy intake below the recommended allowance [8].

The World Health Organization (WHO) has stated that aging populations will present new challenges to health care. The health of the elderly people will be an important resource for determining the health status of a population. As the number of elderly people in a community increases, their health needs also increase. Multimorbidity is more common in resource poor countries and it is associated with increasing age. [8]

Elderly population (>60 years) are uniquely susceptible to malnutrition because of physiological, psychological and functional changes that occur with aging. [9] Nutritional deficiency is common and serious in older adults. Up to 15% of ambulatory outpatients, 35% to 65% of elderly hospital patients, and 25% to 60% of institutionalized older adults have been reported as malnourished [11]

Older adults are a potentially vulnerable group for malnutrition (WHO, 2002). Nutritional status of an individual is influenced by many factors like dentition, neuropsychological problems and mobility. Increasing ill health and increasing disability are interlinked nutritional risk indicators. [10]

Aging increases the prevalence of malnutrition due to factors like physiological changes, decreased physical activities, and decline in cognitive functioning and due to any social and environmental influences. [4] It has been reported that, dietary intake decreases as the aging process enhances. Inadequate dietary intake in old age results in reduced functioning, dysfunction, disability and it is related to morbidity and mortality. [12]

Nutritional deficiency in old age people often influences or increases their clinical conditions, length of the hospital stay, morbidity and even increase in mortality. [13] Nutritionally inadequate diets can increase the chronic and acute diseases, and also influences the development of degenerative diseases associated with aging and delay the recovery from illness. [14] Geriatric patients usually suffer from many diseases that may impair the nutritional status. There is a decreased appetite and physical activity with respect to aging. Protein Energy Malnutrition (PEM) is the common finding in geriatric patients. [15]

Malnutrition refers to a state of disturbances or interruption in the energy intake like proteins, vitamins and other nutrients. This malnutrition results in changes in the body size, shape, composition and function. Malnutrition can be undernourished or over nourished. Malnutrition affects up to 25% of elderly patients at home and more than 50% of those at rehabilitation institutions. [16]

Malnutrition is more frequent in the elderly population in hospitals, in nursing homes and at home but is not generally diagnosed. [17]. The prevalence of malnutrition reaches significant levels (15-60%) in elderly patients who are in hospital, who live in nursing homes, or who are in home care programs [18]. In a study it was shown that the prevalence of malnutrition was higher in case of people who stayed in the old age homes as compared to the people who lived in their own houses [1].

In 2015, 30 percent of men and 15 percent of women who are 65 years or over were active in the labor force and this is more in the developing countries making elderly more vulnerable to under nutrition. [19]

Malnutrition leads to decreased independence due to physical weakness and muscle wasting. Elderly people are more prone to several infections. The factors which also influence the food intake in elderly are dentition, taste, smell, loss of memory, Parkinson disorder. It is seen in the studies that as age progresses there is a decrease in the digestive hormones and thus digestive process is reduced. There is a drop in the bone mass when people are in their 30s and 40s. The drop in the bone mass accelerates during menopause for women resulting in fractures and osteoporosis. [3]

The common nutritional challenges faced by the elderly includes vulnerability, unintentional weight loss, chronic illnesses, disabilities, increased protein, vitamin B6, calcium and vitamin D requirements and reduced energy requirements. [1]

A lowered immune response has been reported in elderly people. [20]. Odor perception declines with age, this diminished odor perception leads to malnutrition and various diseases. [21]. Impaired nutritional status is common in Alzheimer disease. This leads to increased weight loss. [22]. The anorexia of aging is more common and it is produced by multiple factors like decrease in metabolic rate and decreased physical activity that occurs with aging. [23].

Elderly individuals have powerful mind-body relation and their psychiatric illness may significantly influence their physical health. Depression is most common in elderly and this can result in loss of appetite, weight loss, malnutrition and dehydration. [16]

Nutritional status is an indication of the overall wellbeing of a population. Adequate nutritional status of women is important for good health and increased work capacity of women themselves as well as for the health of their offspring. [24]

Osteoporosis greatly affects the health of the postmenopausal women and is recognized as a major public health problem worldwide. Nutrient intake plays an important role in osteoporosis. Calcium and vitamin D, widely known as key components of metabolic bone. [25]

Lifelong adequate nutrition, especially calcium is necessary for the good bone health. Retrospective studies in postmenopausal women shows that bone density is associated with childhood and adolescent milk consumption. Recently, the Food and Nutrition Board of the National Academy of Science revised nutrient requirements considered most related to bone health, *i.e.* calcium, vitamin D, magnesium. [26] It is estimated that 10% of osteoporosis related fractures may be attributed to a low calcium intake. High calcium intake may decrease the osteoporosis fracture risk as much as by 60%. [27]

The tool used in this study is Mini Nutritional Assessment (MNA). The aim of the Mini Nutritional Assessment (MNA) is to evaluate an individual's risk of nutrition so as to permit early nutritional intervention when necessary. The development, validation, and cross validation of this nutritional assessment test was a collaborative research program between the Departments of Internal Medicine and Clinical Gerontology, Toulouse University Hospital, France; the Clinical Nutrition Program, University of New Mexico, USA and the Nestlé Research Center, Lausanne, Switzerland. [18]

Mini Nutritional Assessment (MNA) is a widely used international questionnaire to evaluate the nutritional state of seniors with high sensitivity (98.9%), specificity (94.3%), and diagnostic accuracy (97.2%). [8]

The MNA test is composed of simple measurements and brief questions that can be completed in about 10 minutes. These are: *Anthropometric measurements (*weight, height, and weight loss); *Global assessment* (six questions related to lifestyle, medication, and mobility); *Dietary questionnaire* (eight questions related to number of meals, food, fluid intake, and autonomy of feeding); and *Subjective assessment* (self-perception of health and nutrition). [18]

The scale (score range 0-14) comprises 6 items covering global behavior, subjective factors, weight and height. For patients to be at high risk (11 points or below), further nutrition assessment can be performed to define the degree of malnutrition and the most appropriate plan for nutritional care. [28]

Using the MNA score subjects are categorized as malnourished (<17), at risk of malnourishment (17-23.5) or well nourished (>23.5). [29]

Studies that have been done in India and other developing countries using this questionnaire have found it to be useful and accurate. [30]

II.   REVIEW OF LITERATURE

- **CHAITRA VINOD KHOLE et al, 2018, –** Nutritional Status of Elderly in the Old Age Homes: A Study in Pune city. Concluded that geriatric nutrition assessment should be included and monitored from time to time. Regular monitoring and intervention can improve the health outcomes of the elderly. There is a need for revision of policies and schemes concentrating on the geriatric population.

- **SON NAZAN et al 2018 –** Evaluation of Nutritional Status of Elderly Patients presenting to the Family Health Center. Concluded that the rate of malnutrition increasing rapidly with the increase in the global elderly population. As malnutrition increases there is also high risk of mortality. The use of nutrition screening test in elderly population would increase the health measures and health care among the elderly.

- **JOYMATI O et al 2018 –** Assessment of Nutritional Status among Elderly Population in a rural area in Manipur: community-based cross-sectional study. Concluded that certain approaches must be done to improve the nutritional status among elderly. The approaches should be focused primarily on those who are older, low educational status, female gender and financially dependence.

- **RANA AL-RASHEED et al 2018 –** Malnutrition in Elderly and its relation to Depression. Concluded that depression and malnutrition are prevalent among geriatric population. Depression leads to loss of appetite and weight changes which results in malnutrition. Depression and malnutrition have common risk factors such as loneliness, lack of social support, physical illness, functional impairment. Therefore, clinicians should pay attention to both psychological and physical aspects during treating elderly with depression, malnutrition or both.

- **S. CHITRASENA et al 2017 –** A Prevalence Study on Malnutrition among Elderly Persons of Kancheepuram District in Tamil Nadu. Concluded that a comprehensive nutritional screening is needed for elderly in the primary health care setting and nutritional screening may be done as a part of NCD Programme. Nutritional support for the elderly can also be provided by existing ICDS centres.

- **JANICE HERMANN 2016 –** Nutrition for Older Adults: Factors Which Affect Food Intake. Stated about various factors affecting the food intake in elderly like physical, emotional, social, medication and money factors.

- **KIRTI M, TRIPATHI et al, 2016 –** Geriatric Nutrition: Need for Better Aging. Concluded that there is high prevalence of poor nutritional status among elderly which requires more focus on diet and nutritional intervention. The promotion and implementation of low cost, prevention-based initiatives such as health, nutrition, physical education could increase or maintain the good nutritional status in elderly.

- **HOPE BARKOUKIS 2016 –** Nutrition Recommendations in Elderly and Aging. Discussed about the various physiologic and pathophysiologic changes of aging regarding dysphagia, gastroesophageal reflux disease, gastrointestinal motility, constipation, gastrointestinal absorption; mild cognitive impairment and depression; anorexia of aging and energy homeostasis; "GERIATRIC GIANTS" and the role of nutrition; nutrition screening; nutrition recommendation for older adults.

- **ANIL CHANKARAMANGALAM MATHEW et al 2016 –** Prevalence and Correlates of Malnutrition among Elderly in an Urban Area in Coimbatore. Concluded that the prevalence of malnutrition among elderly is high. The lower MNA scores were associated with increasing lifestyles, somatic, functional and social factors. The findings in the present study indicate that malnutrition is a multifactorial condition. Hence the treatment of malnutrition should be multifactorial and multidisciplinary.

- **SHIVA BHANDARI et al 2016 –** Dietary Intake Patterns and Nutritional Status of Women of Reproductive Age in Nepal: findings from a health survey. Concluded that the nutritional status of women of reproductive age is still poor especially in Terai and the dietary pattern is not adequate. It suggests improving the nutritional status and feeding habits on reproductive aged women.

- **OLFA BERRICHE et al 2016 –** Nutritional Risk Factors for Postmenopausal Osteoporosis. Concluded that nutrition is a major determinant of osteoporosis. Recommendation of nutrition education programs targeting the population who are at risk; this would pave the way for true prevention. Prevention must be earlier because it promotes the acquisition of peak bone mass during the growing period and determines the speed of bone loss during aging.

- **WILMA LESLIE et al 2015 –** Aging, Nutritional Status and Health. Concluded that meeting the diet and nutrition needs of older people is crucial for the maintenance of health, functional independence and quality of life.

- **Md MONOARUL HAQUE et al 2014 –** Health and Nutritional Status of Aged People. Concluded that intervention programs related to health and nutritional status may be arranged.

- **SURAJIT LAHIRI et al 2014 –** Assessment of Nutritional Status among Elderly Population in a rural area of West Bengal, India. Concluded that nutritional status of elderly is poor and there is need and scope for geriatric nutritional interventions in elderly

- **JOANNA WOŹNIAK- HOLECKA et al 2013** – Nutritional Education in the Primary Prevention of Osteoporosis in Perimenopausal and Postmenopausal Women. Concluded that the primary prevention directed to the specific group, like post-menopausal women, should focus on causing positive changes in patient's habit regarding both nutrition method and physical activities.
- **ZENO STANGA 2009** – Basics in Clinical Nutrition: Nutrition in the Elderly. Concluded that good nutrition and even use of vitamins and minerals supplements may have an preventive role in maintaining health and quality of life in the elderly. In making any care plan, ethical consideration are important like respecting the patient's autonomy, ensuring benefit, avoiding harm
- **ADITYA VEDANTAM et al 2009** – Malnutrition in free-living elderly in rural South India: Prevalence and risk factors. Concluded that the low MNA scores were associated with older age, decreased food intake and consuming fewer meals. Considering the high prevalence of poor nutritional status in the elderly, more focus on diet and nutritional interventions is required.
- **H. SOINI et al 2004** – Characteristics of the Mini-Nutritional Assessment in Elderly home-care patients. Suggests that MNA is a useful tool in the identification of elderly home-care patients at risk for malnutrition.
- **YOUNG- HEE PARK et al 2003** – Dietary Intake and Anthropometry of Korean Elderly People: a literature review. Concluded that an inadequate intake of several micronutrients in old age, mostly calcium and vitamin A, is a matter of concern in Korea. This was observed most frequently in elderly people with a low income. Inadequate intake of nutrients is caused by a low energy intake.
- **MARGARETA D. PERSSON, MD et al 2002** – Nutritional Status Using Mini Nutritional Assessment and Subjective Global Assessment Predict Mortality in Geriatric Patients. Concluded that objective nutritional assessment, including body composition measurements, and the ability to predict long term mortality support the use of SGA, MNA, and short MNA as nutrition assessment instruments in geriatric patient care.
- **LAURENCE Z. RUBENSTEIN et al 2001** –Screening for Under nutrition in Geriatric Practice: Developing the Short-Form Mini-Nutritional Assessment (MNA-SF). Concluded that the MNA-SF can identify persons with under nutrition and can be used in a two-step screening process in which persons, identified as "at risk" on the MNA-SF, would receive additional assessment to confirm the diagnosis and plan intervention.
- **CONNIE M. WEAVER et al 1999** – Adolescent Nutrition in the Prevention of Postmenopausal Osteoporosis. Concluded that inadequate nutrition in the puberty results in suboptimal peak bone mass, which increases the risk of fracture in childhood and later in life.
- **P. QUADRI et al 1998**– MNA and Cost of Care. Concluded that early screening for nutritional status could reduce health costs in geriatric medicine by allowing rapid realimentation. MNA scores <17 were associated to higher costs of care and a longer length of stay in hospital.
- **JON WEIMER 1998** – Factors Affecting Nutrient Intake of the Elderly. Concluded that nutritional wellbeing is an integral component of the overall health, independence, and quality of life of the elderly. Basic for improving the health and wellbeing of the elderly is the provision of better measurements of the variation in nutrient intake and their relationship to socioeconomic and other factors.

- **F. ARNAUD-BATTANDIER et al 1998** – MNA and Nutritional Intervention. Concluded that nutritional supplements in the malnourished patients significantly increase their weight gain. MNA scores suggest that the MNA can be used as a follow up tool after nutritional intervention.
- **YVES GUIGOZ et al 1998**– The Mini Nutritional Assessment (MNA) for Grading the Nutritional State of Elderly Patients: Presentation of MNA, History and Validation. Concluded that MNA can assess the risk of malnutrition in elderly before the clinical changes occur. It is a useful tool for physicians to make rapid and reliable evaluation of elderly.
- **E.J. SCHIFFRIN et al 1998** – MNA and Immunity: Nutritional and Immunologic Markers in the Elderly. Concluded that detection of malnutrition by MNA seems to anticipate other biochemical markers of malnutrition and indicate a population at risk, before the physiology of the immune response is profoundly altered.
- **MARTIJN GRIEP et al 1998** –MNA and Odor Perception. Concluded that elderly at risk of malnutrition tend to have worse health, poorer odor perception and more often use drugs affecting odor perception than elderly people who are not risk of malnutrition. Flavor amplification is necessary to optimize the food intake in elderly suffering from malnutrition.
- **S. LAUQUE et al 1998** – Measurements of Nutritional Status (MNA) in Alzheimer Disease Patients. Concluded that nutritional screening and nutritional intervention are important in decreasing morbidity in Alzheimer disease patients and improving their quality of life.
- **J.E. MORLEY et al 1998** – Anorexia of Aging: Leptin and the MNA. Suggested that malnutrition is a major predictor of frailty or the "failure to thrive" syndrome in older persons.

III.   AIM AND NEED OF THE STUDY

AIM OF THE STUDY:
To find out the nutritional status in elderly people, with the age group of >60years and to compare the nutritional status between male and female.

NEED OF THE STUDY:
Nutrition is the one which is most important for human being to carry out their daily physical activity. Nutrition declines when there is increase in the age. Inadequate nutrition is called malnutrition. Malnutrition can lead to reduced immunity, impaired physical and motor development. It is very difficult for an individual to meet out their daily nutritional requirements. According to a nutrition survey, conducted by V.S. Natarajan et al concluded that in India there are more than 50% of elderly population are suffering from malnutrition and more than 90% have less than recommended intake[31]. Hence this study deals with the evaluation of nutritional status on gender variation among elderly people.

IV.   HYPOTHESES

NULL HYPOTHESIS:
There is no variation in nutritional status of old age based on gender.

ALTERNATE HYPOTHESIS:
There is variation in nutritional status of old age based on gender.

V.   METHODOLOGY

5.1 STUDY DESIGN   : Observational study
5.2 STUDY TYPE   :Comparative study
5.3 STUDY DURATION   : 3 months
5.4 STUDY SETTING   : Community based population
5.5 STUDY SAMPLE SIZE: 100 Subjects. Group A(Male):50, Group-B (Female):50
5.6 STUDY SAMPLING METHOD: Random sampling

5.7 INCLUSION CRITERIA
- Those who are willing to participate
- Both gender male and female
- People who are having Diabetes Mellitus
- People who are having Hypertension
- Elderly with the age group >60years
- People those who are willing to reveal about their nutritional status

5.8 EXCLUSION CRITERIA
- Those who are not willing to participate
- Mentally retarded people
- Non-co-operative people
- People who are not willing to reveal about their nutritional status

5.9 MATERIALS USED
Weight machine, Height measuring tape, Mini Nutritional Assessment (MNA) questionnaire
5.10 OUTCOME MEASURE
Mini Nutritional Assessment (MNA)

5.11. PROCEDURE
The subjects included in the study were selected randomly in the community. The age group selected were >60 years. They were selected according to the selection criteria. The total sample size of 100 was selected. They were segregated into two groups namely male and female. Each group contain 50 subjects. Group-A includes male elderly with the sample size of 50 and Group-B includes female elderly with the sample size of 50. The nutritional status of each person will be assessed individually using Mini Nutritional Assessment (MNA) questionnaire.
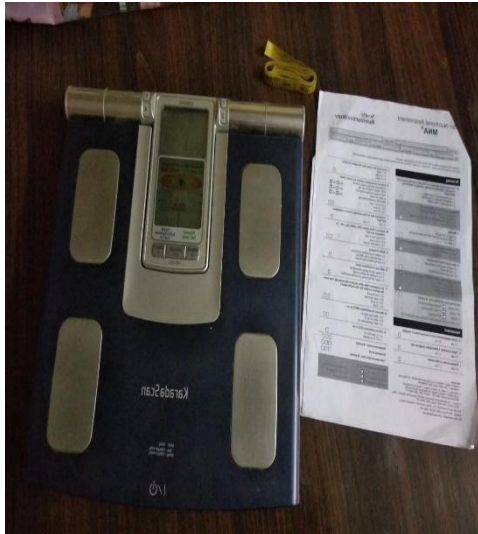
Fig.1: MATERIALS REQUIRED

Fig.2: ASSESSMENT

Fig.3: MID ARM CIRCUMFERENCE

Fig.4: CALF CIRCUMFERENCE

5.12. DATA ANALYSIS

The collected data were tabulated and analysed using Independent t test & Pearson correlation of coefficient. All the parameters were assessed using statistical package for social science (SPSS) version 24. Independent t test was adopted to find the difference between the Group & Pearson correlations of coefficient was adopted to find the correlation between variables.

TABLE-1
COMPARISON OF MINI NUTRITIONAL ASSESSMENT (MNA) SCORE BETWEEN GROUP – A AND GROUP - B IN PRE AND POST TEST

#MNA	GROUP A	GROUP B
MEAN	21.94	21.80
S.D	3.90	3.59
S.E	.552	.508
95% C.I(Lower)	-1.32	1.66
95% C.I(Upper)	-.666	.946

t-test	.226
Df	98
Significance	.821*

(*- P ≥ 0.05)

The above table reveals the Mean, Standard Deviation (S.D), Standard Error, C.I, t-test, degree of freedom(df) and p-value between (Group A) & (Group B) in pre-test and post-test weeks.This table shows that there is no significant difference in MNA between Group A & Group B (*P > 0.05).

GRAPH – I
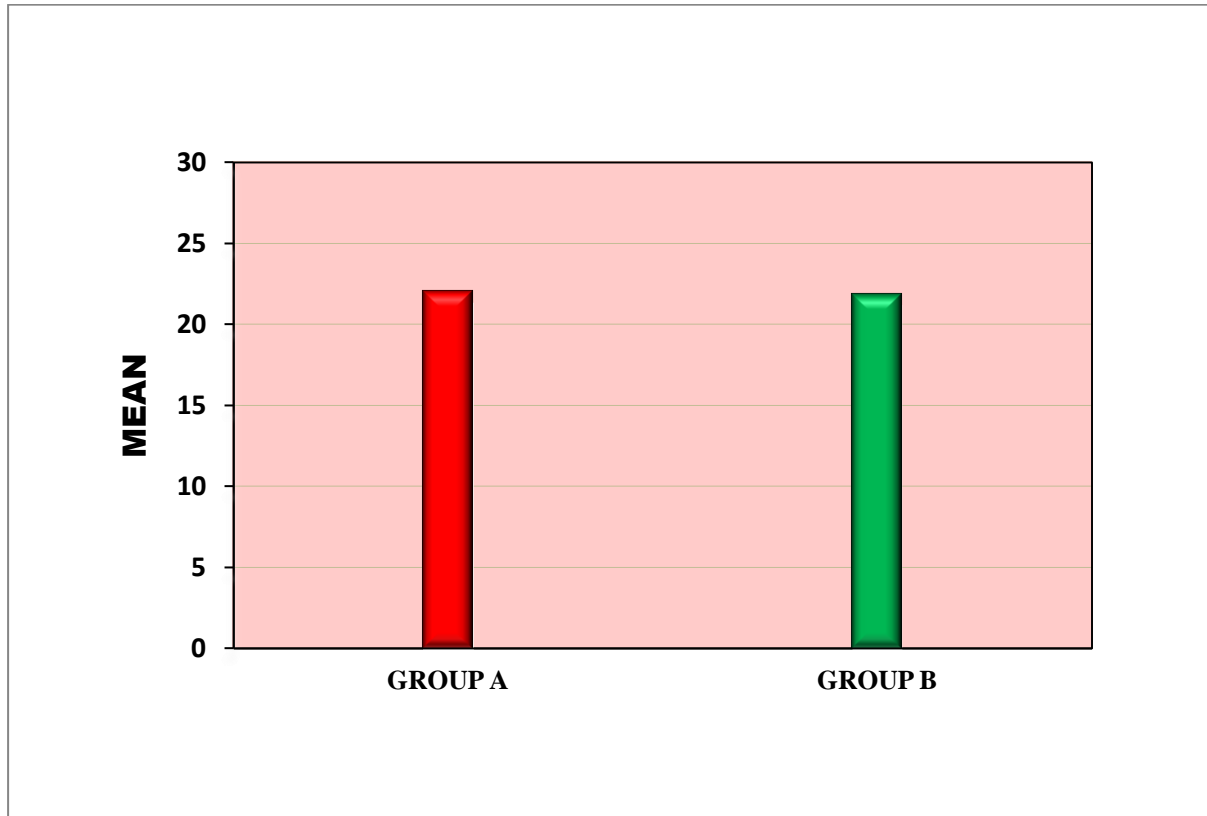
COMPARISON OF MINI NUTRITIONAL ASSESSMENT (MNA) SCORE BETWEEN GROUP – A AND GROUP - B IN PRE AND POST TEST

TABLE - 2
PEARSON CORRELATION OF COEFFICIENT BETWEEN GENDER USING MINI NUTRITIONAL ASSESSMENT (MNA) SCORE

Parameters	Pearson correlation	
	'r' value	P value
MNA & GENDER	0.259	≥ 0.05

The above table reveals the Pearson Correlation of coefficient 'r' value and p-value between Gender Using Mini Nutritional Assessment (MNA) Score
The value of R is 0.259 Although technically a Positive Association and Correlation between Genders.

GRAPH - 2
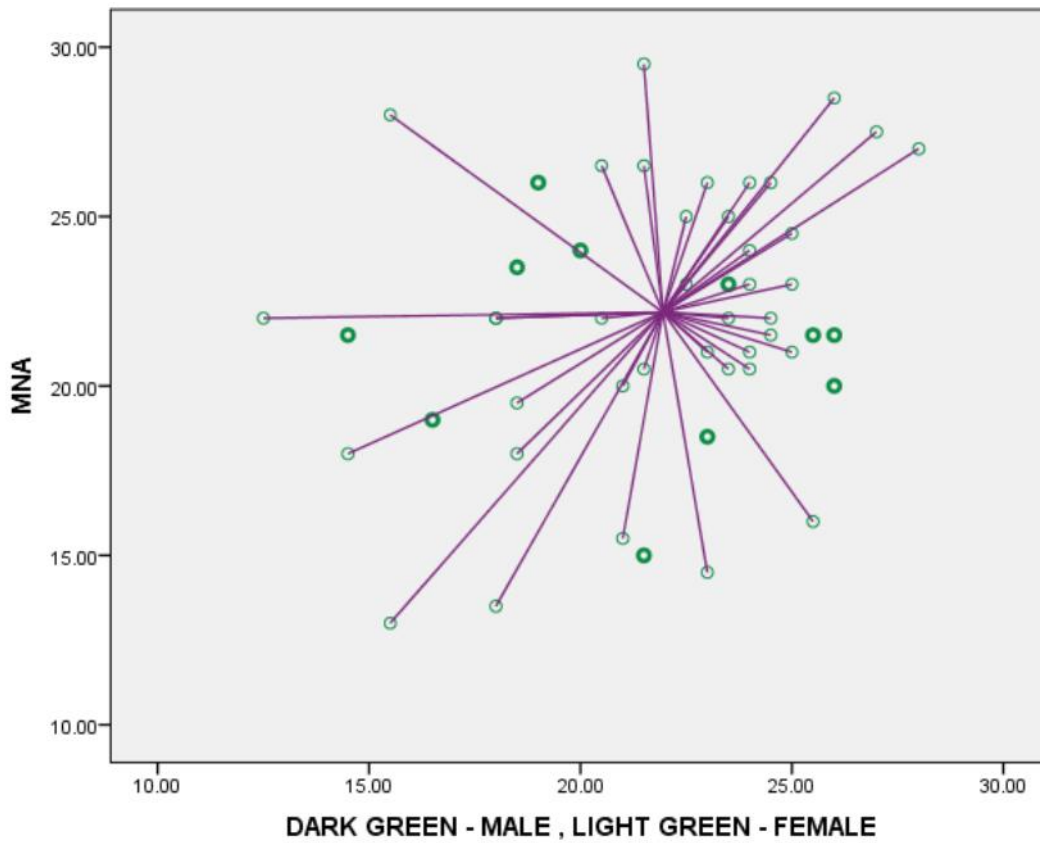
DARK GREEN - MALE , LIGHT GREEN - FEMALE

PEARSON CORRELATION OF COEFFICIENT BETWEEN GENDER USING MINI NUTRITIONAL ASSESSMENT (MNA) SCORE

VI.   RESULT

On comparing the Mean values of Group, A & Group B on Mini Nutritional Assessment Questionnaire Score (MNA), it shows the Mean value of Group A (Male) **21.97** & Group B (Female) **21.80** It indicates that there are no significant gender differences between Group A & Group B at **P > 0.05** Hence Alternate Hypothesis is rejected.

The value of R is 0.259 Although technically a Positive Association and correlation which indicates a risk of malnutrition in both the gender.

VII.   DISCUSSION:

Aging is an art, as people age increases; it requires a lot of awareness about oneself and requires more motivation and support physically, mentally and socially. The adequate nutrition in elderly people propels or enhances the maintenance of health and wellbeing and physical activities of day to day life. Aging is defined as the physiological and developmental changes that occur in an individual. As per the WHO guidelines people 60-74 years of age are called elderly and those between 75 and 85+ years of age as old.

Study done in Pune by **Chaitra Vinod Khole et al**, found that on considering the role of gender in the nutrition status it can be seen that both the genders are equally susceptible to malnutrition. An interesting finding in their study was greater number of males was underweight and females were overweight. In present study also it can be seen that there is an equal distribution of malnourished status between both genders. It is noted that there is very slight difference in the overall nutritional status between male and female. It was observed that BMI is reduced in male and increased in female i.e., male is underweight and female were overweight.

Study done in rural South India by **Aditya Vedantam et al**, identified that 14% of subjects were malnourished and 49% were at risk of malnourishment. They identified that there is no significant difference was found between men and women. Mean MNA score was identical for both men and women. Poor nutritional status (MNA score <23.5) was seen almost equally between men and women. Present study also indicates that there is no significant variation between both genders.

Studies done by **Anil Chakramanglam Mathew et al**, Tamil Nadu, found that 19.47% was malnourished and 24.73% were at risk for malnutrition. They found that there is statistically significant association was found between poor socioeconomic status in general and malnutrition. They observed a significant association between malnutrition and those who do not have a pension. They identified that the MNA score was lower in patients with multiple burdens of somatic, functional or social characteristics provides further evidence that malnutrition could be regarded as a geriatric syndrome. In present study it is also observed that economic status and level of caring for old age plays a major role in determining the level of nutritional status. People who have low economic status has significantly have low level of nutrition.

Similar study done by **Joymati et al**, Manipur, identified that the prevalence of malnourished among elderly population was 20.8% and at risk of malnutrition was 49.2%. They have stated that prevalence of malnutrition can vary according to socio demographic status and eating habits of elderly. This study showed a significant association between malnourishment and older age group, female gender, low educational status and financial dependence. They found that higher educational status relatively has normal nutritional level.

Surajit Lahiri et al, Bangladesh resulted that 29.4% elderly were malnourished and 60.4% elderly were at risk of malnutrition. They showed that women (59.4%) were malnourished than men (40.6%). Elderly women were found more malnourished in this study.

The sociodemographic status can determine the nutritional status, the eating habits and demographic status varies from region to region. According to above articles, it is noted that the malnutrition status is decreased in south India in comparison with other regions of India.

Similar studies done by **Son Nazan et al**, Turkey, stated that the risk of malnutrition increases with age in the geriatric population, that diseases accompanying malnutrition increase and BMI is higher in females, that females have lower CC and MAC values than males, BMI, CC, MAC and blood protein levels decrease with increasing severity of malnutrition, and the risk of malnutrition is higher in the elderly population.

The data analysis and statistic interference have brought to check the comparison of nutritional status between male and female.

The mean value of Mini Nutritional Assessment between Group A (Male) 21.97 & Group B (Female) 21.80 shows that there is no significant difference between two groups at $P > 0.05$. Hence Alternate Hypothesis is rejected.

VIII.   CONCLUSION

Nowadays young adults are also in the risk of developing health disorders like Diabetes Mellitus, hypertension, obesity and cardiovascular disorders due to their sedentary lifestyle and eating habits. So, it is important to maintain the nutritional level in order to prevent from further health complications occurring in old age. Female elderly are more prone to develop osteoporosis after their menopause stage due to deficiency of vitamin D. Hence it is necessary to maintain and improve their nutritional level in the adolescent stage of life. There is equal high risk of malnutrition between both genders. Hence early screening and assessment for malnutrition is important in geriatric population and nutritional intervention should be given as early as possible.

IX.   LIMITATIONS AND RECOMMENDATIONS OF THE STUDY
LIMITATIONS OF THE STUDY:
- Short study duration
- Small sample size
- Only elderly age group were selected
- Nutritional interventions were not given

RECOMMENDATIONS OF THE STUDY:
- Large sample size can be analyzed
- Large duration study can be done
- Different age groups can be selected
- Nutritional interventions can be given

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11.3 OUTCOME MEASURE

MINI NUTRITIONAL ASSESSMENT (MNA)

Last name: First name:

Sex: Age: Weight, kg: Height: Date:

Complete the screen by filling in the boxes with the appropriate numbers.

Add the numbers for the screen. If score is 11 or less, continue with the assessment to gain a Malnutrition Indicator Score.

SCREENING:

A. Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?

0 = severe decrease in food intake

1 = moderate decrease in food intake

2 = no decrease in food intake

B. Weight loss during the last 3 months

0 = weight loss greater than 3kg (6.6lbs)

1 = does not know

2 = weight loss between 1 and 3kg (2.2 and 6.6 lbs)

3 = no weight loss

C. Mobility

0 = bed or chair bound

1 = able to get out of bed / chair but does not go out

2 = goes out

D. Has suffered psychological stress or acute disease in the past 3 months?

0 = yes 2 = no

E. Neuropsychological problems

0 = severe dementia or depression

1 = mild dementia

2 = no psychological problems

F. Body Mass Index (BMI) = weight in kg / (height in m)2

0 = BMI less than 19

1 = BMI 19 to less than 21

2 = BMI 21 to less than 23

3 = BMI 23 or greater

Screening score (subtotal max. 14 points)

12-14 points: Normal nutritional status

8-11 points: At risk of malnutrition

0-7 points: Malnourished

For a more in-depth assessment, continue with questions G-R

ASSESSMENT:

G. Lives independently (not in nursing home or hospital)

1 = yes 0 = no

H. Takes more than 3 prescription drugs per day

0 = yes 1 = no

I. Pressure sores or skin ulcers

0 = yes 1 = no

J. How many full meals does the patient eat daily?

0 = 1 meal

1 = 2 meals

2 = 3 meals

K. Selected consumption markers for protein intake

• At least one serving of dairy products
(milk, cheese, yoghurt) per day

• Two or more servings of legumes
or eggs per week

• Meat, fish or poultry every day

0.0 = if 0 or 1 yes; 0.5 = if 2 yes; 1.0 = if 3 yes

L. Consumes two or more servings of fruit or vegetables per day?

0 = no 1 = yes

M. How much fluid (water, juice, coffee, tea, milk...) is consumed per day?

0.0 = less than 3 cups, 0.5 = 3 to 5 cups, 1.0 = more than 5 cups

N. Mode of feeding

0 = unable to eat without assistance

1 = self-fed with some difficulty

2 = self-fed without any problem

O. Self-view of nutritional status

0 = views self as being malnourished

1 = is uncertain of nutritional state

2 = views self as having no nutritional problem

P. In comparison with other people of the same age, how does the patient consider his / her health status?

0.0 = not as good

0.5 = does not know

1.0 = as good

2.0 = better

Q. Mid-arm circumference (MAC) in cm

0.0 = MAC less than 21

0.5 = MAC 21 to 22

1.0 = MAC greater than 22

R. Calf circumference (CC) in cm

0 = CC less than 31

1 = CC 31 or greater

Assessment   (max. 16 points)
Screening score   (max 14 points)
Total Assessment (max. 30 points)

Malnutrition Indicator Score:

- 24 to 30 points   - Normal nutritional status
- 17 to 23.5 points   - At risk of malnutrition
- Less than 17 points - Malnourished

11.4 MASTER CHART
GROUP- A (MALE)

SL.NO	NAME	AGE/ SEX	SCREENING SCORE (14)	ASSESSMENT SCORE (16)	MALNUTRITION INDICATOR SCORE (30)
1	BALASUBRAMANIAM	66/M	10	10.5	20.5
2	R. SURESH BABU	60/M	10	11.5	21.5
3	GEORGE	64/M	13	15	28
4	NATARAJAN	84/M	11	11	22
5	SHANMUGASUNDAR	68/M	14	12	26
6	KUPPUSAMY	65/M	10	13	23
7	BALAKRISHNAN	82/M	7	8.5	15.5
8	AMARNATH	60/M	9	12	21
9	MUTHU	60/M	9	11.5	20.5
10	DAVID	75/M	7	7.5	14.5
11	MEGANATHAN	64/M	14	12.5	26.5
12	AYYANAR	69/M	7	8	15
13	DHANAPAL	80/M	6	7	13
14	RAMACHANDRAN	60/M	14	12.5	26.5
15	PONNUSAMY	76/M	10	13	23
16	VELAYUDHAM	76/M	8	8	16
17	A. BATHIR JAMAL	65/M	8	5.5	13.5
18	KASI. D	65/M	10	11	21
19	S. OMANATHAN	75/M	10	8	18
20	KRISHNAN	70/M	9	9.5	18.5
21	P. BALAJI	60/M	11	9.5	20.5
22	M.PONRAJ	80/M	9	11	20
23	GOVINDAN	63/M	10	9	19
24	N. NATARAJAN	70/M	11	11	22
25	SUBBIRAMANIAN. C	69/M	12	9	21
26	G. ADISANKAR	63/M	14	13	27
27	ABDUL RAHIM	67/M	9	9	18
28	ETHIRAJ	70/M	13	12	25
29	R. MOORTHY	68/M	14	14.5	28.5

30	KARUNAGARAN	65/M	10	14	24
31	S.K. MOHAMMED HANIFA	80/M	11	11	22
32	THANGARAJ. M	62/M	10	12	22
33	ILAYARAJA	69/M	7	12.5	19.5
34	ILANGO	79/M	11	12	23
35	RAMANAYYA	65/M	13	13	26
36	G. SUBBARAMAIAH	65/M	11	12.5	23.5
37	GNANAPRAKASAM	78/M	8	13.5	21.5
38	MOHAMMED ALI	76/M	10	11.5	21.5
39	M. VEERASAMY	61/M	11	11	22
40	ARUL MOZHI	60/M	12	14	26
41	SYED MOHAMMED	60/M	14	15.5	29.5
42	RATHINAMMALAI	68/M	11	13	24
43	RAHMATHULLAH	64/M	11	12.5	24.5
44	SHAHUL HAMEED	65/M	13	13	26
45	MOHAMMED HABEEB	60/M	12	15.5	27.5
46	MASOOD HUSSAIN	61/M	11	14	25
47	MOHAMMED ISMAIL	65/M	11	11	22
48	MOHAN	70/M	10	11.5	21.5
49	SUBBAIH	65/M	11	12	23
50	MANAVALAN	64/M	10	10	20

GROUP- B (FEMALE)

SL.NO	NAME	AGE/ SEX	SCREENING SCORE (14)	ASSESSMENT SCORE (16)	MALNUTRITION INDICATOR SCORE (30)
1	P. UMMASALIMA	78/F	10	13.5	23.5
2	DHANAM	65/F	8	6.5	14.5
3	THANGAMMAL	70/F	9	6.5	15.5
4	M.MEERA	60/F	8	10	18
5	S. DEVI	60/F	9	10	19
6	S. JOTHI	63/F	12	12	24
7	PAAPATHI.K	69/F	9	12	21
8	VANAJA.G	60/F	11	14	25
9	SIKKANDER BEEVI	72/F	11	13	24
10	BASARIYA BEEVI	70/F	12	11	23
11	RACHELLE.D	68/F	9	12.5	21.5
12	K. RADHA	60/F	9	12	21.5
13	ELLAYAMMA	60/F	8	7.5	15.5
14	ROSY.F	65/F	10	10.5	20.5
15	T. FATHIMA	69/F	11	12.5	23.5
16	M.GRACY	60/F	13	12.5	25.5
17	S. JANAKI	64/F	8	10	18
18	M.MAHOOBNISA	60/F	11	13	24
19	JANAKIAMMAL	80/F	7	7.5	14.5
20	NAVANEEDHAM	75/F	12	11	23
21	RAMALAKSHMI	76/F	10	11.5	21.5
22	B. JAYALARABU	60/F	13	13	26
23	AMMAJAAN FATHIMA	80/F	7	9.5	16.5
24	M. MASTHAAN BEEVI	70/F	6	6.5	12.5
25	V. LAKSHMI	60/F	12	11	23
26	T.R. INDRA DEVI	68/F	13	15	28
27	A.FATIMA BEEVI	65/F	11	7.5	18.5
28	PONPAATHU BEEVI	78/F	10	12.5	22.5
29	T. PADMINI	61/F	14	12	26
30	SAMSUN MAHARIBA	86/F	11	9	20
31	MARLIYA	71/F	11	9.5	20.5
32	SHANTHA NAYAGI	70/F	7	11	18
33	UMA MAHESHWARI	60/F	8	10.5	18.5
34	SAJI KALA	60/F	12	13	25
35	NALINI GOVINDHAN	62/F	13	11.5	24.5
36	SALIMA BEEVI	63/F	7	11.5	18.5
37	C.MALARKODI	60/F	11	15	26
38	D.USHA RANI	60/F	13	11.5	24.5
39	G. RUKMANI	60/F	10	13.5	23.5

40	S. LEELAVATHI	68/F	11	13	24
41	D. SUGUNA	70/F	10	11.5	21.5
42	F. MUMTAJ	64/F	11	13	24
43	MARIAMMA	66/F	11	14	25
44	DEVI	60/F	13	10	23
45	V. THANGAM	70/F	12	15	27
46	B. NALINI	60/F	10	13.5	23.5
47	M. SHARFUNISHA	67/F	13	11.5	24.5
48	KAYALA SARASWATHI	60/F	13	12.5	25.5
49	MAVILLA LAKSHMAMMA	62/F	11	11.5	22.5
50	NOORJAHAN	62/F	9	12	21