



Çankırı Karatekin University
Graduate School of Health Sciences



Master of Nursing Science Thesis

**ASSESSMENT OF NUTRITIONAL STATUS AMONG THE
ELDERLY PEOPLE ATTENDING PRIMARY HEALTH CARE
CENTERS IN AL-DIWANIYAH CITY**

By

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Advisor

Asst. Prof. Dr TEMEL KALAFAT

Çankırı 2023

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**The Institute of Health Sciences
The Department of Nursing**

The Degree of Master of Science in Nursing

SUPERVISOR

Asst. Prof. Dr Temel KALAFAT

Çankırı 2023

ACCEPTANCE AND APPROVAL

Qasim Abdulameer Habeeb ALKARAKOOL, the graduate student of The Institute of Health Sciences with the student number of 208205272, has successfully presented her thesis entitled “Assessment of Nutritional Status among the Elderly people Attending Primary Health Care Centers in Al-Diwaniyah City” before the jury whose signatures are below, after fulfilling all of the requirements determined by the relevant regulations for the degree of Master of Science in Nursing.

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ETHICS STATEMENT

The thesis entitled “Assessment of Nutritional Status among the Elderly people Attending Primary Health Care Centers in Al-Diwaniyah City” which was prepared and presented as a thesis, was written by myself and in accordance with the scientific, academic rules and ethical conduct. The idea/hypothesis of my thesis solely belongs to my supervisor and to me. The research pertaining to the thesis was conducted by myself and therefore, all of the used sentences and interpretations within the work belongs to me.

I declare the aforementioned issues to be correct.

Signature

2023

Qasim Abdulameer Habeeb ALKARAKOOL

ABSTRACT

ASSESSMENT OF NUTRITIONAL STATUS AMONG THE ELDERLY PEOPLE ATTENDING PRIMARY HEALTH CARE CENTERS IN AL-DIWANIYAH CITY

Qasim Abdulameer Habeeb ALKARAKOOL

Master of Science in Nursing

Advisor: Asst. Prof. Dr Temel KALAFAT

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Malnutrition greatly affects the elderly due to various reasons such as physiological and functional changes that occur with age, lack of financial assistance and inadequate access to food. The aim of this study was to evaluate the nutritional status of elderly people attending primary health care centers in Al-Diwaniyah city, Iraq, in addition to medical problems such as infectious and non-communicable diseases, malnutrition increases the health problems of the elderly. The Study Design is a cross-sectional study. This study, which was conducted at primary health care centers in Al-Diwaniyah city, Iraq, from (25/3/2022) to (20/ 8/2022). The Study Sample the study consisted of elderly people aged 50-85 years who went to primary health care centers in the city of Al-Diwaniyah. Sample size calculator by used G* power program and the sample size consisted of 157 elderly people. The questionnaire used in this study is Mini Nutritional Assessment scale (MNA). Data analysis by used IBM SPSS 26 package program was used to analyze the data collected in the study, Frequency analysis , T-Test and ANOVA analysis , While creating the research report, 95% confidence interval ($p < .05$) was used for the significance level. The result of this study show that During the course of the present study data analysis and logical discussion and interpretation of result the study concludes that Most of the respondents are from the age group (60-69) and most of them are married, as well as the work status was not working, Family Monthly Income was Income equals expenses, and more than half of the sample get a Presence of Health Insurance. There is a significant statistical relationship between age, marital status, marriage age, education level, family monthly income, presence of children, Long Lived Place and Mini Nutritional Assessment Scale (MNA). Recommendation of this study is Increase the health awareness of the elders about consuming healthy food through application of educational activity such as meetings in primary health care, seminars, distribution of folders and leaflets in cooperation with primary health care providers. Establishing local NGO for care and support of older adults in the province involving members from health care providers, civil activist's volunteers, academics, social workers and lawyers to advocate and to protect them.

2023, 75 pages

Keywords: Elderly people, Malnutrition, Screening, Evaluation, MNA.

ÖZET

AL-DİWANİYAH ŞEHRİNDEKİ BİRİNCİ BASAMAK SAĞLIK MERKEZLERİNE GİDEN YAŞLILARDA BESLENME DURUMLARININ DEĞERLENDİRİLMESİ

Qasim Abdulameer Habeeb ALKARAKOOL

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Malnütrisyon, yaşla birlikte ortaya çıkan fizyolojik ve fonksiyonel değişiklikler, maddi yardım eksikliği ve gıdaya yetersiz erişim gibi çeşitli nedenlerle yaşlıları büyük ölçüde etkilemektedir. Bu çalışmanın amacı, Irak'ın Al-Diwaniyah kentindeki birinci basamak sağlık merkezlerine devam eden yaşlıların beslenme durumlarını değerlendirmektir, bulaşıcı ve bulaşıcı olmayan hastalıklar gibi tıbbi sorunların yanı sıra, yetersiz beslenme yaşlıların sağlık sorunlarını artırmaktadır. Çalışma Tasarımı kesitsel bir çalışmadır. Irak'ın Al-Diwaniyah şehrindeki birinci basamak sağlık merkezlerinde (25/3/2022) ile (20/8/2022) tarihleri arasında yürütülen bu çalışma. Çalışma Örnekleme, Al-Diwaniyah kentindeki birinci basamak sağlık merkezlerine giden 50-85 yaş arası yaşlılardan oluşmaktadır. Kullanılan G* güç programı ile örneklem büyüklüğü hesaplayıcısı ve örneklem büyüklüğü 157 yaşlı kişiden oluşuyordu. Bu çalışmada kullanılan anket Mini Beslenme Değerlendirme ölçeğidir (MNA). Çalışmada toplanan verilerin analizinde IBM SPSS 26 paket programı kullanılarak veri analizi, Frekans analizi, T-Testi ve ANOVA analizi, araştırma raporu oluşturulurken anlamlılık düzeyi için %95 güven aralığı ($p<.05$) kullanılmıştır. Bu çalışmanın sonucu, bu çalışma süresince veri analizi ve sonucun mantıksal olarak tartışılması ve yorumlanması sırasında, araştırmanın katılımcıların çoğunun (60-69) yaş grubundan (60-69) olduğu ve çoğunun evli olduğu, ayrıca çalışma durumunun çalışmadığı, Aile Aylık Gelirinin Gelir eşittir giderler olduğu sonucuna vardığını ve numunenin yarısından fazlası Sağlık Sigortası Varlığı alıyor. Yaş, medeni durum, evlilik yaşı, eğitim düzeyi, ailenin aylık geliri, çocuk varlığı, Uzun Ömürlü Yer ve Mini Beslenme Değerlendirme Ölçeği (MNA) arasında anlamlı istatistiksel ilişki bulunmaktadır. Bu çalışmanın önerisi, birinci basamak sağlık hizmeti sunucuları ile iş birliği içinde toplantılar, seminerler, klasör ve broşür dağıtımı gibi eğitim faaliyetlerinin uygulanması yoluyla yaşlıların sağlıklı gıda tüketme konusundaki sağlık bilincinin artırılmasıdır. Eyaletteki yaşlı yetişkinlerin bakımı ve desteklenmesi için sağlık hizmeti sağlayıcılarından, sivil aktivist gönüllülerden, akademisyenlerden, sosyal hizmet uzmanlarından ve avukatlardan onları savunmak ve korumak için üyeleri içeren yerel STK'ların kurulmasıdır.

2023, 75 sayfa

Anahtar Kelimeler: Yaşlılar, Malnütrisyon, Tarama, Değerlendirme, MNA.

PREFACE AND ACKNOWLEDGEMENTS

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CONTENTS

ACCEPTANCE AND APPROVAL	i
ETHICS STATEMENT	ii
ABSTRACT	iii
ÖZET.....	iv
PREFACE AND ACKNOWLEDGEMENTS	v
CONTENTS.....	vi
LIST OF ABBREVIATIONS	ix
LIST OF TABLES	x
1. INTRODUCTION.....	1
1.1. The Aim of the Study	4
1.2. Importance of the Study	4
1.3. Hypotheses	6
1.4. Limitations.....	6
1.5. Assumptions.....	6
2. GENERAL INFORMATION	7
2.1. Old Age and Ageing.....	7
2.2. Life Expectancy and Life Span	8
2.3. Theories of Ageing	9
2.3.1. Biological theories	9
2.3.2. Psychosocial theories.....	11
2.3.3. Evolutionary aging theory	11
2.4. Changes with Aging	12
2.5. Health Problems Related to Nutrition in the Elderly	18
2.6. Energy and Nutrient Requirements in the Elderly	21
2.6.1. Macronutrient requirements.....	22
2.6.2. Micronutrient requirements	23
2.7. Physical Activity in the Elderly.....	26
2.7.1. Negative effects of inactivity in old age	27
2.7.2. Benefits of physical activity in old age	27
2.7.3. Physical activity recommendations in old age	28
2.7.5. Frailty in old age	28

2.8. Evaluation of Nutritional Status in the Elderly	29
3. MATERIALS AND METHOD.....	30
3.1. The Study Design	30
3.2. The Study Sample	30
3.2.1. Inclusion criteria	30
3.2.2. Exclusion criteria	31
3.3. The Study Setting.....	31
3.4. Study Instrument and Data Collection	31
3.5. Ethics Committee Approval.....	33
3.6. Data Analysis.....	33
4. RESULTS	34
4.2. Descriptive Findings of the Mini Nutritional Assessment Scale	35
5. DISCUSSION	54
5.1. Discussions of Demographic Characteristics of Participants.....	54
5.2. Discussion of the Mini Nutritional Assessment Scale	54
5.3. Discussions of Comparison of Mini Nutritional Assessment Scale and Demographic Characteristics.....	55
5.3.1. Age comparison with mini nutritional assessment scale.....	55
5.3.2. Marital status comparison with mini nutritional assesment scale.....	56
5.3.3. Educational status comparison with mini nutritional assessment scale	56
5.3.4. Family monthly income comparison with mini nutritional assessment scale	56
5.3.5. Long-Lived place and presence of health insurance comparison with mini nutritional assessment scale.	57
5.3.6. Discussion of multiple comparisons post-hoc (LSD) tests between malnutrition scores and demographic characteristics.....	57
5.4. Discussion of Multiple Comparisons Post-Hoc (LSD) Tests between Screening Scores and demographic characteristics.....	58
5.5. Discussion of multiple Comparisons Post-Hoc (LSD) Tests between Evaluation Scores and demographic characteristics.....	58
6. CONCLUSSION AND RECOMMENDIATION	60
REFERENCES.....	61
APPENDICES	69
APPENDIX 1. Questionnaire.....	69
APPENDIX 2. Approval of Cankiri Karatkin University.....	72

APPENDIX 3. Approval of Iraqi Ministry of health	73
CURRICULUM VITAE.....	75



LIST OF ABBREVIATIONS

DM	Diabetes Mellitus
MNA	Mini Nutritional Assessment
MUST	Malnutrition Universal Screening Tool
NHANES	National Health and Nutrition Examination Survey
SD	Standard Deviation
SGA	Subjective Global Assessment
UN	The United Nations
WHO	World Health Organization
FVC	Forced Vital Capacity

LIST OF TABLES

Table 4.1	Findings on Demographic Characteristics	35
Table 4.2	Descriptive Findings of the Mini Nutritional Assessment Scale	36
Table 4.3	Age Comparison with Mini Nutritional Assessment Scale	37
Table 4.4	Marital Status Comparison with Mini Nutritional Assessment Scale....	38
Table 4.5	Married Age Comparison with Mini Nutritional Assessment Scale.....	39
Table 4.6	Educational Status Comparison with Mini Nutritional Assessment Scale	40
Table 4.7	Working Status Comparison with Mini Nutritional Assessment Scale .	41
Table 4.8	Family Monthly Income Comparison with Mini Nutritional Assessment Scale.	42
Table 4.9	Presence of Children Comparison with Mini Nutritional Assessment Scale.....	43
Table 4.10	Long Lived Place Comparison with Mini Nutritional Assessment Scale.....	44
Table 4.11	Presence of Health Insurance Comparison with Mini Nutritional Assessment Scale	45
Table 4.12	Multiple Comparisons Post-Hoc (LSD) Tests between Malnutrition Scores and demographic characteristics	46
Table 4.13	Multiple Comparisons Post-Hoc (LSD) Tests between Screening Score and demographic characteristics	48
Table 4.14	Multiple Comparisons Post-Hoc (LSD) Tests between Evaluation Scores and demographic characteristics	51

1. INTRODUCTION

Today, the world's elderly population is increasing as a result of social, economic, medical, scientific and technological developments. By 2050, the population over 60 years of age in the world is expected to increase to 22%. Aging is all of the irreversible, structural and functional changes that occur with the progression of time at the level of molecules, cells, tissues, organs and systems in the organism. Ageing is a process characterised by a decrease in basic biological capacities and has physiological, psychological, economic and social aspects (WHO, 2018).

The most important factor determining life span is genetics. However, many factors such as lifestyle, environmental factors, diseases and the way people cope with adverse conditions also play a role in determining life expectancy. Some physiological changes occur in the body with ageing. In 2050, it is estimated that 80% of elderly people will live in low and middle income countries. All countries are facing the challenges of this demographic change. There is an increase in chronic diseases such as cancer, cardiovascular diseases, hypertension, diabetes associated with nutritional problems in old age (Baz and Ardahan, 2016).

However, it should not be forgotten that these physiological changes can be delayed with a healthy diet and lifestyle. The presence of chronic diseases in the elderly causes nutritional limitations and a decrease in functional capacity and negatively affects the quality of life. Ensuring adequate and balanced nutrition in the elderly is important in preventing diseases, improving and developing health and thus increasing the duration and quality of life. As individuals age, changes occur in their food consumption (Kansal *et al.*, 2016).

Firstly, changes related to decreased appetite occur, and accordingly, with inadequate food intake and loss of fatty and lean body tissues, another situation that attracts attention in this age group is malnutrition. With the loss of functional capacity and abilities, the need for health care increases as the activities of daily living of the elderly individual become semi-dependent or fully dependent. The geriatric age group is a

special age group due to developing physiological changes, increase in chronic diseases and geriatric syndromes, and multiple drug use. Nutrition has an important place among various factors that change the quality of ageing. Healthy nutrition is a basic requirement for every age group. However, with the advancement of age, changes are observed in the eating habits of individuals (Başbüyük et al., 2017).

Nutritional problems seen in old age appear as malnutrition and unbalanced nutrition. There is an increase in chronic diseases such as cancer, cardiovascular diseases, hypertension, and diabetes mellitus (DM), associated with unbalanced nutrition problems in old age. Malnutrition problems in the elderly are mostly seen as protein energy malnutrition. Although malnutrition is not a natural component of aging, elderly individuals are at risk of malnutrition due to physiological, psychological and social risk factors (Altunok et al., 2016).

Physiological risk factors associated with malnutrition include inadequate diet, dental problems, decreased sense of taste and smell, disability status and mobility limitation, diseases (cancer, DM, stroke, etc.). Social risk factors include inadequate nutritional knowledge, social isolation, loneliness, poverty, lack of food preparation capacity. Psychological risk factors include confusion, depression, anxiety and dementia. The most important cause of malnutrition in the elderly is diseases. Since acute and chronic diseases increase with advancing age, the elderly are more affected by these diseases. With the effect of diseases, imbalances arise between the need for nutrients, intake and consumption of nutrients in the acute and/or chronic period (Adıgüzel, 2016).

This imbalance may arise from the lack of sufficient nutrients on the one hand, as well as the inadequacy of the quality of the food offered or the way the food is presented. On the other hand, the imbalance in question may also be due to inadequate food intake despite the adequate availability of food. The vicious cycle between malnutrition and chronic diseases is also an important cause of mortality and morbidity in this age group. In a retrospective analysis of data from 12 countries, the overall prevalence of malnutrition in the elderly population was reported to be approximately 23%. The

highest prevalence was observed in rehabilitation settings (50.5%), hospitals (38.7%), nursing homes (13.8%) and the community (5.8%) (Erdoğan and Tunca, 2016).

Malnutrition is an important factor for the elderly to maintain their daily life activities and quality of life. Therefore, every elderly patient should be evaluated in terms of malnutrition. Early diagnosis of malnutrition and adequate and qualified treatment can prevent complications, accelerate recovery and make a significant contribution to maintaining the functionality of the elderly and preventing the loss of quality of life. Therefore, early recognition and appropriate treatment of malnutrition is necessary. In the early diagnosis of malnutrition in the elderly, nutritional risk screening is important. Screening tests provide early identification of characteristics, risks and protective factors associated with nutritional status rather than determining the actual nutritional level (Krishnamoorthy et al., 2018).

One of the key issues in the fight against malnutrition is the development of systems for the assessment of nutritional status in the community with easy methods. Depending on the nutritional status of elderly individuals, various screening tools are used to identify individuals with malnutrition or those at risk of malnutrition. Between 1998 and 2002, 71 screening tests were developed and 21 of them were found to be applicable for elderly individuals. However, as a result of reliability and validity tests conducted over time, some of them were reported to be more valid than others. MNA (Mini Nutritional Assessment Analysis-Mini Nutritional Assessment) has an important place among the frequently used tools whose reliability and validity have been established in determining nutritional status in elderly individuals (Li et al., 2019).

Researchers have stated that MNA is better known than other tools in the diagnosis of nutritional status and the best fit is found between the Subjective Global Assessment (SGA) and the Malnutrition Universal Screening Tool (MUST). The tool they considered appropriate to be used in diagnosing the nutritional status of the elderly in the home environment is the MNA. 15 Activities of daily living should also be evaluated in maintaining adequate and balanced nutrition and evaluating nutritional problems in the elderly. Since the old age period, in which physiological, biological and

spiritual decline is seen in individuals, is a period in which functional and structural changes are experienced, protection, surveillance and care needs increase; problems are seen in the fulfilment of daily living activities (Bellanti et *al.*, 2020).

With the loss of functional capacity and abilities, the activities of daily living of the elderly individual become semi-dependent or fully dependent, and the need for health care increases. While planning the care needs of the elderly, nurses evaluate both nutrition and activities of daily living during the data collection phase and make interventions for the nursing diagnosis (Bleiel et *al.*, 2021).

The aim of this study was to evaluate the nutritional status of elderly people attending primary health care centres in Al-Diwaniyah city. In Iraq, in addition to medical problems such as infectious and non-communicable diseases, malnutrition increases the health problems of the elderly. Healthy nutrition can protect the elderly from degenerative diseases and improve their quality of life. Therefore, the importance of this study is to monitor the nutritional health of the elderly in Iraq and to raise public awareness about the importance of this monitoring. This study is important for the quality of life of the elderly population in the region.

1.1. The Aim of the Study

It is aimed to evaluate the nutritional status of the elderly who go to primary health centers in the city of Al-Diwaniyah.

1.2. Importance of the Study

The proportion of the elderly is increasing rapidly in the world. The number of elderly people worldwide is expected to reach approximately 1.5 million by 2050, and most of this increase occurs in developing countries (Bloom et *al.*, 2011).

The United Nations (UN) does not have a global numerical standard for the definition of old age, but it can be said that old age is the age starting from the age of 60. Also, the proportion of the elderly (60 years and older) in Iraq was the lowest among age groups, at just 3.1% in 2020. No matter how low this number is in the population, it will undoubtedly create some problems. Some of the challenges faced by the elderly in Iraq are lack of a substantial and secure income, lack of social security, loss of social status, lack of opportunities to use time creatively, and persistent illnesses. Therefore, the elderly population increases the country's demand for caregivers, society and health services (Qader et al., 2013).

Malnutrition greatly affects the elderly due to various reasons such as physiological and functional changes that occur with age, lack of financial assistance and inadequate access to food. The functional status of the elderly causes them to be unable to perform daily tasks such as preparing and eating food, which affects their nutritional status. (Mangels, 2018).

Nutrition and health of the elderly are often overlooked. Most nutrition intervention programs target newborns, young children, adolescents, and pregnant and lactating women. On the other hand, nutritional therapies can help the elderly avoid degenerative diseases and improve their quality of life. In individuals at risk of malnutrition, weight loss can be stopped with timely intervention (Chauncey et al., 1984).

In addition to medical problems such as communicable and non-communicable diseases, malnutrition increases the health problems of the elderly in Iraq. With a healthy diet, the elderly can be protected from degenerative diseases and improve their quality of life. Therefore, the importance of this study is to monitor the nutritional health of the elderly in Iraq and to raise public awareness of the importance of this monitoring. This study is important for the quality of life of the elderly population in the region.

1.3. Hypotheses

- a) Is there a significant difference between nutritional status among the elderly and malnutrition with their demographic characteristics (age, marital status, age of marriage, educational status, working status, family monthly income, presence of children, longest lived place, and presence of health insurance)?
- b) Is there a significant difference between nutritional status among the elderly people and screening with their demographic characteristics (age, marital status, age of marriage, educational status, working status, family monthly income, presence of children, longest lived place, and presence of health insurance)?
- c) Is there a significant difference between nutritional status among the elderly people and evaluation with their demographic characteristics (age, marital status, age of marriage, educational status, working status, family monthly income, presence of children, longest lived place, and presence of health insurance)?

1.4. Limitations

The research is limited to the elderly attending primary health care centers in the city of Al-Diwaniyah. It cannot be generalized, as it only shows results for older individuals living in a particular area.

1.5. Assumptions

The hypotheses of the research are listed below:

- Elderly individuals participating in our research have openly expressed their views. The scales used in our research are valid and reliable. The sample in our research reflects the study population.

2. GENERAL INFORMATION

Seniors are people over the age of 65. Changes in old age depend on genetic predisposition and lifestyle, e.g. sports, smoking and eating habits. The most important changes affecting diet and nutritional status are related to body composition and weight, energy and nutrient requirements, thirst sensation, altered sensory perceptions, chewing ability and digestion and gastrointestinal system. A healthy and balanced diet is important at all stages of life and can positively influence health. Especially in old age, meals are of high social importance as they give structure to the day and provide enjoyment, pleasure and community. In addition, an appropriate diet that meets the needs of older people can reduce their susceptibility to disease. However, many changes occur in the body in old age that make it difficult to obtain adequate amounts of various nutrients and can dull the pleasure of eating (Jawaid, 2020; O'Connell *et al.*, 2021).

In this chapter, information about old age, ageing, theories of ageing, changes seen in old age, nutrition of the elderly and physical activity in the elderly are given.

2.1. Old Age and Ageing

Living beings are born, grow and develop. Aging is an advanced stage of growth and development. Aging is an inevitable process seen in all living organisms and includes structural and functional changes occurring at the level of molecules, cells, tissues, organs and systems. Although there are different approaches and definitions related to old age, the mostly adopted criterion is to consider people aged 65 years and older as "elderly". The World Health Organisation (WHO) defined old age as a decrease in the ability to adapt to environmental factors. WHO accepts the increase in the elderly population in the world as a positive indicator of the development in global health services (Rudnicka *et al.*, 2020).

Today, it is reported that there are 650 million elderly people over the age of 60 in the world and this figure may reach 2 billion in 2050. Apart from the concept of individual

old age, there are various concepts related to the social evaluation of old age. These are the concept of elderly society, life expectancy at birth and average age of the society. According to the level of the share of the number of people aged 65 years and over in the total population in a society, young-mature-older society definitions can be made for societies. If the share of the elderly population in the society is less than 4%, it is referred to as "young population"; if it is between 4-6.9%, it is referred to as "mature population"; if it is between 7-10%, it is referred to as "elderly population"; and if it is over 10%, it is referred to as "very old population" (Kurtkapan, 2019).

2.2. Life Expectancy and Life Span

Life expectancy refers to the average life expectancy of a population at birth or at certain ages. Demographic and epidemiological changes in societies affect life expectancy. In developed societies, high mortality rate, high fertility and high prevalence of infectious diseases; the change in the direction of low mortality rate, low fertility and control of infectious diseases has led to an increase in life expectancy. Today, life expectancy has increased nearly one fold. Especially after the 1950s, this prolongation has accelerated. The reason for this is that fertility, child mortality and mortality from infectious diseases have been prevented to a great extent with the measures taken (Aburto et al., 2020).

Although there are fluctuations in life expectancy at birth in developing countries, it continues to increase in many countries. This means that the group defined as the elderly will gradually grow. The increase in the share of the elderly population in the total population will bring along health, economic, environmental and social problems. These countries, including Iraq, will face the problem of old age in the near future with the rapid decrease in fertility (Andrasfay and Goldman, 2021).

2.3. Theories of Ageing

Ageing has been a subject of curiosity since the beginning of human history. From the beginning of the twentieth century until today, many theories have been developed to explain the mechanism of ageing (Thuesen et al., 2021).

2.3.1. Biological theories

- Somatic mutation theory: According to this theory, ageing is caused by random changes in vital molecules. These changes accumulate and when they reach a threshold level, age-related physiological declines occur. The most important example of this theory is that radiation causes mutations, resulting in functional decline and death. The DNA repair theory is an even more specific example of the mutation theory. The ability of tissue culture cells to repair radiation-induced damage to DNA is closely related to their maximum lifespan. However, there is no experimental study clearly showing the place of DNA repair in aging (Trevisan et al., 2019).
- Free radical theory: Free radicals are chemical elements formed during reactive and caustic metabolic processes at the cellular level. They are highly present in cell mitochondria. In addition, free radicals are also formed as a result of exposure to chemical toxins such as ozones, hydrogen peroxide and radiation. Proliferating free radicals can damage DNA and affect the protein synthesis of the cell. It is thought that free radicals are involved in the production of ageing pigments, especially in neurons and myocardium. According to the proponents of the free radical theory, DNA changes and mutations caused by radical substances formed in the cell cause negative changes in connective tissue, skin, heart, neurons and musculoskeletal system structures (Golubev et al., 2018).
- Cellular ageing theory: Cell senescence is associated with DNA loss in the telomere region and apoptosis. Genes controlling cell proliferation are among the causes of

clonal senescence. Cell senescence also includes DNA loss in the telomere region at the ends of chromosomes. Programmed cell death, apoptosis, is also related to ageing. Cell death can also be caused by ischaemia or toxins; this is called "necrotic cell death" (Trevisan *et al.*, 2019).

- Autoimmum theory: This theory is in a sense the opposite of the immunological theory of ageing. Normal functioning of the immune system and its cellular components is necessary for the functioning of the self-tolerance mechanism that prevents the body from recognising and reacting to its own cells. According to the autoimmune aging theory, contrary to the immune aging theory, aging is not the result of the body's inability to defend itself against external influences due to the decline in the immune system, but the result of the immune system becoming unable to recognise the bodies own cells and starting to destroy body cells (Mager, 2022).
- Immune theory of ageing: Humans have a weak immunity at birth. Immunity against diseases increases with antibodies formed against pathogens encountered in the body over time and vaccines. This development of the immune system reaches its peak at the age of 40. In the following years, the development of the immune system is replaced by a decline. This theory basically argues that old age occurs when the body is unable to protect itself against injuries, diseases, mutations or external organisms as a result of the decline of the immune system (Fedarko, 2018).
- Endocrine theory: Menopause occurs with the depletion of the limited storage of ovarian follicles and oocytes and involves physiological changes (6, 15, and 20).
- Noroendocrine theory: It is a theory examining the role of changes in the functions of the pituitary gland in aging (Nagaratnam, 2019).

All the theories are based on the idea of wear and tear in neurons and other cells in such a way that the regenerative power is lost due to mechanical or chemical fatigue. Representatives of these theories believe that by slowing down cell metabolism, the

physiological and anatomical consequences of ageing can be delayed. The weak point of this theory is that a machine cannot repair itself, but a living organism has the ability to repair itself (Fedarko, 2018).

2.3.2. Psychosocial theories

In addition to physical changes and losses in old age, it is necessary to create new adaptation strategies because retirement, loss of spouse, separation of children from home and chronic diseases are difficult situations to cope with. The reaction of the elderly to these psychosocial changes is based on the following three theories (Turner, 2018).

- The theory of disengagement: Since old age is a period of physical, psychological and social decline, the individual moves away from the outside world and focuses on his/her own life. He/she reduces the roles and relationships he/she undertakes, does not undertake new roles, and is condemned to loneliness (Zhang and Lin, 2022).
- Activity theory: The individual continues his/her life as he/she wants and directs his/her energy to new roles and interests. These individuals are psychologically healthier and live longer (Rantanen et al., 2018).
- Continuity theory: The individual is not negatively affected by old age and continues to live successfully. He/she uses similar strategies in old age as he/she coped with his/her problems in all developmental periods (Cook, 2018).

2.3.3. Evolutionary aging theory

Individuals with different characteristics undergo natural selection depending on the interaction of their genetic structure and environmental factors, their capacity to adapt to the environment and the quality of environmental factors. If favourable environmental conditions are provided, it causes the individual to develop characteristics that enable

the individual to live longer in the evolutionary process. The fact that individuals have different life spans and aging patterns and that aging has biological, chronological, pathological, psychological, social and economic aspects is an indication that aging is a cumulative and complex biological event (Johnson, Shokhirev and Shoshitaishvili, 2019).

2.4. Changes with Aging

It is possible to examine the changes occurring in the elderly individual in 3 sections as physiological, psychological and socio-cultural changes.

- **Physiological Changes:** The changes that occur due to ageing do not cause loss of function under normal conditions. However, there is a decrease in the reserves of organ systems and homeostatic control (de Carvalho Cordeiro *et al.*, 2021).
- **Respiratory System:** The number of alveoli and alveolar surface area decreases with age and elasticity decreases. Lung volumes decrease gradually. Inspiratory capacity decreases. Chest wall compliance decreases and chest wall deformities may occur. Respiratory muscles, especially the diaphragm, weaken. Arterial oxygen pressure decreases, alveolar-arterial gas exchange decreases and consequently ventilation-perfusion balance is impaired. The decrease in forced expiratory volume in one second (FEV1)/forced vital capacity (FVC) ratio is slower in elderly men than in elderly women. Maximum expiratory flow and maximum voluntary ventilation decrease more slowly in women. Maximum oxygen uptake (VO₂max) decreases, thus decreasing exercise capacity and reserve (Chalise, 2019).
- **Cardio-Vascular System:** The heart is harder and fills more slowly. Vein walls are thicker and elasticity is decreased. Cardiac output and blood volume decrease. The cardiac output of an 80-year-old person is half of the cardiac output of a 20-year-old person. Left atrium size increases with age. Large elastic arteries become dilated with decreased compliance. The prevalence of ventricular hypertrophy seen on

echocardiography increases. The stiffness of the left ventricle increases with age, its compliance decreases and its relaxation deteriorates (Pisaruk et *al.*, 2022)

- **Gastro-Intestinal System:** As a result of delayed gastric emptying, bloating and decreased appetite occur. As a result of decreased absorption in the intestines, the intake of essential substances required for metabolism and body tissues such as vitamins, minerals, fats, carbohydrates and proteins decreases. Prolonged colon movement leads to constipation and delayed output. Anal sphincter resting pressure in both sexes and maximum sphincter pressure in women decrease. There is a decrease in hepatic blood flow due to shrinkage in the liver, a change in the clearance of drugs as a result of a decrease in the activity of some enzymes and a delay in regeneration ability after hepatic injury (Van Soest et *al.*, 2020).
- **Neurological System:** Brain weight and cerebral blood flow decrease. Neuron loss is seen more in certain parts of the brain. The volume of ventricles increases. There is a decrease in various neurotransmitters and dendrite connections. Neurofunctional abilities decline with age, reaction time is prolonged. Slowdown is observed in most of the functions related to learning and memory (Whitson et *al.*, 2018)
- **Endocrine System:** There is a numerical and functional decrease in insulin producing beta cells in the pancreas. Insulin sensitivity decreases. Glucose tolerance decreases as a result of decreased glucose-mediated insulin secretion, impaired insulin-mediated glucose uptake into skeletal muscle, postreceptor impairment in adipose tissue, increased body fat, decreased physical activity, decreased dietary carbohydrate, impaired renal function and increased sympathetic nervous system activity. Sex hormones decrease (van den Beld et *al.*, 2018).
- **Haematological System:** Bone marrow stem cell count is reduced. Although iron absorption from the intestines is normal, slowed erythropoiesis reduces the composition of iron in erythrocytes. Average haemoglobin and haematocrit values decrease but remain within normal limits (Rosko et *al.*, 2021).

- **Immunological System:** There is a decrease in the number of germinal centres in the lymph nodes and an increase in the number of plasma cells and lymphocytes in the bone marrow. Decrease in T-cell function decreases cellular immunity. There are changes in neutrophil and macrophage function. Inadequate or delayed response to antibiotics may be observed. Urinary and lung mucosal defence is weakened. Impairment in the function of natural killer cells results in an increase in parasitic and viral infections (Sellami et *al.*, 2018).
- **Genito-urinary system:** Glomerular filtration rate decreases progressively with age. They clear the blood less, more residues remain in the blood. They also cause dehydration by causing more water excretion. The bladder capacity decreases, the bladder muscles sometimes contract spontaneously outside of urination and cause a feeling of urination. While the bladder muscles weaken and cause an increase in the amount of residue, this is one of the reasons for the increased incontinence frequency in the elderly. In women, the urethra shortens and the inner surface thickness decreases with menopause. As the urethral sphincter tone decreases, urinary incontinence increases. In men, the prostate tends to grow and may become large enough to prevent urine passage. In women, vaginal atrophy, reduction in uterine volume and atrophy of the mammary glands occur due to estrogen and progesterone deficiency. Most men do not lose their ability to have an erection and orgasm for life. Erection quality and duration decrease and the time needed for a second erection may increase (Nappi et *al.*, 2019).
- **Musculoskeletal System:** The density of bones decreases with age and they become weaker and more fragile. Joint range of motion decreases. Difficulty in starting movement and stiffness develops. The decrease in muscle mass is mainly due to loss and atrophy of muscle cells. There is also a decrease in the neural stimulation of the muscles. The most important reason for the decrease in muscle mass is the decrease in the amount of growth hormone and testosterone. The decrease in physical activity, especially during the disease, leads to a further decrease in muscle mass. As a result, a decrease in functional capacity leads to problems such as increased risk of falls and limitations in independent movement. Increased kyphosis in the back leads to short

stature, decrease in postural stability, deterioration in respiratory mechanism and decrease in abdominal volume (Grote *et al.*, 2019).

- **Changes in Body Composition:** Between the ages of 60-75, body weight remains constant and weight loss is observed after the age of 75. Fat mass increases from 14 per cent in the 30s to 30 per cent in the 70s. The period of increase in fat mass is longer in women than in men. Unlike young people, body fat is distributed more intra hepatic, intramuscular, intraabdominal rather than subcutaneous in elderly individuals. Visceral fat accumulation is higher in men and subcutaneous fat accumulation is higher in women. Especially visceral fat accumulation poses a risk for hypertension, dyslipidaemia, and coronary artery disease and insulin resistance. Lean body mass decreases with ageing. After the age of 50, a loss of up to 3 kilograms (kg) in lean body mass and an increase in adipose tissue are observed in each decade. In the 30s, lean body mass accounts for 45 per cent of total weight, whereas by the age of 70 it decreases to 27 per cent. In men, the loss of lean body mass is greater than in women and occurs mostly in the lower limbs. Total body water decreases by 17% from 30 to 80 years of age in women and by 11% in men in the same period (Achamrah *et al.*, 2018).
- **Menopause:** In 75% of menopausal women, vasomotor imbalance or hot flushes occur and in 80% these complaints last for more than one year. As well as causing serious discomfort while awake, hot flushes can be seen during sleep and may cause insomnia (Mitchell and Waetjen, 2018).
- **Osteoporosis:** It is a condition characterised by an increased risk of fracture as a result of low bone mass and structural deterioration in bone tissue with ageing. Advanced age is an important risk. Bone density decreases by about 10 per cent per decade in women and about 5 per cent per decade in men after the forties. By the age of eighty, 30 per cent of total bone tissue is lost in women (Cannarella *et al.*, 2019).
- **Skin:** As a result of thinning of the skin and decrease in its durability, decrease in collagen tissue elasticity and set, there is an increase in skin sensitivity and risk of

wound formation. Nail changes are observed. Reduction in subcutaneous adipose tissue, hair follicles, blood vessels, sebaceous glands and nerve endings results in loss of sensation, dryness, poor thermoregulation and increased risk of bruising. The risk of burns and cuts increases due to decreased sensation of touch and heat. Decrease in melanin pigment increases the risk of sunburn (Park, 2022).

- **Eye and Ear:** In the eye, the most important changes occur in the lens. The hardness of the lens increases and there is not enough shape change to focus on objects and the image of the object cannot be reduced on the retina. A 60-year-old person needs 3 times more light than a 20-year-old person. This situation causes them not to be able to recognise the light at first. In addition, as the thickness of the lens will increase, it will be difficult to recognise dim light. The number of nerve cells travelling from the eye to the brain also decreases. The sense of depth perception decreases and this may cause difficulty in running. There is an increase in the development of dry eye due to a decrease in the number of tear-producing cells. Increased development of glaucoma, retinopathy, macular degeneration and cataracts. There is a decrease in the quality of hearing as a result of years of exposure to loud noises or simply due to age. The accumulation of earwax increases with age and this reduces the quality of hearing. As age increases, high-pitched sounds such as women's and children's voices are more difficult to hear (Ciabattini et al., 2018).
- **Mouth:** Deterioration of oral health may be due to systemic diseases, medication, inappropriate diet or lack of preventive oral care. Due to increasing fibrosis of the salivary glands and age-related salivary gland diseases, about 40% of older people complain of dry mouth. Basal salivation is probably reduced, which contributes to poor oral digestion and reduced swallowing power. These make taste significantly more difficult. In addition, the number of taste buds on the tongue decreases, so that the sense of taste begins to decline after the age of 50. The decrease in the sense of taste is particularly noticeable in the perception of sweet and salty rather than fatty and sour. These changes cause the elderly to add more bitter and salt to their meals. Chewing power decreases due to tooth, gum and jaw problems, and difficulties in communication and speech are experienced. Due to the recession of the gums, the

gaps between the teeth, especially in the lower jaw, will be very open, and food residues and bacteria will accumulate in these areas. These changes make the teeth more sensitive, cavities are formed and eventually tooth loss occurs (Xu, et *al.*, 2019).

- **Psychological Changes:** The psychological aspect of ageing is generally concerned with changes in cognitive abilities and mental behaviour (Baghel ve diğçerleri, 2019).
- **Cognitive Changes:** Information processing speed slows down. There is age-related regression in situations that require attention to be divided into two simultaneous tasks. Failure is seen in tasks that require sustained attention. Difficulties are experienced in tasks that require the elimination of irrelevant information or distractors and the identification of only the target stimulus to be dealt with, and the possibility of making mistakes in such tasks increases. Short-term memory is relatively less affected by age-related decline. In long-term memory, a more severe decline is observed in recall performance than in recognition or cued recall performance. Language skills such as word finding and/or naming, finding words appropriate to a category are impaired. There is a decline in visual-spatial tasks such as three-dimensional structuring and shape copying (Baghel et *al.*, 2019).
- **Mental Changes:** Sadness, depression and stagnation are not considered to be pathologies, but human and natural reactions to chronic health problems and psychological losses such as the loss of a spouse, relatives or job. This situation is often expressed as 'ageing mimics depression'. Older individuals are less interested in the environment, more interested in their own body and self, may be deeper and more selective in relationships, may be afraid of innovations and miss their old lives. Old age is also a period in which individuals question their past more frequently. If the individual has lived a satisfying life in the past, if he/she has been able to approach his/her goals, wishes and ideals, he/she accepts old age more easily and can participate in activities that he/she could not do during the productive period. He/she can engage in activities that enrich his/her life such as travelling, reading, and spending time with his/her family and friends. Acceptance of old age varies according to each individual. Lack of financial security, dysfunctional family

situation, loss of loved ones, feeling oneself as an excess, assuming that one is a burden to one's relatives may start a restless period and the elderly person may become depressed (Ulfa and Sartika, 2019)

- **Socio-Cultural Changes:** The social status of an age group usually depends on its social influence or its function in production. In agricultural societies, the elderly have a respected status; their life experiences are especially valuable in societies where knowledge is transmitted orally. The scope of activities in these societies also ensures that the elderly remain productive members. In industrialised societies, however, the status of the elderly declines as technology becomes more prominent. In addition, the spread of the nuclear family in changing family relations causes the elderly, who spend most of their time in the family environment, to move away from each other and from younger family members. Another important social aspect of old age is related to the values and education of this generation. In industrial societies where change is very fast, a person who has reached the age of 65 encounters very different moral values, expectations and role definitions from those of his/her youth (Bagheri-Nesami and Shorofi, 2015).

2.5. Health Problems Related to Nutrition in the Elderly

Health problems related to nutrition in the elderly are as follows:

- **Malnutrition:** With aging, many physiological changes occur that affect the nutritional level of the individual. Changes in neurotransmitters and hormones in the elderly affect the central nutrition system and peripheral satiety system. 37-40% of the elderly do not have enough nutrition to meet their daily energy needs and two out of three elderly people skip one meal. The physiological changes that develop as a result of this are called "anorexia of old age". Physiological regulation of appetite in the elderly is different from young individuals. Due to physiological changes in appetite, average food consumption in elderly individuals was found to be 30% lower than in young people. Mortality rate increases by 9-38% within 1-2.5 years following body weight loss for any reason in the elderly due to body weight loss alone. In

addition to decreased oral food intake, daily growth hormone secretion decreases by 29-70% with age, which leads to sarcopenia (Papadopoulou, 2020). Three conditions should be differentiated from each other to understand malnutrition in the elderly. These are anorexia, sarcopenia and cachexia. Inadequate energy intake leads to loss of body weight and consequently anorexia and loss of fat mass. Sarcopenia is the loss of muscle mass as a result of reduced physical activity and/or insufficient protein intake. This also reduces mobility, for example by increasing the risk of falls. Sarcopenia is consequently a symptom of the frailty of old age. Cachexia, on the other hand, is a condition that occurs as a result of a large loss of fat and muscle mass due to anorexia and sarcopenia (Bernstein ve Munoz, 2019). While the prevalence of sarcopenia is 10-25% under the age of 70, it is around 30% in women and 50% in men over the age of 80. From the age of fifty, 2% muscle loss occurs every year. An involuntary decrease of 5% in body weight or low body weight leads to sarcopenia with increased morbidity and mortality). The prevalence of malnutrition due to any cause varies between 1-83% among geriatric patients in an inpatient treatment institution and between 2-32% among healthy elderly people living in their own homes. When the subject is protein-energy malnutrition, the prevalence is 30-65% among hospitalised elderly people and 25-60% among elderly people living in any institution (nursing home, elderly care home) (Bernstein and Munoz, 2019). Therapeutic diets and drug treatment applied due to chronic diseases such as osteoporosis, cardiovascular diseases, hypertension and cancer affect food consumption in elderly individuals. The energy content of restricted diets is generally very low, the foods are unappetising (viscous, flavourless and tasteless), unappealing to the eye and not consumed. Therapeutic diets restricted in sugar, salt and fat also reduce the flavour of meals, thus preventing adequate nutritional intake. In elderly people receiving long-term care, implementation of diets that are not very restricted may improve nutrition (Dent et al., 2019).

- Obesity: Decrease in physical activity with ageing, decrease in basal metabolic rate (BMR) with slowing down of muscle movements decrease energy requirement. Excessive food intake in this period causes obesity. Obesity is a risk factor for hypertension, hyperlipidaemia, diabetes, cardiovascular diseases, some types of

cancer and osteoarthritis. In addition, obesity decreases mobility and decreases the quality of life by preventing activities of daily living and makes the patient bed or chair dependent. The mortality rate in these patients is also higher compared to non-obese patients. It is known that insulin resistance is higher in diabetic patients with abdominal obesity compared with non-obese patients. In addition to the health problems caused by obesity, it is also effective on mortality. Studies show that the life expectancy at birth of obese individuals aged 40 years and over is 6-7 years less than non-obese individuals. It has been shown that the mortality rate is higher in individuals with a Body Mass Index (BMI) value above 27 kg/m² than in those with a BMI value below 27 kg/m² (Bosello and Vanzo, 2021). In the Turkish Adult Heart Disease and Risk Factors study (Gorkem and Inal, 2019), the prevalence of obesity according to BMI increased from 10.2% in men and 26.7% in women aged 60-69 years in 1990 to 35.2% in men and 54.2% in women in 2002. Again, while it was 7.3% in men and 21.1% in women over 70 years of age in 1990, it increased to 25.3% in men and 35.1% in women in 2002. In England, the prevalence of obesity is 22% in women aged 75 years and over and 12% in men. According to the National Health and Nutrition Examination Survey (NHANES) data, one third of American adults in the United States of America are obese and obesity increased from 14.7% to 22.9% in the 60-69 age group between 1991 and 2000. In the group over the age of seventy, this rate increased from 11.4% to 15.5% (Palakshappa and diğerleri, 2019).

- **Frailty:** Frailty is a geriatric syndrome characterised by slowness, weakness, fatigue, low physical activity and unwanted body weight loss. It has become an increasingly important public health problem in the elderly population. This syndrome is observed in 3.9% of people over the age of 65 and 25% of people over the age of 85 (Shwe ve diğerleri, 2019). Nutritional inadequacy, dependency, prolonged bed rest, pressure sores, gait disturbance, general weakness, very advanced age, body weight loss, anorexia, fear of falling, dementia, hip fracture, delirium, confusion, going out of the house less and multiple drug use have been defined as the characteristics of the frail elderly. It appears as a multifaceted syndrome with physical, psychological-cognitive and social aspects. Physically, it is defined as severe body mass loss with body weight loss and sarcopenia, decrease in hand grip strength, decrease in endurance,

fatigue, slow motor performance (decrease in walking speed, decreased balance) and low energy consumption and associated low physical activity (Ribeiro *et al.*, 2019).

- **Drug Use and Relationship with Nutrition:** Some drugs may impair the level of nutrition and drug metabolism may also be affected in case of inadequate nutrition. Drugs have side effects including anorexia, nausea and change in taste intake. In addition, their effects modifying absorption, metabolism and excretion of nutrients are also known. Food-drug interaction is reciprocal. Some drugs reduce the food intake of the elderly with side effects such as decreased appetite, constipation, diarrhoea, nausea, vomiting, dry mouth and altered taste sensation. Some drugs may cause malnutrition and vitamin and mineral deficiencies by negatively affecting the absorption and excretion of nutrients (Tek and Ermumcu, 2018).

2.6. Energy and Nutrient Requirements in the Elderly

When planning nutrition in the elderly, it should be aimed both to consider the frequently encountered nutrient deficiencies and to prevent chronic diseases and to provide medical nutrition therapy, if any. Diets applied in the elderly should be individualised. In order to make healthy nutrition plans and programmes, the nutritional status of the individual should be evaluated in detail. It is necessary to reveal the problems related with nutrition. Socio-economic, demographic and health risk factors related to elderly individuals should be defined. Physiological and metabolic changes due to aging, chronic diseases and continuous drug use cause changes in the requirement of energy and some other nutrients. Particular attention should be paid to a few nutrients in old age. These are protein, calcium, vitamin D, vitamin C, iron, vitamin A, folic acid, vitamin B12, zinc and water. Adequate consumption of foods rich in fibre will help digestion and prevent diseases such as constipation (Elmadfa and Meyer, 2020).

Energy requirement decreases with advancing age. The decrease is thought to be 5 per cent per decade after the age of fifty. The reason for the decrease in energy expenditure is the changes in body composition. In old age, there is an increase in body fat tissue

and a decrease in lean body mass or muscle density (sarcopenia). Muscle cell metabolism and body proteins decrease. Accordingly, basal metabolic rate and thus energy requirement decreases. Again, decrease in physical activity and work capacity leads to a decrease in energy requirement. Obesity, cardiovascular diseases, musculoskeletal diseases and osteopenia that occur with age also decrease physical activity. In general, it is recommended that the elderly should consume 30-35 kcal/day of energy per kilogram of ideal body weight, assuming that they have a mild physical activity level (Berendsen *et al.*, 2019).

2.6.1. Macronutrient requirements

The majority of the energy requirement should be provided from carbohydrates. Carbohydrate content of the diet for elderly individuals should be between 55-60% of daily energy. Foods rich in complex carbohydrates (cereals, legumes and potatoes etc.) should be preferred instead of simple sugars (sugar, sugar-added foods and beverages, molasses, honey etc.). It is known that simple sugars are associated with high triglyceride and low density lipoprotein (low density lipoprotein-LDL) cholesterol levels. The proportion of carbohydrates from simple sugars should not exceed 10%. Foods containing complex carbohydrates are also good sources of protein, vitamins, minerals and pulp. Water-soluble pulp lowers cholesterol and regulates blood glucose, and water-insoluble pulp prevents constipation and reduces the risk of colon cancer formation. Daily intake of 25-30 grams of pulp is recommended in the elderly. In studies, a 10-15% decrease in plasma cholesterol level was observed in hypercholesterolaemic individuals by increasing soluble pulp in the diet (Saghafi-Asl and Izadi, 2018).

While the protein content of muscle mass decreases with age, it is replaced by fat mass. This situation affects the rate of protein synthesis and total protein change of the body. While the change in muscle protein constitutes 30 per cent of the total in young adults, this value decreases to 20 per cent in the elderly. Similarly, serum protein level is also low in the elderly. Digestion, absorption and metabolism of protein are also altered in the elderly. While some of these conditions decrease protein requirement, others

increase it. Protein requirement is recommended as 0.9-1.1 gram/day per kilogram of body weight in healthy elderly. Protein requirement, which is higher in cases of stress, injury, infection and surgery, should be regulated as 1.5 g/day per kilogram of body weight. In this period, protein is required for protection of body tissues and immune system. It has been reported that dietary protein intake in the elderly increases catecholamine production and release, thus affecting cognitive function. Loss of muscle mass and risk of infection increase in protein deficiency in the elderly. This is also an important pathogenic risk factor for osteoporosis. It is known that low protein consumption suppresses intestinal calcium absorption. However, high animal protein consumption has been found to be associated with negative calcium balance (Nilsen et al., 2021).

Fat is necessary for the intake of fat-soluble vitamins (A, D, E, K) and fatty acids, which are the precursors of some hormones that regulate the functioning of the body, as well as being a source of energy. In elderly individuals, maximum 30% of the daily energy intake should be provided from fats. In a healthy diet, the ratio of fatty acids is as important as the total fat content in the diet. The cholesterol content of the diet should be kept below 300 mg daily. In the elderly with high levels of low-density lipoprotein cholesterol, diabetes and/or cardiovascular disease, the cholesterol content of the diet should be below 200 mg per day. Frequent consumption of fish containing omega-3 fatty acids has been found to have a positive protective effect on age-related maculopathy. Consumption of high levels of especially saturated fats and cholesterol in the diet increased age-related maculopathy. Increased consumption of saturated fats and Trans fatty acids in the diet leads to increased blood cholesterol level (Rodd et al., 2021).

2.6.2. Micronutrient requirements

Calcium Calcium plays an important role in maintaining bone health. Calcium absorption decreases due to changes in vitamin D metabolism due to ageing. In addition, calcium consumption is very low in many elderly people. Bone mineral loss begins with ageing. Especially in women, bone density decreases rapidly (2-5% per

year) due to estrogen deficiency following menopause. Bone weakening, hip, and vertebral and wrist fractures affect a large number of elderly people. Therefore, the importance of calcium in the diet increases even more in the elderly. The decrease in vitamin D synthesis in the skin through ultraviolet rays leads to a decrease in serum vitamin D level. Again, decreased renal function in the elderly leads to a decrease in the conversion of vitamin D into active form. This adversely affects calcium absorption and utilisation in the body. It is recommended to consume 1200 mg calcium daily to prevent osteoporosis in men and women over the age of fifty (de Almeida Brasiel, 2020).

In the elderly, decrease in physical activity both increases the withdrawal of calcium from bones and leads to a decrease in the consumption of calcium-rich foods due to decreased appetite. Some elderly people have problems in the digestion of milk, which is a rich source of calcium. This is due to the inability of the small intestine to form lactase enzyme which digests lactose in milk. For these elderly people, drinking a small amount of milk at a time or consuming special lactose-reduced milk, buttermilk, yoghurt, and cheese can also be recommended instead of milk. Green leafy vegetables, legumes and molasses are also rich in calcium. In addition, drinking hard water with high mineral content should be preferred. Hard water contains 200-280 mg/L calcium. In a study, individuals over 68 years of age were given supplemental calcium and vitamin D for 3 years and followed up for 2 years and the effects of this on bone mass were measured. As a result of the study, it was concluded that supplemental calcium and vitamin D intake did not affect bone density. Therefore, it was observed that increasing calcium intake in old age did not have much effect on the prevention of age-related osteoporosis (Hans and Jana, 2018).

Iron The causes of iron deficiency anaemia in the elderly are inadequate intake of iron in the diet, decrease in iron absorption due to decreased gastric acid secretion or antacids, blood loss caused by diseases (ulcer, haemorrhoids, etc.) or drugs (anticoagulants, aspirin, arthritis drugs, etc.). After menopause, iron requirement is the same in men and women and it is thought that a daily intake of 8-10 mg is sufficient. Iron can be supplied from animal and plant origin foods. The utilisation of animal-derived iron in the body is higher. However, it should not be forgotten that excessive

consumption will increase saturated fat and cholesterol consumption. In order to increase the absorption of plant-derived iron, it should be consumed together with a source of vitamin C (Zhu et al., 2020).

Dietary zinc consumption and absorption level of zinc are generally lower in elderly individuals than in young people. In addition, low plasma zinc level in sick elderly people is considered as a descriptor of malnutrition. Drug use also affects absorption negatively. In the elderly with a weakened immune system, zinc is important in cellular immunity and adequate dietary zinc intake has a protective effect against diseases, repairs body tissues and accelerates the healing of wounds. Meat, chicken, fish, milk, cheese, oily seeds are rich sources of zinc. Good cooking of legumes, preparation of bread and pastry foods by fermentation increases the bioavailability of zinc in these foods (Chamba et al., 2021).

Available data show that the need for these vitamins is higher in some elderly people due to diseases that prevent the absorption of vitamin B12, vitamin B6 and folate (e.g. gastric atrophy). Another cause of insufficiency is inadequate intake through food. Vitamin B12, vitamin B6 and folate deficiency in the elderly leads to impaired cognitive function, immunity and endurance, increased risk of megaloblastic anaemia and cardiovascular diseases due to increased homocysteine levels in the blood. Vitamin B12 deficiency may also cause neurological problems in some elderly people (Abiri and Vafa, 2020).

Progression of aging and deficiency of antioxidant vitamins (tocopherols, carotenoids, and vitamin C) and trace elements (zinc, selenium) are associated with impairment of protective mechanisms against oxidative stress. Vitamin C plays an important role in the health of connective tissue and wound healing. It is thought that absorption is impaired with ageing. Therefore, it is recommended that the diet should be rich in vitamin C sources. Serum ascorbic acid and vitamin E levels were generally found to be low in the elderly. These vitamins are known to have protective effects against cancer and cardiovascular diseases. It is thought that vitamins C and E may decrease the progression of dementia due to their antioxidant properties and have a role in the

development of decreased immunity (Gröber and Holick, 2021). Foods rich in antioxidant vitamins may reduce the risk of atherosclerotic diseases by preventing oxidation of LDL. It is known that vegetables and fruits are rich in antioxidants. It has been found that there is a relationship between low vegetable and fruit content of the diet and high risk of coronary heart disease. Studies have also shown that consumption of vegetables and fruits rich in antioxidants reduces the incidence of cancer). It has been found that carotenoids, which are a precursor of vitamin A, have a protective effect against some diseases (cancer, cataract and cardiovascular diseases, etc.) due to their antioxidant properties (Rezaei et al., 2022).

Fluid consumption in the elderly is a very important but often overlooked issue. Failure to consume enough fluid due to decreased sense of thirst in old age, decreased ability of the kidneys to concentrate urine and inability to reabsorb water sufficiently, and the use of certain drugs (diuretics, laxatives) cause dehydration. Total body water decreases as a result of frequent urination and less fluid retention in the body. It will be appropriate to consume 8-10 cups of fluid per day to meet the requirement in the elderly. Consuming enough water or liquid prevents constipation, which is an important health problem for the elderly, as well as keeping the kidneys healthy and preventing dehydration. In addition, taking small amounts of water or liquids with meals facilitates digestion. This is because many elderly people have reduced saliva secretion, which helps chewing and swallowing. It should not be forgotten that it is important to drink enough water while taking medication. Factors such as physical activity, disease status and environmental temperature may affect fluid requirement. Elderly individuals should be advised to drink water at certain intervals even if they are not thirsty (Ribeiro et al., 2020).

2.7. Physical Activity in the Elderly

Physical activity, in its simplest definition, is the movement of the body to expend energy. It can be defined as activities that occur with energy consumption by using our muscles and joints in daily life, increase heart and respiratory rate and result in fatigue of different intensities. Walking, running, jumping, swimming, cycling, squatting and squatting, arm and leg movements, head and trunk movements, all or some of the basic

body movements such as all or some of the various sports branches, dance, exercise, games and activities during the day can be considered as physical activity. It is thought that 60 per cent of the world population does not engage in sufficient physical activity. According to WHO estimates, 2 million people die each year due to lack of physical activity. Inactivity is a problem that leads to diseases and results in disability (Gharaveis, 2020)

2.7.1. Negative effects of inactivity in old age

Inactivity in the elderly may lead to significant functional losses and may cause dependence in IYA. Inactivity causes muscle atrophy, loss of strength, contracture, increased risk of fracture due to osteoporosis, ankylosis of joints and balance disorders. Decrease in VO₂ max, decrease in heart rate, increase in heart contraction rate, early fatigue, decrease in intravascular volume and increase in the risk of venous thrombosis. It causes loss of appetite, constipation and faecal obstruction and decreases motility in the gastro-intestinal tract. Hypercalciuria, negative nitrogen balance, abnormal glucose tolerance and increased insulin resistance. Increased risk of depression and psychosis and loss of mental function. Increased risk of aspiration pneumonia, decreased lung volume and oxygen saturation and atelectasis. It predisposes to incontinence, urinary infections and urinary tract stones. It increases the risk of pressure sores (Damiot *et al.*, 2020).

2.7.2. Benefits of physical activity in old age

Regular physical activity improves muscle strength and body flexibility, prevents limitation of movement by improving functional capacity, reduces the incidence of cardiovascular diseases and deaths caused by cardiovascular diseases, the risk of non-insulin-dependent diabetes, the risk of high blood pressure, the risk of bowel cancer, the risk of falls and fractures, lowers blood pressure, blood sugar, blood cholesterol, protects and improves mental health, stabilises body weight and improves quality of life (Callow *et al.*, 2020).

2.7.3. Physical activity recommendations in old age

It is important for the elderly to be able to perform the activities they need to do in daily life such as cleaning, dressing, shopping, going up and down stairs without fatigue. Exercises such as walking, light body movements, gardening or running at a low pace for 30-40 minutes a day are suitable for the elderly. Physical activity exercises recommended for the elderly are aerobic, resistance muscle strengthening, flexibility and balance exercises to protect against falls. Aerobic exercises are activities such as walking, cycling, swimming, tennis, etc. and it is appropriate for the elderly to do these activities every day. These activities strengthen the cardiopulmonary system, increase VO₂max capacity and burn calories. Resistance exercises are resistant movements for lifting, moving and carrying involving large muscle groups 2-3 times a week. It prevents muscle atrophy and sarcopenia and strengthens the muscles. Flexibility and balance exercises prolong the length of the muscle, increase joint mobility, improve the sense of position, shorten muscle reaction time and protect against falls (Langhammer et al., 2018).

2.7.5. Frailty in old age

Frailty is a state of decline in the elderly that results in weakness, fatigue, loss of appetite, weight loss, loss of muscle strength, immobilisation and institutionalisation. Symptoms of frailty include sarcopenia, osteopenia, impaired balance and gait, malnutrition and slow walking. The activities of the frail elderly are reduced, mental health deteriorates and life satisfaction decreases. While frailty is seen in 10-25% of elderly people aged 65 years and older, it increases up to 30-45% in those aged 85 years and older. The adverse consequences of frailty are inadequacy in GYA, decreased mobility, falls, hospitalisation and death. Treatment of frailty includes protein-rich diet, exercise and hormone therapy. In the frailty criteria; 1) involuntary weight loss, 2) feeling of burnout, 3) weakness, 4) decrease in walking speed and 5) decrease in physical activity, the elderly with three or more of the findings are defined as frail (Pickard, 2018).

2.8. Evaluation of Nutritional Status in the Elderly

The health of the elderly is closely related to nutritional status. The effect of nutritional status on morbidity, mortality and length of hospital stay especially in the elderly with chronic diseases should be evaluated in various aspects. The aim here is to (Nazan and Buket, 2018):

- To define the nutritional status of the elderly accurately,
- Defining malnutrition clinically,
- Monitoring changes in nutritional status due to nutritional support,

Prevention of deaths and loss of ability. Ideally, nutritional screening and nutritional assessment should be performed regularly/periodically throughout the life of all individuals from intrauterine life to old age. These assessments should not be performed only at the time of illness.

3. MATERIALS AND METHOD

3.1. The Study Design

This study, which was conducted to evaluate the nutritional status of the elderly who went to primary health care centers in the city of Al-Diwaniyah, is a cross-sectional study.

3.2. The Study Sample

The population of the study consisted of elderly people aged 50-85 years who went to primary health care centers in Al-Diwaniyah city.

An Online sample size calculator by used G* power program to determine the study sample:

- The power of work 80%
- Confidence interval 95%
- The margin of error is 5%

The sample size consisted of 157 elderly people based on the information above.

3.2.1. Inclusion criteria

Elderly people who agreed to participate in the research.

Elderly people between the ages between (50-85).

3.2.2. Exclusion criteria

Elderly people who do not agree to participate in the research, also, the elderly who did not fill out the questionnaire completely.

3.3. The Study Setting

This study, which was conducted at primary health care centers in the city of Al-Diwaniyah, Iraq, from (25/3/2022) to (20/ 8/2022).

3.4. Study Instrument and Data Collection

The questionnaire consists of:

- **Socio-demographic characteristics:** In this part, information about socio-demographic characteristics such as age, marriage age, education level, occupation, income, place of residence, and presence of health insurance.
- **Mini Nutritional Assessment scale.**

Mini Nutritional Assessment (MNA) is a well-validated method for the diagnosis of geriatric malnutrition. Compared to a clinical examination by two nutritionists, the device has 92 percent accuracy compared to a comprehensive nutritional evaluation that includes biochemical tests, anthropometric measures, and dietary evaluation (Vellas *et al.*, 2006).

The MNA is a validated nutritional screening and assessment tool that can identify geriatric patients aged 65 and over who are malnourished or at risk for malnutrition. MNA was developed nearly 20 years ago and is the best approved nutritional screening tool for the elderly. The current MNA® scale, which originally consisted of 18 questions, now consists of 6 questions, making the screening process easier. The current MNA® scale maintains the validity and accuracy of the original MNA in identifying

older adults who are malnourished or at risk of malnutrition. The revised MNA Short Form makes intervention connectivity easier and faster and is now the preferred form of MNA for clinical use.

It includes 6 (MNA-SF) or 18 (MNA-LF) self-reported questions derived from general, anthropometric, diet, and self-assessment.

Questions A – E have a score of 0,1,2,3. The tool contains 18 items and evaluates 4 different aspects: anthropometric assessment (body mass index (BMI), weight loss, and arm and calf circumferences); overall assessment (lifestyle, medication, mobility, and presence of signs of depression or dementia); brief dietary assessment (number of meals, food and fluid intake, and autonomy of nutrition); and subjective assessment (self-perception of health and nutrition). (Guigoz, 2006).

By summing the scores labeled MNA-LF, individuals can be divided into 3 groups using thresholds for 'undernourished' for <17 , 'at risk of malnutrition' for 17–23.5, and 'normal nutritional status' for ≥ 24 , with a maximum total score of 30 points. (Guigoz, 2006).

The questionnaire is re-constructed and developed after extensive review of available literature and related studies. It is adopted from the Hartford institute for geriatric nursing, New York University, college of nursing used to identify potential items for the study of instrument.

In 2019, in a related study in Iraq, MNA was translated into Arabic and previously used by Jasim et al. (Jassim et al., 2019).

Content validity for the instrument was determined and the internal consistency reliability was determined through computing Cronbach's alpha and the ratio was = 0.833

The collection data by interviewing face to face each elderly people included in this study. The time of each interview took about 20-25 minutes to complete all the data. Data were collected from (25/ 3/2022, to 20/ 8/ 2022).

3.5. Ethics Committee Approval

Ethical approval was obtained from Çankırı Karatekin University

For the purpose of conducting the research; (NO. 25, Date: 18 / 3 /2022).

Ethical approval was obtained from the Ministry of Health/Diwaniyah Health Department for the purpose of sample collection; (NO. 23, Date: 14 / 3 /2022).

3.6. Data Analysis

IBM SPSS 26 package program was used to analyze the data collected in the study.

It was determined that the data belonging to the mini multitritional assessment scale used in the study had normal distribution by controlling the skewness and kurtosis values. Parametric analysis methods were used to test the hypotheses, taking into account the normal distribution.

Frequency analysis was performed in order to learn general information about the participants. A descriptive analysis was carried out in order to learn general information about the Mini Nutritional Assessment scale. T-Test and Anova analysis were used to determine whether the mulnutrition score of the participants differed according to demographic variables.

While creating the research report, 95% confidence interval ($p<.05$) was used for the significance level.

4. RESULTS

Table 4.1. Findings on Demographic Characteristics Of the participants, 40.8 % are between the ages of 50-59, 44.6% between the ages of 60-69, 10.2% between the ages of 70-79 and 4.5% between the ages of 80-85. 87.3 % of the participants are married and 12.7% are single. 47,8% of the participants have 15-19 years, 38,85% have 20-25 years, 13,29% have 26-30 years and 0,06 % 31 years or more of marriage ages. 3.2% of the participants are illiterate or literate, 18.5% primarily school, 25.5% secondary school, 36.3% high school and 16.6% undergraduate or more educational level. While 38.2 of the participants are not working, 26.1% officer, 4.5% employee, 28.7% retired and 2.5% self-employed. The monthly income 1.3% of families is less than expenses, the monthly income of 51% of families is equal to expenses and the income of 47,8% of families is more than expenses. While 89.2% of the participants have children, 10.8% have not. 7% of the participants live in villages/towns, 42% live in district and 51% live in cities/metropolitans. While 53.5% of the participants have health insurance, 46,5% do not have health insurance.

Table 4.1 Findings on Demographic Characteristics

Variables	Groups	Frequencies	Percents
Age	50-59 Age	64	40,8
	60-69 Age	70	44,6
	70-79 Age	16	10,2
	80-85 Age	7	4,5
Marital Status	Married	137	87,3
	Single	20	12,7
Age of Married	15-19 year	75	47,8
	20-25 year	61	38,85
	26-30 year	20	13,29
	31 year and above	1	0,06
Educational Status	Illiterate or Literate	5	3,2
	Primarily School	29	18,5
	Middle School	40	25,5
	High School	57	36,3
	Undergraduate or More	26	16,6
Working Status	Non-Working	60	38,2
	Office	41	26,1
	Employee	7	4,5
	Retired	45	28,7
	Self_Employed	4	2,5
Family Monthly Income	Income less than expenses	2	1,3
	Income equals expenses	80	51,0
	Income more than expenses	75	47,8
Presence of Children	Yes	140	89,2
	No	17	10,8
Longest Lived Place	Village/Town	11	7,0
	District	66	42,0
	City/Metropolitan	80	51,0
Presence of Health Insurance	Yes	84	53,5
	No	73	46,5

4.2. Descriptive Findings of the Mini Nutritional Assessment Scale

The results of the analysis carried out to determine the characteristics of the answers given for the scales used in the research are shown in Table 2.

Table 4.2. Descriptive Findings of the Mini Nutritional Assessment Scale It is seen that the total malnutrition scores of the participants change between 3 and 30 and the total malnutrition score average is 20.97. The highest score that they can have is 30.

It is seen that the total screening scores of the participants change between 0 and 14 and the total screening score average is 9.43. The highest score that they can have is 14.

It is seen that the total evaluation scores of the participants change between 1.5 and 16 and the total evaluation point average is 11.54. The highest score that they can have is 16.

Table 4.2 Descriptive Findings of the Mini Nutritional Assessment Scale

Dimentionals of Scale	Mean	S.D	Minimum	Maximum
Malnutrition Score	20,97	6,13	3,00	30,00
Screening Score	9,43	3,06	0,00	14,00
Evaluation Score	11,54	3,42	1,50	16,00

• **Comparation of Mini Nutritional Assesment Scale and Demogaphis Characteristics**

In this research, the results of the analysis made to test whether the mini nutritional assessment scale differs in demographic characteristics are discussed under this title.

Table 4.3. Age Comparation with Mini Nutritional Assesment Scale It was determined that the malnutrition score showed a statistically significant difference according to the age of the participants ($F=30,173$; $p<.05$). When the average malnutrition score is examined; it is seen that the mean of malnutrition score decreases as the age increases.

It was determined that the scareening score showed a statistically significant difference according to the age of the participants ($F=24.512$; $p<.05$). When the average scannig score is examined; it is seen that the average of the screening score decreases as the age increases.

It was determined that the evaluation score showed a statistically significant difference according to the age of the participants ($F=27,642$; $p<.05$). When the average evaluation

score was examined; it is seen that the average score of the evaluation decreases as the age increases.

Table 4.3 Age Comparison with Mini Nutritional Assessment Scale

Dimentionals of Scale	Age	Mean	S.D	F	p
Malnutrition Score	50-59 Age	23,39	4,61	30,173	,001*
	60-69 Age	21,43	5,52		
	70-79 Age	15,19	3,59		
	80-85 Age	7,57	4,63		
Screening Score	50-59 Age	10,31	2,58	24,512	,001*
	60-69 Age	9,84	2,63		
	70-79 Age	7,13	1,86		
	80-85 Age	2,57	2,57		
Evaluation Score	50-59 Age	13,08	2,49	27,642	,001*
	60-69 Age	11,59	3,15		
	70-79 Age	8,06	2,33		
	80-85 Age	5,00	2,19		

* p<,05

Table 4.4. Marital Status Comparison with Mini Nutritional Assessment Scale

The results of the analysis conducted to test whether the mini nutritional assessment scale differs according to the marital status of the participants are shown in Table 4.4. Malnutrition score does not show a statistically significant difference according to the marital status of the participants ($t=-1.970$; $p>.05$).

Screeing score does not show a statistically significant difference according to the marital status of the participants ($t=-1.756$; $p>.05$).

The evaluation score does not show a statistically significant difference according to the marital status of the participants ($t=-1.949$; $p>.05$).

Table 4.4 Marital Status Comparison with Mini Nutritional Assessment Scale

Dimentionals of Scale	Marital Status	Mean	S.D	t	p
Malnutrition Score	Married	2061	4,29	-1,970	,051
	Single	23,48	4,21		
Screening Score	Married	9,27	3,16	-1,756	,081
	Single	10,55	2,01		
Evaluation Score	Married	11,34	3,48	-1,949	,053
	Single	12,93	2,71		

* *p<,05

Table 4.5. Married Age Comparison with Mini Nutritional Assessment Scale

The results of the analysis conducted to test whether the mini nutritional assessment scale differs according to the marriage age of the participants are shown in Table 4.5. It was determined that the malnutrition score showed a statistically significant difference according to the marriage age of the participants ($F=9.590$; $p<.05$). When the average malnutrition score is examined; it is seen that the mean of malnutrition score increases as the age of marriage increases.

It was determined that the screening score showed a statistically significant difference according to the marriage age of the participants ($F=5.371$; $p<.05$). When the average screening score is examined; as the age of marriage increases, it is seen that the average screening score increases.

It was determined that the evaluation score showed a statistically significant difference according to the marriage age of the participants ($F=12.170$; $p<.05$). When the average evaluation score is examined; as the age of marriage increases, it is seen that the average score of the evaluation increases.

Table 4.5 Married Age Comparison with Mini Nutritional Assesment Scale

Dimentionals of Scale	Married Age	Mean	S.D	F	p
Malnutrition Score	15-19 Age	18,39	6,68	9,590	,001*
	20-25 Age	22,60	4,91		
	26-30 Age	23,50	5,66		
Screening Score	15-19 Age	8,41	3,43	5,371	,001*
	20-25 Age	10,04	2,59		
	26-30 Age	10,40	2,82		
Evaluation Score	15-19 Age	9,98	3,56	12,170	,001*
	20-25 Age	12,56	2,75		
	26-30 Age	13,10	3,22		

* $p < .05$

Table 4.6. Educational Status Comparison with Mini Nutritional Assesment Scale

The results of the analysis conducted to test whether the mini nutritional assessment scale differs according to the educational status of the participants are shown in Table 4.6.

It was determined that the malnutrition score showed a statistically significant difference according to the educational status of the participants ($F=15.574$; $p < .05$). When the average malnutrition score is examined; it is seen that the mean of malnutrition score increases as the education level increases.

It was determined that the screening score showed a statistically significant difference according to the educational status of the participants ($F=12.960$; $p < .05$). When the average screening score is examined; it is seen that as the education level increases, the average of the screening score increases.

It was determined that the evaluation score showed a statistically significant difference according to the educational status of the participants ($F=14.990$; $p < .05$). When the average evaluation score is examined; it is seen that the mean score of the evaluation increases as the education level increases.

Table 4.6 Educational Status Comparison with Mini Nutritional Assessment Scale

Dimentionals of Scale	Educational Status	Mean	S.D	F	p
Malnutrition Score	Iliterate or Literate	7,40	5,82	15,574	,001*
	Primarily School	17,39	6,00		
	Middle School	21,26	5,21		
	High School	22,16	5,47		
	Undergraduate or More	24,54	3,36		
Screening Score	Iliterate or Literate	2,40	2,79	12,960	,001*
	Primarily School	8,03	3,15		
	Middle School	9,97	2,45		
	High School	9,74	2,80		
	Undergraduate or More	10,85	2,11		
Evaluation Score	Iliterate or Literate	5,00	3,10	14,990	,001*
	Primarily School	9,36	3,29		
	Middle School	11,28	3,03		
	High School	12,42	3,09		
	Undergraduate or More	13,69	1,76		

* $p < .05$

Table 4.7. Working Status Comparison with Mini Nutritional Assessment Scale

The results of the analysis conducted to test whether the mini nutritional assessment scale differs according to the working status of the participants are shown in Table 4.7.

Malnutrition score does not show a statistically significant difference according to the working status of the participants ($t = -2.262$; $p > .05$).

Screening score does not show a statistically significant difference according to the working status of the participants ($t = -1.089$; $p > .05$).

It was determined that the evaluation score showed a statistically significant difference according to the working status of the participants ($F = 3.534$; $p < .05$). When the average evaluation score is examined; it is seen that the highest evaluation score is the self-employed participants and the lowest is the non-working participants.

Table 4.7 Working Status Comparison with Mini Nutritional Assesment Scale

Dimentionals of Scale	Working Status	Mean	S.D	F	p
Malnutrition Score	Non-Working	19,69	6,83	2,262	,065
	Office	23,27	5,46		
	Employee	21,78	3,73		
	Retired	20,51	5,19		
	Self_Employed	20,50	10,30		
Screening Score	Non-Working	9,13	3,34	1,089	,364
	Office	10,19	3,01		
	Employee	10,14	2,26		
	Retired	9,11	2,57		
	Self_Employed	8,50	5,19		
Evaluation Score	Non-Working	10,55	3,76	3,534	,009*
	Office	13,07	2,86		
	Employee	11,64	2,54		
	Retired	11,40	3,00		
	Self_Employed	12,00	5,11		

* p<,05

Table 4.8. Family Monthly Income Comparison with Mini Nutritional Assesment Scale.

The results of the analysis conducted to test whether the mini nutritional assessment scale differs according to the family monthly income of the participants are shown in Table 4.8.

It was determined that the malnutrition score showed a statistically significant difference according to the monthly income of the participants ($F=5.355$; $p<.05$). When the average malnutrition score is examined; it is seen that the average of malnutrition score of the participants whose income is more than their expenses is higher.

It was determined that the screening score showed a statistically significant difference according to the monthly income of the participants ($F=6.362$; $p<.05$). When the average screening score is examined; it is seen that the screening score average of the participants whose income is less than their expenses is lower.

It was determined that the evaluation score showed a statistically significant difference according to the monthly income of the participants ($F=3,522$; $p<.05$). When the average evaluation score is examined; it is seen that the evaluation score average of the participants whose income is more than their expenses is higher.

Table 4.8 Family Monthly Income Comparison with Mini Nutritional Assessment Scale.

Dimentionals of Scale	Family Monthly Income	Mean	S.D	F	P
Malnutrition Score	Income less than expenses	7,25	2,47	5,355	,006*
	Income equals expenses	21,14	6,27		
	Income more than expenses	21,16	5,66		
Screening Score	Income less than expenses	2,00	1,41	6,362	,002*
	Income equals expenses	9,53	3,18		
	Income more than expenses	9,53	2,73		
Evaluation Score	Income less than expenses	5,25	1,06	3,522	,032*
	Income equals expenses	11,62	3,45		
	Income more than expenses	11,63	3,31		

* $p<.05$

Table 4.9. Presence of Children Comparison with Mini Nutritional Assessment Scale

The results of the analysis conducted to test whether the mini nutritional assessment scale differs according to precense of children of the participants are shown in Table 4.9.

It was determined that the malnutrition score showed a statistically significant difference according to the presence of children of the participants ($F=-3,266$; $p<.05$). When the average malnutrition score is examined; it is seen that the mean of malnutrition score of the participants who do not have children is higher.

It was determined that the screening score showed a statistically significant difference according to the presence of children of the participants ($F=-1,999$; $p<.05$). When the

average screening score is examined; it is seen that the screening score average of the participants who do not have children is higher.

It was determined that the evaluation score showed a statistically significant difference according to the presence of children of the participants ($F=2.301$; $p<.05$). When the average evaluation score is examined; it is seen that the evaluation score average of the participants who do not have children is higher.

Table 4.9 Presence of Children Comparison with Mini Nutritional Assessment Scale.

Dimentionals of Scale	Presense of Children	Mean	S.D	t	p
Malnutrition Score	Yes	20,59	6,25	-3,266	,003*
	No	24,15	3,93		
Screening Score	Yes	9,26	3,13	-1,999	,047*
	No	10,82	2,04		
Evaluation Score	Yes	11,33	3,48	-2,301	,023*
	No	13,32	2,42		

* $p<.05$

Table 4.10. Long Lived Place Comparison with Mini Nutritional Assessment Scale

The results of the analysis conducted to test whether the mini nutritional assessment scale differs according to the long lived place of the participants are shown in Table 4.10.

It was determined that the malnutrition score showed a statistically significant difference according to the place where the participants lived ($F=35.980$; $p<.05$). When the average malnutrition score is examined; it is seen that the average of malnutrition score of the participants living in the city/metropolitan city is higher.

It was determined that the screening score showed a statistically significant difference according to the place where the participants lived ($F=30,403$; $p<.05$). When the average screening score is examined; it is seen that the average of the screening score of the participants living in the city/metropolitan city is higher.

It was determined that the evaluation score showed a statistically significant difference according to the place where the participants lived ($F=31.578$; $p<.05$). When the average evaluation score is examined; it is seen that the evaluation score average of the participants living in the city/metropolitan city is higher.

Table 4.10 Long Lived Place Comparison with Mini Nutritional Assesment Scale.

Dimentionals of Scale	Longest Lived Place	Mean	S.D	F	p
Malnutrition Score	Village/Town	9,32	5,68	35,980	,001*
	District	20,38	5,37		
	City/Metropolitan	23,07	4,78		
Screening Score	Village/Town	3,73	2,97	30,403	,001*
	District	9,36	2,68		
	City/Metropolitan	10,28	2,51		
Evaluation Score	Village/Town	5,59	3,09	31,578	,001*
	District	11,02	3,10		
	City/Metropolitan	12,79	2,71		

* $p<.05$

Table 4.11. Presence of Health Insurance Comparison with Mini Nutritional Assesment Scale.

The results of the analysis conducted to test whether the mini nutritional assessment scale differs according to precense of health insurance of the participants are shown in Table 4.11. It was determined that the malnutrition score showed a statistically significant difference according to the health insurance status of the participants ($F=2.047$; $p<.05$). When the average malnutrition score is examined; it is seen that the mean of malnutrition score of the participants with health insurance is higher.

The screening score does not show a statistically significant difference according to the health insurance status of the participants ($t=1,287$; $p>.05$).

It was determined that the evaluation score showed a statistically significant difference according to the health insurance status of the participants ($F=2,546$; $p<.05$). When the

average evaluation score is examined; It is seen that the evaluation score average of the participants with health insurance is higher.

Table 4.11 Presence of Health Insurance Comparison with Mini Nutritional Assessment Scale

Dimentionals of Scale	Presense of Health Insurance	Mean	S.D	t	p
Malnutrition Score	Yes	21,92	5,24	2,047	,043*
	No	19,89	6,90		
Screening Score	Yes	9,73	2,71	1,287	,200
	No	9,09	3,42		
Evaluation Score	Yes	12,19	2,95	2,546	,012*
	No	10,79	3,79		

* p<,05

In Table 4.12, participants in the age groups 70–79, 50–59, 60–69, and 80–85 had significantly higher malnutrition scores than other participants of different ages ($p < 0.001$). Participants who received middle school, high school, or undergraduate education or more had a significantly higher malnutrition score than other participants of different ages ($p < 0.001$). In addition, those with Income equals expenses and Income more than expenses had significantly higher Malnutrition Scores than other participants ($p < 0.001$). Participants were from all regions had significantly higher Malnutrition Scores than other participants ($p < 0.001$). Participants in aged of married groups 20-25 years and 26-30 years had significantly Malnutrition Scores higher than other participants of different ages ($p < 0.001$).

Table 4.12 Multiple Comparisons Post-Hoc (LSD) Tests between Malnutrition Scores and demographic characteristics

Dependent Variable : Malnutrition Score							
Independent variables			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Age	50-59	60-69	2.567*	1.021	0.013	0.55	4.58
		70-79	8.766*	1.650	0.000	5.51	12.02
		80-85	16.382*	2.350	0.000	11.74	21.02
	60-69	50-59	-2.567-*	1.021	0.013	-4.58	-0.55
		70-79	6.198*	1.635	0.000	2.97	9.43
		80-85	13.814*	2.340	0.000	9.19	18.44
	70-79	50-59	-8.766-*	1.650	0.000	-12.02	-5.51
		60-69	-6.198-*	1.635	0.000	-9.43	-2.97
		80-85	7.616*	2.675	0.005	2.33	12.90
	80-85	50-59	-16.382-*	2.350	0.000	-21.02	-11.74
		60-69	-13.814-*	2.340	0.000	-18.44	-9.19
		70-79	-7.616-*	2.675	0.005	-12.90	-2.33
Educational Status	Illiterate or Literate	Primarily School	-10.0193-*	3.3314	0.003	-16.601	-3.437
		Middle School	-13.8650-*	3.2633	0.000	-20.312	-7.418
		High School	-13.9382-*	3.2088	0.000	-20.278	-7.599
		Undergraduate or More	-17.2938-*	3.3595	0.000	-23.931	-10.656
	Primarily School	Illiterate or Literate	10.0193*	3.3314	0.003	3.437	16.601
		Middle School	-3.8457-*	1.6779	0.023	-7.161	-0.531
		High School	-3.9189-*	1.5692	0.014	-7.019	-0.819
		Undergraduate or More	-7.2745-*	1.8581	0.000	-10.946	-3.604
	Middle School	Illiterate or Literate	13.8650*	3.2633	0.000	7.418	20.312
		Primarily School	3.8457*	1.6779	0.023	0.531	7.161
		High School	-0.0732	1.4190	0.959	-2.877	2.730
		Undergraduate or More	-3.4288-*	1.7331	0.050	-6.853	-0.005
	High School	Illiterate or Literate	13.9382*	3.2088	0.000	7.599	20.278
		Primarily School	3.9189*	1.5692	0.014	0.819	7.019
		Middle School	0.0732	1.4190	0.959	-2.730	2.877
		Undergraduate or More	-3.3556-*	1.6281	0.041	-6.572	-0.139

	Undergraduate or More	Illiterate or Literate	17.2938*	3.3595	0.000	10.656	23.931
		Primarily School	7.2745*	1.8581	0.000	3.604	10.946
		Middle School	3.4288*	1.7331	0.050	0.005	6.853
		High School	3.3556*	1.6281	0.041	0.139	6.572
Longest Lived Place	Village/Town	District	-10.99939-*	2.15542	0.000	- 15.2574	-6.7414
		City/Metropolitan	-13.79636-*	2.12831	0.000	- 18.0008	-9.5919
	District	Village/Town	10.99939*	2.15542	0.000	6.7414	15.2574
		City/Metropolitan	-2.79697-*	1.10056	0.012	-4.9711	-0.6228
	City/Metropolitan	Village/Town	13.79636*	2.12831	0.000	9.5919	18.0008
		District	2.79697*	1.10056	0.012	0.6228	4.9711
Age of Married	15-19	20-25	-3.47327-*	1.25052	0.006	-5.9438	-1.0027
		26-30	-5.67775-*	1.86283	0.003	-9.3579	-1.9976
		31 year and above	-7.30933	5.19657	0.162	- 17.5756	2.9570
	20-25	15-19	3.47327*	1.25052	0.006	1.0027	5.9438
		26-30	-2.20449	1.90555	0.249	-5.9691	1.5601
		31 year and above	-3.83607	5.21204	0.463	- 14.1329	6.4608
	26-30	15-19	5.67775*	1.86283	0.003	1.9976	9.3579
		20-25	2.20449	1.90555	0.249	-1.5601	5.9691
		31 year and above	-1.63158	5.39182	0.763	- 12.2836	9.0204
	31 year and above	15-19	7.30933	5.19657	0.162	-2.9570	17.5756
		20-25	3.83607	5.21204	0.463	-6.4608	14.1329
		26-30	1.63158	5.39182	0.763	-9.0204	12.2836

*. The mean difference is significant at the $p < 0.001$ level.

In Table 4.13, participants in age group of 80–85 had significantly higher screening than other participants of different ages ($p < 0.001$). Participants who received undergraduate education or more had a significantly higher screening than other participants of different ages ($p < 0.001$). In addition, those with income equaling expenses had significantly higher screening than other participants ($p < 0.001$). Participants were from Village and District had significantly higher Screening than other participants ($p < 0.001$). Participants in aged of married groups 15-19 years and 26-30 years had significantly screening higer than other participants of different ages ($p < 0.001$).

Table 4.13 Multiple Comparisons Post-Hoc (LSD) Tests between Screening Score and demographic characteristics

Dependent Variable : Screening Score							
Independent variables			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Age	50-59	60-69	0.483	0.650	0.459	-0.80	1.77
		70-79	3.234*	1.050	0.002	1.16	5.31
		80-85	7.725*	1.495	0.000	4.77	10.68
	60-69	50-59	-0.483	0.650	0.459	-1.77	0.80
		70-79	2.752*	1.041	0.009	0.70	4.81
		80-85	7.243*	1.489	0.000	4.30	10.18
	70-79	50-59	-3.234-*	1.050	0.002	-5.31	-1.16
		60-69	-2.752-*	1.041	0.009	-4.81	-0.70
		80-85	4.491*	1.702	0.009	1.13	7.85
	80-85	50-59	-7.725-*	1.495	0.000	-10.68	-4.77
		60-69	-7.243-*	1.489	0.000	-10.18	-4.30
		70-79	-4.491-*	1.702	0.009	-7.85	-1.13
Educational Status	Illiterate or Literate	Primarily School	-5.6690-*	2.2708	0.014	-10.155	-1.182
		Middle School	-7.3850-*	2.2244	0.001	-11.780	-2.990
		High School	-7.4246-*	2.1873	0.001	-11.746	-3.103
		Undergraduate or More	-8.4077-*	2.2900	0.000	-12.932	-3.883
	Primarily School	Illiterate or Literate	5.6690*	2.2708	0.014	1.182	10.155
		Middle School	-1.7160	1.1437	0.136	-3.976	0.544

Table 4.13 Multiple Comparisons Post-Hoc (LSD) Tests between Screening Score and demographic characteristics(continued)

		High School	-1.7556	1.0697	0.103	-3.869	0.358
		Undergraduate or More	-2.7387-*	1.2666	0.032	-5.241	-0.236
	Middle School	Illiterate or Literate	7.3850*	2.2244	0.001	2.990	11.780
		Primarily School	1.7160	1.1437	0.136	-0.544	3.976
		High School	-0.0396	0.9673	0.967	-1.951	1.871
		Undergraduate or More	-1.0227	1.1814	0.388	-3.357	1.311
	High School	Illiterate or Literate	7.4246*	2.1873	0.001	3.103	11.746
		Primarily School	1.7556	1.0697	0.103	-0.358	3.869
		Middle School	0.0396	0.9673	0.967	-1.871	1.951
		Undergraduate or More	-0.9831	1.1098	0.377	-3.176	1.209
	Undergraduate or More	Illiterate or Literate	8.4077*	2.2900	0.000	3.883	12.932
		Primarily School	2.7387*	1.2666	0.032	0.236	5.241
		Middle School	1.0227	1.1814	0.388	-1.311	3.357
		High School	0.9831	1.1098	0.377	-1.209	3.176
Family Monthly Income	Income less than expenses	Income equals expenses	-7.9088-*	2.9769	0.009	-13.790	-2.028
		Income more than expenses	-7.2533-*	2.9794	0.016	-13.139	-1.368
	Income equals expenses	Income less than expenses	7.9088*	2.9769	0.009	2.028	13.790
		Income more than expenses	0.6554	0.6684	0.328	-0.665	1.976
	Income more than expenses	Income less than expenses	7.2533*	2.9794	0.016	1.368	13.139
		Income equals expenses	-0.6554	0.6684	0.328	-1.976	0.665
Longest Lived Place	Village/Town	District	-5.5864-*	1.3085	0.000	-8.171	-3.001
		City/Metropolitan	-6.4477-*	1.2920	0.000	-9.000	-3.895

Table 4.13 Multiple Comparisons Post-Hoc (LSD) Tests between Screening Score and demographic characteristics(continued)

	District	Village/Town	5.5864*	1.3085	0.000	3.001	8.171
		City/Metropolitan	-0.8614	0.6681	0.199	-2.181	0.459
	City/Metropolitan	Village/Town	6.4477*	1.2920	0.000	3.895	9.000
		District	0.8614	0.6681	0.199	-0.459	2.181
Age of Married	15-19	20-25	-1.13849	0.81946	0.167	-2.7574	0.4804
		26-30	-3.36800-*	1.22070	0.007	-5.7796	-0.9564
		31 year and above	5.13200	3.40528	0.134	-1.5954	11.8594
	20-25	15-19	1.13849	0.81946	0.167	-0.4804	2.7574
		26-30	-2.22951	1.24869	0.076	-4.6964	0.2374
		31 year and above	6.27049	3.41541	0.068	-0.4770	13.0180
	26-30	15-19	3.36800*	1.22070	0.007	0.9564	5.7796
		20-25	2.22951	1.24869	0.076	-0.2374	4.6964
		31 year and above	8.50000*	3.53322	0.017	1.5198	15.4802
	31 year and above	15-19	-5.13200	3.40528	0.134	-	1.5954
		20-25	-6.27049	3.41541	0.068	-	0.4770
		26-30	-8.50000-*	3.53322	0.017	-	-1.5198

*. The mean difference is significant at the $p < 0.001$ level.

In **Table 4.14**, participants in age group of 70-79 had significantly higher Evaluation than other participants of different ages ($p < 0.001$). Participants who received undergraduate education or more had a significantly higher Evaluation than other participants of different ages ($p < 0.001$). And Office had higher Evaluation than other participants ($p < 0.001$); in addition, those with Income more than expenses had significantly higher Evaluation than other participants ($p < 0.001$). Participants were from Village and District had significantly higher Evaluation than other participants ($p < 0.001$). Participants in aged of married groups 15-19 years and 26-30 years had significantly Evaluation higer than other participants of different ages ($p < 0.001$).

Table 4.14 Multiple Comparisons Post-Hoc (LSD) Tests between Evaluation Scores and demographic characteristics

Dependent Variable : Evaluation Score							
Independent variables			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Age	50-59	60-69	-0.51382	0.30965	0.099	-1.1256	0.0979
		70-79	0.37109	0.50044	0.460	-0.6176	1.3598
		80-85	0.30047	0.71277	0.674	-1.1077	1.7086
	60-69	50-59	0.51382	0.30965	0.099	-0.0979	1.1256
		70-79	0.88491	0.49613	0.046	-0.0952	1.8651
		80-85	0.81429	0.70975	0.253	-0.5879	2.2165
	70-79	50-59	-0.37109	0.50044	0.460	-1.3598	0.6176
		60-69	-0.88491	0.49613	0.046	-1.8651	0.0952
		80-85	-0.07062	0.81136	0.931	-1.6735	1.5323
	80-85	50-59	-0.30047	0.71277	0.674	-1.7086	1.1077
		60-69	-0.81429	0.70975	0.253	-2.2165	0.5879
		70-79	0.07062	0.81136	0.931	-1.5323	1.6735
Educational Status	Illiterate or Literate	Primarily School	-4.10931-*	2.06549	0.048	-8.1901	-0.0285
		Middle School	-6.02500-*	2.02329	0.003	-10.0224	-2.0276
		High School	-6.95772-*	1.98949	0.001	-10.8883	-3.0271
		Undergraduate or More	-8.20846-*	2.08294	0.000	-12.3237	-4.0932
	Primarily School	Illiterate or Literate	4.10931*	2.06549	0.048	0.0285	8.1901
		Middle School	-1.91569	1.04031	0.068	-3.9710	0.1396
		High School	-2.84841-*	0.97293	0.004	-4.7706	-0.9262
		Undergraduate or More	-4.09915-*	1.15203	0.000	-6.3752	-1.8231
	Middle School	Illiterate or Literate	6.02500*	2.02329	0.003	2.0276	10.0224
		Primarily School	1.91569	1.04031	0.068	-0.1396	3.9710
		High School	-0.93272	0.87980	0.291	-2.6709	0.8055
		Undergraduate or More	-2.18346-*	1.07454	0.044	-4.3064	-0.0605

Table 4.14 Multiple Comparisons Post-Hoc (LSD) Tests between Evaluation Scores and demographic characteristics(continued)

	High School	Illiterate or Literate	6.95772*	1.98949	0.001	3.0271	10.8883
		Primarily School	2.84841*	0.97293	0.004	0.9262	4.7706
		Middle School	0.93272	0.87980	0.291	-0.8055	2.6709
		Undergraduate or More	-1.25074	1.00945	0.217	-3.2451	0.7436
	Undergraduate or More	Illiterate or Literate	8.20846*	2.08294	0.000	4.0932	12.3237
		Primarily School	4.09915*	1.15203	0.000	1.8231	6.3752
		Middle School	2.18346*	1.07454	0.044	0.0605	4.3064
		High School	1.25074	1.00945	0.217	-0.7436	3.2451
Working Status	Non-Working	Office	-1.69364-*	0.85717	0.048	-3.3871	-0.0001
		Employee	-1.09840	1.70168	0.520	-4.4604	2.2636
		Retired	-1.09711	0.84563	0.196	-2.7678	0.5736
		Self_Employed	-1.66983	2.20014	0.449	-6.0166	2.6770
	Office	Non-Working	1.69364*	0.85717	0.048	0.0001	3.3871
		Employee	0.59524	1.73936	0.733	-2.8412	4.0317
		Retired	0.59654	0.91910	0.517	-1.2193	2.4124
		Self_Employed	0.02381	2.22941	0.991	-4.3808	4.4284
	Employee	Non-Working	1.09840	1.70168	0.520	-2.2636	4.4604
		Office	-0.59524	1.73936	0.733	-4.0317	2.8412
		Retired	0.00130	1.73371	0.999	-3.4240	3.4266
		Self_Employed	-0.57143	2.67044	0.831	-5.8474	4.7046
	Retired	Non-Working	1.09711	0.84563	0.196	-0.5736	2.7678
		Office	-0.59654	0.91910	0.517	-2.4124	1.2193
		Employee	-0.00130	1.73371	0.999	-3.4266	3.4240
		Self_Employed	-0.57273	2.22500	0.797	-4.9687	3.8232
	Self_Employed	Non-Working	1.66983	2.20014	0.449	-2.6770	6.0166
		Office	-0.02381	2.22941	0.991	-4.4284	4.3808
		Employee	0.57143	2.67044	0.831	-4.7046	5.8474
		Retired	0.57273	2.22500	0.797	-3.8232	4.9687

Table 4.14 Multiple Comparisons Post-Hoc (LSD) Tests between Evaluation Scores and demographic characteristics(continued)

Family Monthly Income	Income less than expenses	Income equals expenses	-5.91950-*	2.89406	0.043	-11.6367	-0.2023
		Income more than expenses	-6.36900-*	2.89641	0.029	-12.0908	-0.6472
	Income equals expenses	Income less than expenses	5.91950*	2.89406	0.043	0.2023	11.6367
		Income more than expenses	-0.44950	0.64976	0.490	-1.7331	0.8341
	Income more than expenses	Income less than expenses	6.36900*	2.89641	0.029	0.6472	12.0908
		Income equals expenses	0.44950	0.64976	0.490	-0.8341	1.7331
Longest Lived Place	Village/Town	District	-6.25303-*	1.09215	0.000	-8.4106	-4.0955
		City/Metropolitan	-6.56000-*	1.07841	0.000	-8.6904	-4.4296
	District	Village/Town	6.25303*	1.09215	0.000	4.0955	8.4106
		City/Metropolitan	-0.30697	0.55765	0.583	-1.4086	0.7947
	City/Metropolitan	Village/Town	6.56000*	1.07841	0.000	4.4296	8.6904
		District	0.30697	0.55765	0.583	-0.7947	1.4086
Age of Married	15-19	20-25	-2.30619-*	0.74984	0.002	-3.7876	-0.8248
		26-30	-3.88841-*	1.11700	0.001	-6.0951	-1.6817
		31 year and above	-4.10947	3.11598	0.189	-10.2654	2.0464
	20-25	15-19	2.30619*	0.74984	0.002	0.8248	3.7876
		26-30	-1.58223	1.14261	0.168	-3.8396	0.6751
		31 year and above	-1.80328	3.12526	0.565	-7.9775	4.3710
	26-30	15-19	3.88841*	1.11700	0.001	1.6817	6.0951
		20-25	1.58223	1.14261	0.168	-0.6751	3.8396
		31 year and above	-0.22105	3.23306	0.946	-6.6082	6.1661
	31 year and above	15-19	4.10947	3.11598	0.189	-2.0464	10.2654
		20-25	1.80328	3.12526	0.565	-4.3710	7.9775

*. The mean difference is significant at the $p < 0.001$ level.

5. DISCUSSION

5.1. Discussions of Demographic Characteristics of Participants

The result of the study shows about 40% are between the ages of 50-59 and about 44% between the ages of 60-69, also regarding marital status about 87% of the participants are married. This result is supported by the study conducted in Iran by (Bakhtiari et al., 2020) also find more percentage for the age group 60–75 and more of the sample were married according to the researcher's opinion that age people are less focused on nutritional status.

Also, the result show about 25% of secondary school and 36% were high school undergraduate or more educational level and 38, 2 of the participants are not working and The monthly income of 51% of families is equal to expenses this result is similar to the study did by (Agarwalla et al., 2015) they found 84% of samples was independent regarding financial status. Another study conducted in India was in similar with study result because the participant of Indian study was 7.7% were illiterate and 72.8% had education only up to primary level.

Also, about 89% of the participants have children and 53% of the participants have health insurance this finding agree with a study by (Mabiana et al., 2021) also found that most participants with a health problem and have children according to researcher believe age person become more health problem.

5.2. Discussion of the Mini Nutritional Assessment Scale

The result shows total malnutrition scores of the participants change between 3 and 30 and the total malnutrition score average is 20.97. The highest score that they can have is 30. It is seen that the total screening scores of the participants change between 0 and 14 and the total screening score average is 9.43. The highest score that they can have is 14 and the total evaluation scores of the participants change between 1.5 and 16 and the total evaluation point average is 11.54. The highest score that they can have is 16 this

finding is supported by a study done in India by (Agarwalla et al., 2015) also find of the 360 elderly, 15% were found to be malnourished, 55% were risk of malnutrition and 30% were found to be well nourished another study found a similarly high prevalence of malnutrition and risk of malnutrition among our population 29.4% and 60.4%, respectively (Lahiri et al., 2015)

Another study by MERİÇ (2022) found 54.8% of the elderly malnourished, 78.0% of the elderly at risk for malnutrition, and all of the elderly with normal nutritional status stated that they did not skip meals. (Hallaj, 2015) found that 17.5% of the elderly evaluated with MNA-SF in Syria were malnourished and 41.8% were at risk for malnutrition according to the researcher's opinion because an older person becomes dependent that cause less care regarding nutritional status.

5.3. Discussions of Comparison of Mini Nutritional Assessment Scale and Demographic Characteristics

5.3.1. Age comparison with mini nutritional assessment scale

The result explains malnutrition score, screening score, and evaluation score showed a statistically significant difference according to the age of the participants ($F=30,173$; $p<.05$, $F=24,512$; $p<.05$, $F=27,642$; $p<.05$ respectively). When the average malnutrition score is examined; it is seen that the mean malnutrition score, screening score, and evaluation decreases were decreased as age increases this finding is supported by a study done in Lebanon by (Boulos et al., 2016) this study fined highly significant between age and malnutrition. Another study conducted by (Bakhtiari et al., 2020) in Iran to assess the nutrition status among elderly people also find the prevalence of malnutrition and its associated age. Researcher believe that age decrees focus on nutrition requirement.

5.3.2. Marital status comparison with mini nutritional assesment scale

Malnutrition score, screening score, and evaluation score does not show a statistically significant difference according to the marital status of the participants ($t=-1.970$; $p>.05$, $t=-1.756$; $p>.05$, $t=-1.949$; $p>.05$ respectively) this finding is supported by a study conducted by (Toniazzo et al., 2018) to assess nutritional status and oral health among elderly people, the find was no relation between nutritional and marital status. According to a researcher in elderly people no contact between marriage and nutrition.

5.3.3. Educational status comparison with mini nutritional assessment scale

The data analysis showed a statistically significant difference according to the educational status with malnutrition score, screening score, and evaluation score at ($F=15.574$; $p<.05$, $F=12.960$; $p<.05$, $F=14.990$; $p<.05$, respectively) and this finding similar to results of the study did in Brazil to investigate the association between nutritional status and functional limitation and disability in an elderly population and result was low education level could influence the family income, access to health services and adequate food, resulting in disability and underweight (Danielewicz et al., 2014).

5.3.4. Family monthly income comparison with mini nutritional assessment scale

The result explains malnutrition score, screening score, and evaluation score showed a statistically significant difference according to the monthly income of the participants at ($F=5.355$; $p<.05$, $F=6.362$; $p<.05$, $F=3,522$; $p<.05$, respectively), this finding compatible with other study apply by (Jiménez et al., 2014) did in Canada to evaluate nutritional and quality life of elderly people the result show there is the relation between income and health status of elderly people. According to the researcher's opinion if a family is less than required so that direct influence in nutrition needs of this family because they can't maintain their major food needs.

5.3.5. Long-Lived place and presence of health insurance comparison with mini nutritional assessment scale.

The result shows a significant difference between Long-Lived Place and the Presence of Health Insurance with malnutrition score, screening score, and evaluation score, and this finding is supported by a study conducted by (Fávaro et al., 2016) to find risk factors for malnutrition in the older population, the result of this study was explained there is significant between chronic disease and malnutrition in older people. Another study by (Amarya et al., 2015) find the living site effect on nutrition status by this study to evaluate Changes during aging and their association with malnutrition according to the researcher believes both health insurance and living place have close contact with nutrition by a direct effect on body and food type.

5.3.6. Discussion of multiple comparisons post-hoc (LSD) tests between malnutrition scores and demographic characteristics.

The result show Individuals in the 80–85 age group performed considerably better on the Screening test than participants of other ages ($p < 0.001$). The Screening was substantially greater among participants with baccalaureate degrees or more than among participants of other ages ($p < 0.001$). Additionally, individuals with income equaling expenses had significantly higher screening than other participants ($p < 0.001$), as did those who were working and non-working. Compared to other participants, persons from the Village and District had substantially higher Screening ($p < 0.001$). Participants who were married and between the ages of 15 and 19 and 26 and 30 had substantially higher screening than participants of other ages ($p < 0.001$) and this result supported by study conducted by by (Bakhtiari et al., 2020) also find significantly higher Screening than other participants of different regarding age, received undergraduate education and non-working this study did at Iran. Another study applies in Indian by (Agarwalla et al., 2015) also find defrenss in aged of married groups 20-25 years and 26-30 years had significantly Malnutrition Scores higher than other participants of different ages.

5.4. Discussion of Multiple Comparisons Post-Hoc (LSD) Tests between Screening Scores and demographic characteristics.

Those in the 80-85 age group substantially outperformed participants of other ages in Screening ($p < 0.001$). Those with college degrees or more substantially outperformed participants of other ages in terms of Screening ($p < 0.001$). Additionally, individuals whose income was equivalent to or greater than their expenses scanned considerably more than the other participants ($p < 0.001$) both those who were working and those who were not. Compared to other participants, persons from the Village and District had substantially higher Screening ($p < 0.001$). Participants who were married and between the ages of 15 and 19 and 26 and 30 had substantially higher screening than participants of other ages ($p < 0.001$). This finding is compatible with a study done in India to assess changes during aging and their association with malnutrition by (Amarya and Sabharwal, 2015) also find significance regarding age, non-working, and income equalling expenses regarding malnutrition. Another study by (Besora *et al.*, 2020) to assess malnutrition in the elderly could be tackled by addressing socioeconomic factors and also find the same result.

5.5. Discussion of multiple Comparisons Post-Hoc (LSD) Tests between Evaluation Scores and demographic characteristics.

In comparison to individuals of various ages, those in the age range of 70 to 79 had considerably higher evaluations ($p < 0.001$). Participants with at least an undergraduate degree performed considerably better on the evaluation than participants of other ages ($p < 0.001$) and Office had considerably higher Evaluation than the rest of the participants ($p < 0.001$), as did those whose income was more than their outgoing costs. Evaluation scores among participants from the Village and District were substantially higher than those of the other participants ($p < 0.001$). Participants who were married and between the ages of 15 and 19 and 26 and 30 had substantially higher evaluation scores than those who were not married ($p < 0.001$). This finding is similar to the result of a study conducted by (Tamang *et al.*, 2019) assessing the nutritional status of the elderly population and factors associated with malnutrition in the community setting in rural Nepal. This study finds also participants in the age group of 70-79, received

undergraduate education, Income, and Participants from Village and District had significantly higher Evaluations than other participants.



6. CONCLUSSION AND RECOMMENDIATION

During the course of the present study data analysis and logical discussion and interpretation of result the study concludes that Most of the respondents are from the age group (60-69) and most of them are married, as well as the work status was not working, Family Monthly Income was Income equals expenses, and more than half of the sample get a Presence of Health Insurance. There is a significant statistical relationship between age, marital status, marriage age, education level, family monthly income, presence of children, Long Lived Place and Mini Nutritional Assesment Scale.

Based on the results of the study, the Researcher recommends the following:

1. Establishing a program of visitor nursing health care visitor to promote community and family health care.
2. Developing education programs for families and activating the role of health centers and family medicine services in the primary care sector and in collaborator with other sectors such as Department of Labor and Social Affairs, Education, religious institutions and civil society organizations to form a multidisciplinary teams to stimulate families to care for the elderly
3. Increase the health awareness of the elders about consuming healthy food through application of educational activity such as meetings in primary health care, seminars, distribution of folders and leaflets in cooperation with primary health care providers.
4. Establishing a nursing education program to enhance the capacity building of community health nurse in cooperation with the health promotion programs in the primary health care
5. Establishing local NGO for care and support of older adults in the province involving members from health care providers, civil activist's volunteers, academics, social workers and lawyers to advocate and to protect them.

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APPENDICES

APPENDIX 1. Questionnaire







APPENDIX 2. Approval of Cankiri Karatkin University



APPENDIX 3. Approval of Iraqi Ministry of health





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