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YEDITEPE UNIVERSITY

INSTITUTE OF HEALTH SCIENCES

DEPARTMENT OF PHYSIOTHERAPY AND REHABILITATION

COMPARISON OF ELDERLY LIVING IN NURSING HOME AND AT HOME IN TERMS OF HAND FUNCTIONS

MASTER THESIS

MEHMET MUSA IŞIK, PT.

ISTANBUL-2022

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Assist. Prof. ÇİĞDEM YAZICI MUTLU

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APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated ..... and numbered .....

Prof. Dr. Bayram YILMAZ

Director of Institute of Health Sciences

DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgement has been made in the text.

21.02.2022

MEHMET MUSA IŞIK

DEDICATION

I would like to dedicate my wife Merve Nur IŞIK and my little daughter Elif IŞIK, and also I thank to my loving parents Necla IŞIK and Naci IŞIK and my brother Bahadır Burak IŞIK for their support.

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LIST OF SYMBOLS / ABBREVIATIONS

ADL	Activities of Daily Living
BMI	Body Mass Index
CAD	Coronary Artery Disease
CVD	Cardiovascular Disease
HGS	Hand Grip Strength
IF	Interphalangeal
MF	Metacarpophalangeal
MMSE	Mini-Mental State Examination
NSA	Nottingham Sensory Assessment
RHE	Right Hand Extension
RHF	Right Hand Flexion
RHRD	Right Hand Radial Deviation
RHUD	Right Hand Ulnar Deviation
ROM	Range Of Motion
SD	Standard Deviation
WHO	The World Health Organization

ABSTRACT

IŞIK,M.M(2022). Comparison of Elderly People Living in Nursing Home and at Home in Terms of Hand Functions.Yeditepe University, Institute of Health Sciences, Department of Physiotherapy and Rehabilitation, Master Thesis.Istanbul. This study aims to examine the effects of the residence style of elderly individuals on the hand functions of the home environment and the nursing home. The study included 55 geriatric individuals (38F, 17M) aged 65 and over, living in Nezih Nursing Home and in their own home in Istanbul between October 2021 and December 2021. Individuals were separated into two groups according to their type of residence. The elderly participants were determined that live in a nursing home as Group 1 (n=27; 79.3±7.52 years), and the elderly living at home as Group 2 (n=28, 75.32±7.25 years). Mini Mental State Examination was applied to evaluate the cognitive function levels of individuals, and the Nottingham Sensory Assessment was used to assess the sensory state of the hand. Purdue Pegboard Test was used to assess hand dexterity. To evaluate the muscle strength of the hand, Hand Grip Strength Evaluation with a hand dynamometer and Joint Range Of Motion Evaluation with a goniometer to evaluate the range of motion of the wrist joint were performed. As a result of the study, when the two groups were compared, a statistically significant difference was found in the tactile and stereognosis, the hand dexterity, the hand strength, and right hand ulnar deviation scores of range of motion ($p<0.05$). Lifestyle affects hand functions, and the hand dexterity, strength and joint functions of the elderly living at home are better than those living in a nursing home.

Keywords: elderly, geriatrics, hand function, handgrip strength, nursing home, purdue pegboard test

ÖZET

IŞIK,M.M(2022). Huzurevinde ve Evde Yaşayan Yaşlıların El Fonksiyonları Açısından Karşılaştırılması. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü, Fizyoterapi ve Rehabilitasyon ABD. Yüksek Lisans Tezi. İstanbul Bu çalışmanın amacı; yaşlı bireylerin ikamet şekillerinin, kendi işlerini yaptıkları ev ortamı ile başkalarının onlara hizmet ettiği huzurevi yaşamının el fonksiyonları üzerine etkisini incelemektir. Çalışmaya Ekim 2021-Aralık 2021 tarihleri arasında Nezih Huzurevi'nde ve İstanbul ili içinde kendi evinde yaşayan, 65 yaş ve üzerinde olan 55 geriatrik birey(38K, 17E) dahil edildi. Bireyler ikamet şekillerine göre iki gruba ayrıldı. Huzurevinde yaşayan yaşlılar Grup 1 (n=27; 79.3±7.52 yıl) , evde yaşayan yaşlılar Grup 2 (n=28, 75.32±7.25 yıl) olarak belirlendi. Bireylerin; bilişsel işlev düzeyini ölçmek için Mini-Mental Durum Anketi, elin duyusal durumunu değerlendirmek amacıyla Nottingham Duyu Değerlendirmesi uygulandı. El becerisini değerlendirmek için Purdue Pegboard test kullanıldı. Elin kas kuvvetini ölçmek için el dinamometresiyle El Kavrama Kuvveti Değerlendirmesi ve el bileği ekleminin hareket durumunu değerlendirmek amacıyla gonyometre ile Eklem Hareket Açıklığı Değerlendirmesi yapıldı. Çalışmanın sonucunda iki grubu karşılaştırmak için bakıldığında; Nottingham Duyu Değerlendirmesi'nin taktil ve sterognoz kısımları, purdue pegboard test, el kavrama kuvveti ve eklem hareket açıklığında sağ el ulnar deviasyon skorlarında istatistiksel olarak anlamlı fark tespit edilmiştir ($p<0,05$). Yaşam stili el fonksiyonlarını etkiler ve evde yaşayan yaşlıların el becerileri, kuvvetleri ve eklem fonksiyonları huzurevinde yaşayanlardan daha iyi durumdadır.

Anahtar Kelimeler: el fonksiyonları, el kavrama kuvveti, huzurevi, purdue pegboard test, yaşlılar

1. INTRODUCTION AND PURPOSE

The World Health Organization (WHO) defines people aged 65 and over as elderly and aged 85 and over as very old. Gerontologists classified old age as a young age between 65-74 years, middle age between 75-84 years and advanced age over 85 years (old age)[1].

Aging is a natural phenomenon that affects all people during their lives. It is correlated with a decline in the human body's physical and cognitive functions, as seen, also includes the likeliness of age-related diseases[2].

Experiencing the aging process; it differs between individuals due to differences in chronological age, biological age, and perceived age. Advancing age is predictably connected with motor, sensory, and cognitive alterations; this may affect the ability of many elderly to function effectively in society. Physiological changes occur with age, which include muscle mass, vital capacity, muscle strength, flexibility, as well as mineral density. These physiological changes affect body tissues, organ systems and functions [3, 4]. Despite the developments that prolong human life, with aging, the cardio-vascular system, endocrine system, immune system, urinary system, musculoskeletal system central nervous system, respiratory and gastrointestinal system functions decline and decrease [5].

A typical flexion posture is acquired in old age. Body length is shortened, dorsal kyphosis increases, cervical and lumbar lordosis decreases. The shoulders are low, and the scapula is protruding. There is flexion in the hips and knees. The decreased fatty tissue in the face and extremities tends to accumulate in the abdominal area and hips [6]. With decrease in muscle and bone mass, and with a decline in physical capacity within a year with aging, the body composition is changing[7].

Along with increasing age, changes in the musculoskeletal and nervous systems, as well as alterations in coordination, visual, tactile and auditory senses, also affect hand function significantly[8]. Hand function reduces gradually in women and man, especially after 65 years of age[9]. Ranganathan et al. (2001) hypothesized that this slowdown in hand functions was caused by the deterioration of muscle coordination in the upper extremity and decreased sensory functions of the hand in the central nervous system and finger dexterity [10]. With aging, Meissner body (touch receptor) and Pacinian body

(pressure-vibration receptors) in the dermis and epidermis decrease in number, while Krause and Ruffini bodies (temperature receptors) and peripheral nerves show structural changes and weaken in function. On the other hand, the feeling of pain is preserved because there is no loss in the number of free nerve endings. Sensitivity to touch, heat and vibration senses also weaken and decrease over time. In addition to the decrease in the peripheral stimulus, the somatosensory cortex also adapts to the slowdown in nerve conduction velocity. The sending of protective reflex motor responses to the periphery is also reduced [11]. In their study, Cole et al. (1991) associated decreased grip strength in elderly individuals with decreased hand tactile sensitivity. In addition, optical changes can affect hand function, including sharpness, colour distinction, light and dark harmony, eye-hand coordination, depth perception, and photosensitivity.

Moreover, common metabolic, skeletal diseases and hormonal changes such as rheumatoid arthritis, osteoarthritis, and osteoporosis in older adults are major factors in divided hand function. Hand functions may also be affected in the homeostasis of minerals, especially in calcium system disorders or the deficiency of specific alimentational factors [9].

The relationship between cognitive capacity and handgrip strength in old age has been extensively studied. Different views have been put forward on this issue. Numerous studies have shown that decreased handgrip strength over time can be used as a indicator of cognitive loss with as we age. Taekema et al. (2010) discovered that low handgrip strength at baseline could conclude an accelerated decrease in Mini-Mental State Examination scores over the 4-year follow-up period [12]. MacDonald et al. (2004), over a 12-year period, handgrip strength in 125 elderly individuals; reported that it is associated with changes in cognitive performance. In contrast, Albert et al. (1995) found no significant relationship between change in handgrip strength and cognitive performance over a 2.5-year period in 1192 elderly individuals [13]. Upper extremity tasks involving functional movement are probably more dependent on cognitive capacity than maximal force production. For example, movements such as grasping, object manipulation, and reaching are important for active daily living (ADL), proposing that a task including such motor units may be due to cognitive status rather than grip strength. [14].

With the development of nuclear family life in our country, the elderly population living in a nursing homes is gradually increasing. For this reason, it is important to know the differences in daily life activity level, depression, quality of life and social isolation levels of elderly people in the nursing home and home environment. In the study of Şimşek et al. (2010), when the elderly people living in a nursing home and family atmosphere were evaluated and compared with the social isolation measurement, it was found that the social isolation status of the individuals living in the nursing home was significantly higher. In particular, social isolation causes sarcopenia (i.e. decreased muscle mass) by causing a decrease in physical activity in the elderly with depression. Some studies have associated this with low grip strength [15].

Hand function in the elderly is the most crucial indicator of addiction and should be evaluated in studies on senior health. We think that the evaluation of hand function and performance is important in describing the skill level of the individual's ADL, the productivity of rehabilitation and the person's role abilities. In addition, based on the idea that environmental factors, mainly lifestyle, can have an effect on hand functions. In our study, we aimed to examine the effects of the residence style of the elderly on hand functions of the home environment where they do their jobs and the nursing home life where others serve them.

Two hypotheses were identified in this study:

H0: There is no statistically significant difference between the hand functions of the elderly living at home and those living in the nursing home.

H1: There is a statistically significant difference between the hand functions of the elderly living at home and those living in the nursing home.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1. Aging

The demographic change of society is closely related to welfare. When we look at countries with 'old' or 'very old' populations, we see that they have a high level of welfare. The conclusion we can draw from here is; more than societal aging, not being prepared for the aging process can cause problems [16].

Many definitions of aging have been made in different fields, taking into account different factors. Although individuals over the age of 65 are generally considered to be elderly, the classification of old age varies according to the conditions of the countries, health insurance systems and innate life expectancy. Most important, elderly care affects the quality of life, and research should depend on elderly care [17].

The aging process divides into three subsections: primary, secondary, and tertiary aging. Alteration in biological, psychological, sociocultural and life-cycle processes is related to primary aging, which is normal during adulthood. For instance, menopause, decline reflexes with age, thinning of hair are related to the primary aging process. Secondary aging is developmental alteration that are relevant to lifestyle, disease other environmentally caused changes that are not expected. Alzheimer's disease and associated forms of dementia, cancer are examples of secondary aging. Tertiary aging describes mortality-related aging to express deteriorated intellectual abilities that explain shortly (months, maybe years) before death[18].

2.1.1. Aging Process

Older adults tend to age-related diseases, functional deterioration, and physical impairment. Actual biological aging is at different rates in different individuals because genetic features, lifestyle, diseases and ways of dealing with the physiological changes are very different. In the normal aging process, time-dependent changes do not result in loss of function under normal conditions. Still, there may be a reduction in the reserve of organ systems and homeostatic control. To find out pathological changes in the older adults, it is necessary to find out the usual course of aging[18].

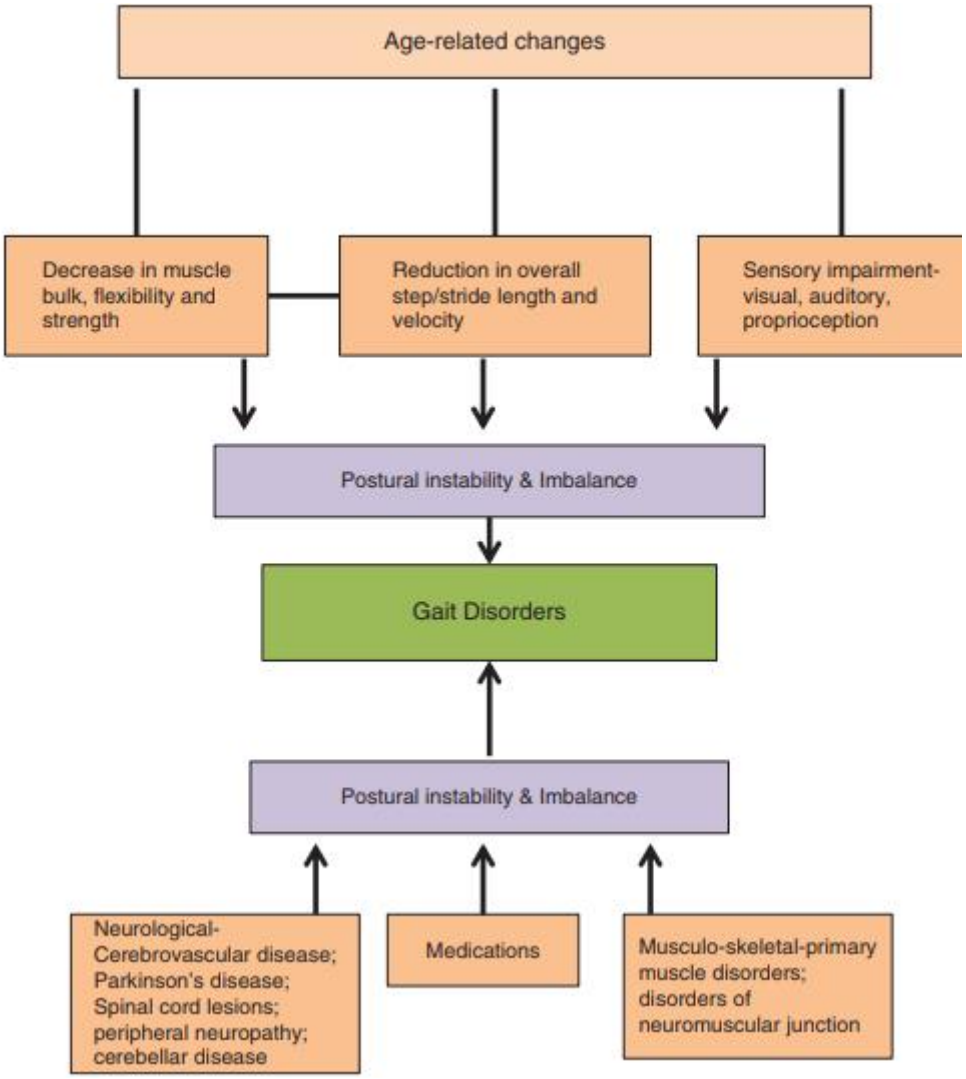

Figure 2.1 Age-related changes [19]

2.1.1.1. Age-associated changes in the nervous system and cognition

Insufficient intake of certain vitamins or certain metabolic disorders can disrupt the ways of using energy in neurons, affecting cognitive processes in the body, which in turn can affect the decisiveness of successive synaptic plasticity or the flexibility of encoding new memories.This, in turn, affects independence and quality of life. **[20].**

Depending on age, neural integration and neural function deterioration occur in the neurovascular unit. These changes affect brain structure and function also affect molecular activities in the same region. Meninges gradually thickens with age. The characteristic thinning of the myelin sheaths in the dorsal column begins at the age of 40 and progresses slowly. By the age of 50, ischemic changes in anterior horn cells and

changes with atrophy in pigments can be seen. Similar changes in the lateral columns can be seen by the age of 60. [21].

Atrophy of dendrites is very important in neurological control; because this atrophy causes the inability to preserve short-term memory, deterioration in sensory perceptions, a decrease in learning ability and intellectual responses. With aging in peripheral nerves, thinning of the myelin sheath occurs, followed by slowing of the conduction velocity and loss of reflexes[22].

2.1.1.2. Age-associated changes in the physiological system changes

Aging leads to changes in body composition on health and physical system. In particular, a progressive decline in fatless body mass and an rise in body fat are observed. **[20].**

Physiological changes occur in the structures of the individual, along with the aging process. Body functions decrease and terminate at a specific rate until cell life reaches an unsustainable point in the aging process. Difficulties in detection and forgetfulness begin[23].

Due to the fact that the density of bones decreases with age, the bones become weaker and more fragile while the body posture deteriorates. As a result of the fact that the ligaments connecting the joints lose their elasticity, the mobility of the joints decreases. The effect of aging on the digestive system is a decrease in movement, mucus and absorption. In addition, with the aging process, a decrease in glucose tolerance is observed due to a decrease in the response of tissues to insulin and/or a decrease in the secretion of insulin against glucose [24].

2.1.1.3. Age-associated changes in the cardiovascular system changes

With age, cardiac output and stroke volume decrease, and postural hypotension risk increases. Looking at the chest X-ray shadow is widening. With aging, the vessel walls thicken, and their elasticity decreases. As a result of various calcifications in the heart, aortic and mitral valves are affected, causing sclerosis, thickening of the heart valves and murmurs [25].

The prevalence of cardiovascular disease (CVD) is increasing gradually. For example, coronary artery disease (CAD), hypertension, and diabetes may lead to ischemic, hypertensive, or diabetic cardiomyopathy [26].

2.1.1.4. Age-associated changes in the musculoskeletal system changes

All elderly people have a decrease in muscle mass and strength. The muscle mass and strength reach a maximum at 20 and 30 years old and gradually decline in time of life; around age 80 muscle loss accelerates resulting in progressive weakness, and muscle mass is halved, and fatty tissue doubles compared to it of a young adult.

Musculoskeletal system problems begin with complaints that either directly belong to the musculoskeletal system or indicate systemic disease. Factors such as decrease in proprioception, balance and coordination, increase in falling tendency, cortical atrophy, decrease in visual/hearing senses, muscle and bone mass, slowdown in post-injury repair processes cause complaints in the musculoskeletal system. Loss of muscle fibres and muscle atrophy begins around the age of fifty and are closely related to the grade of physical action of the individual. Pain causes limitation in ADL and negatively affects the quality of life[25].

There are inevitably various alterations in the musculoskeletal system, such as kyphosis, muscle loss, and aging. The posture is more hump, the knees, the hips may be more flexed. As the pelvis expands, the shoulders narrow. Movements are slow and limited; less arm swing is done. Posture and walking changes, balance loss increase the risk of damage, which leads to falls and fractures[37]. Depending on the sedentary lifestyle that comes with age, the individual may lose 40 percent of the muscle mass. Individuals suffer weight loss as well as structural changes due to the decrease in fibril diameter with age[27].

The imbalance between muscle protein synthesis and degradation is shown as the factor that causes skeletal muscle loss that develops with aging. Spinal motor neuron loss due to aging causes a reduce in the number and size of muscle fibres. In these processes that progress with aging, muscle strength decreases in parallel with the loss of skeletal muscle mass. Decreased muscle strength also causes loss of functional capacity, decreased mechanical muscle performance, and an increased risk of chronic metabolic disease[28].

Due to these changes that occur with aging, a slowdown is observed in hand functions as well as in many functions. Hand function declines over time in men and women, especially after age 65. Ranganathan et al. (2001) hypothesized that this slowdown in hand functions is due to the deterioration of muscle coordination in the upper

extremity, as well as decreased finger dexterity and sensory functions of the hand in the central nervous system[10]. Impairment of hand function in the elderly population occurs secondary related to age degenerative changes in the nervous, musculoskeletal, as well as vascular systems. In addition, metabolic, skeletal diseases and hormonal changes for example osteoarthritis, osteoporosis, and rheumatoid arthritis which are common in the elderly, are also crucial factors in affected hand function. Hand functions can also be affected by disorders in the homeostasis of minerals, especially calcium system, or a lack of nutritional agents. Decreased hand motor function, that is, fine, gross, and complex hand motor function, is related to a decrease in the skill to move objects, to perform daily functional actions such as dressing, eating and writing, and affects daily living skills [29].

2.2. Aging And Hand Function

The functions of the hand, wrist and shoulder girdle play a significant role in ADL and are considered an major part of the independence criterion and life quality[30].

Decreased finger and wrist strength and the skill to control clamping force have been suggested to have a negative impact on hand function with aging. This decrease in hand function is thought to be due to impaired muscle coordination, hand sensation and degeneration of the central nervous system.

The cortical and subcortical zones of the brain that arrange manual dexterity are related to cognitive functions. This too; may explain why people with cognitive impairment are not very good at fine motor skills. Also; decreased hand grip strength (HGS) may also be linked to cognitive impairment. [31].

Regular participation in physical activity is essential for maintaining body awareness and strength during aging. For example, lifelong physical action is an important modulator of functional and structural changes in the brain that shield against neurodegeneration [32].

2.3. Changes Related With Aging

As we age, some physical changes consist in the hand. These changes are sensivity, cognitive, neuromuscular changes and wound healing. With age, there are decreases in fluency of movement, strength, and coordination consist, and all associated with a

decreases in neuromuscular system. The decrease in control with aging, is especially evident for fine hand movements [33].

Age-related decreases in strength are due not only to decreases in muscle quantity, but also to a decrease in muscle activation [34].

2.3.1. Changes in Senses

Warabi et al. suggested that reduced of sensory operations are a critical factor of declined motor functions. There are optical changes that can influence hand function such as sensivity to light, harmony, decreased sharpness, colour differentiation, depth perception, and impaired hand-eye coordination[35].

2.3.2. Wound Healing

In aging, the skin system process rapidly. These changes cause the skin to forfeit its talent against external factors. Due to its reduced mechanical properties, aged skin not only shows typical signs of aging such as wrinkles and furrows. Tactile thresholds in aging also change rapidly. This is thought to possibly cause a decrease in the density and distribution of Pacinian and Meissner corpuscles and Merkel discs in the skin. Consequently, skin aging should be understood not only as an aesthetic issue, but also as a serious medical problem that is gaining attention in an aging population. [36, 37].

2.4. Evaluations of Hand function

Evaluation of hand function and performance is important in defining a person's skill level in daily life activities (ADL), the effectiveness of rehabilitation, and revealing a person's role skills. Hand function can fundamentally be described as the hand's capacity in daily activities interconnected with anatomical strength, integrity, coordination, sensation and dexterity [33, 38].

2.4.1. Grip (Prehension)

2.4.1.1. Power Grip

It is a grip made to hold an object in the palm of hand. Power grip requires strong finger flexion. The thumb, index and middle fingers contribute more to grip in terms of

the resulting strength. The ring and little fingers provide support. The wrist is ulnar deviation and slightly extended to achieve a power grip. Power grip consists of four phases. In the first stage, the fingers are extended thanks to the long extensors and lumbricals. In the second stage, the fingers take a position to grasp the object. In the third stage, the fingers close and wrap the object. These three phases are dynamic phases. The fourth phase is static and is performed by maintaining muscle contractions to maintain grasping the object in hand. There are four types of coarse grips[39].

2.4.1.1.A. Cylindrical Grip

The fingers are in flexion, the thumb is in flexion opposite the second and third finger. (Ex: cup holding). The flexor digitorum profundus muscle is the primary responsible muscle. It helps the flexor digitorum superficialis and interosseous muscles when more strength is needed. Interosseous muscles are important in providing metacarpophalangeal flexion [40].

2.4.1.1.B. Spherical Grip

It is similar to the cylindrical grip. But the fingers are further apart from each other. Metacarpophalangeal joints are more abducted. The spherical grip is required greater activity of the interosseous muscles (e.g. holding a baseball) [40].

2.4.1.1.C. Hook Grip

It is the grip we use when carrying a bag. The thumb is abducted, and the proximal interphalangeal joints of the other four fingers are flexed. The Flexor digitorum superficialis and flexor digitorum profundus muscles are the primary responsible muscles [41].

2.4.1.2. Precision Grip

It is a form of grasping between the thumb and index and middle fingers on the radial side of the hand. The object held in hand is purposefully manipulated. During the fine grip, the fingers are usually flexed. Small objects are held between the thumb and the tips of the index and middle fingers [41].

2.4.1.2.A. Tripod (Palmar) Grip

It occurs with the opposition of the thumb pulp to the index and middle finger pulp (e.g., holding a pencil). It is achieved by reciprocal contractions of the volar and dorsal interosseal muscles and the thenar muscles[41].

2.4.1.2.B. Pinch Grip

The interphalangeal joints of the thumb and other fingers are flexed. Flexor digitorum profundus, flexor pollicis longus and interosseal muscles are responsible [39].

2.4.1.2.C. Lateral Grip

When the thumb is in extension and adduction, the second finger occurs with the position of the middle phalanx to the radial side. The flexor pollicis brevis and adductor pollicis muscles are responsible. The lateral grip is the strongest of these three grip types, the thin grip type [39].

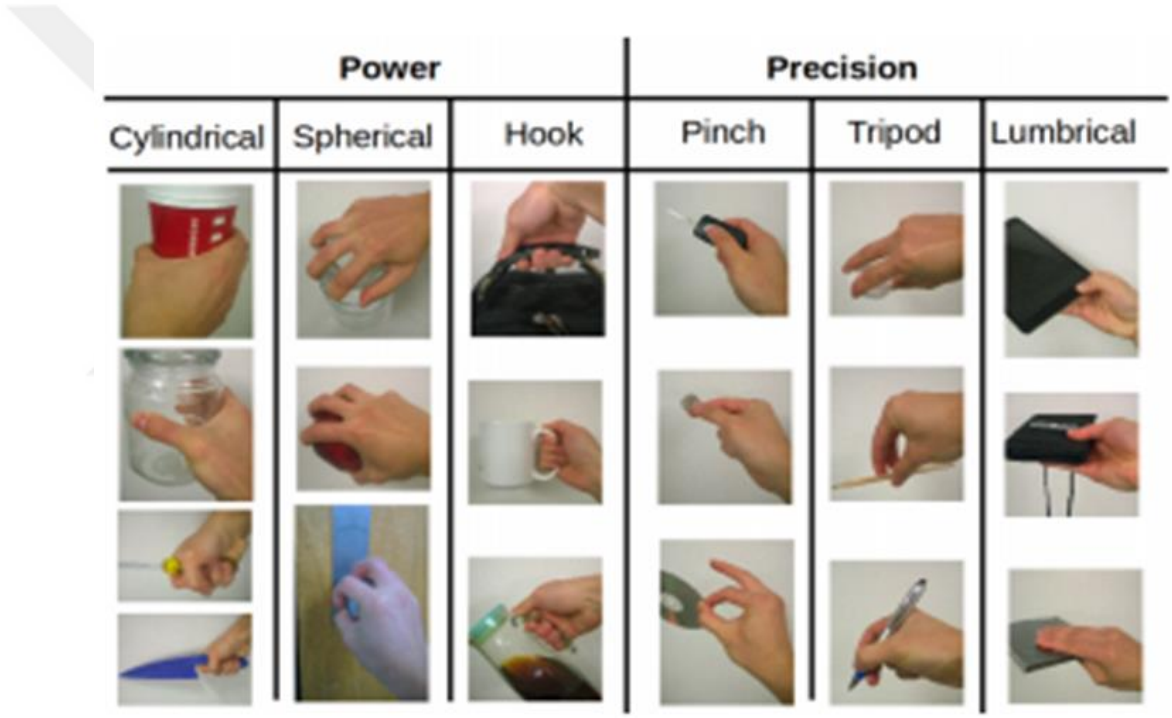

Figure 2.2 Hand Grip Types

2.4.2. Dexterity

Dexterity has been described by Poirier and others as "a dexterity that requires the rapid coordination of fine and gross movements depended on a certain number of capacities developed through learning, training, and experience". Speed is the most important criterion for evaluating this skill. However, in addition to fine motor control of the hand, it requires a significant degree of hand-eye awareness and coordination. There are two types of skills: finger dexterity and dexterity[42].

Finger dexterity is defined as performing rapid, controlled, and manipulative movements of the fingers on small objects. PPT is used to assess finger dexterity [43].

Manual dexterity is defined as the ability to provide control and manipulations of larger objects over a certain period of time. The Box and Block Test is used to measure one-sided great dexterity. [44].

There are some tests to test dexterity. The PPT is made by grasping and lifting small pegs and inserting them into small holes in the board. Second, Grooved Pegboard is one of those tests where the pegs are key-shaped and finer manipulation is required to match the screw with its hole [45].

In the Nine-Hole Pegboard Test, it is applied by measuring the time it takes a person to insert and remove nine latches from a hole on the board. As for the Box and Block Test, there is a two-compartment box with 150 cubes. The subject first takes a block with his dominant hand and moves the cube to the opposite room. The instructor determines the number of cubes that can be moved within 1 minute [44].

2.4.3. Range of Motion

One of the parameters evaluated in the clinical evaluation of "function" is the range of motion. ROM, as measured by the goniometer, was introduced into clinical practice in the first ten years of the 20th century [46, 47].

2.4.4. Hand Grip Strength

Grip strength is used to detect musculoskeletal functions and to assess frailty and disability. According to Rantanen et al. (1999) reported that there is a strong and positive link between grip strength, general health status and functionality level. Mendes et al. (2015) divided 90 individuals into three groups according to their age; investigated the connection between grasping power and tongue power and swallowing. They evaluated tongue muscle strength, drinking time of 200 millilitres of water, number of swallows and grip strength. They found that as age increases, the time to drink water increases, tongue muscle strength and grip strength decrease, there is a relationship between tongue muscle strength and grip strength, and grip strength differs between groups. Parry et al. (2015), in their study with 60 patients hospitalized in the intensive care unit; performed manual muscle testing, grip strength, functional assessment test for patients hospitalized in the

intensive care unit. They evaluated the weakness of the intensive care unit, the length of hospital stay, and the duration of mechanical ventilation to individuals over 18 years of age who were dependent on mechanical ventilation for at least 48 hours and had critical illnesses. They reported that there was no linked between age and grip strength, there was a linked between intensive care weakness and grip strength, and there was a relationship between mechanical ventilation time and grip strength[48]. Moreover; grip strength helps us understand not only upper extremity muscle weakness, but also lower extremity strength and functioning. More demanding activities, such as sitting and getting up from a chair, walking and climbing stairs, have also been shown to be associated with lower grip strength in older people [49]. There is also a relationship between reduced grip strength and loss of hand functionality. This loss is also seen in the performance of daily activities [50].

2.4.5. Aging and The Hand Senses

The sensory system that provides information about the external world and the environment is the extrasensory sense, which also includes somatosensory functions and special senses. The interoceptive sensory system is the sense that carries information about internal functions such as blood pressure and concentrations of chemical components in body fluids. Proprioceptive senses, on the other hand, carry the orientation of the human body and extremities in space. Apart from Sherrington's classification of senses, the senses are classified in 4 different ways. Superficial sensations: light touch, pain, temperature, superficial pressure; deep senses proprioception - kinesthesia, joint position sense, deep pressure, deep pain; Mixed senses are grouped as stereognosia, graphical aesthesia, two-point discrimination, vibration, finger recognition, sensory localization, barognosia, and visceral senses of radiating pain, nausea.

For the geriatric group, it is very important to maintain their hand and wrist senses, their social life and daily living activities[29]. Hands have many physiological and anatomical changes due to aging. When the literature is examined, there are studies showing that joint position sense, vibration, sensory threshold and two-point separation of the hand and wrist are negatively affected with aging [50].

Some authors have reported that the threshold for touch is significantly higher in healthy older individuals than in young, healthy individuals, particularly with regard to touch. This is due to alterations in the skin, the peripheral and central nervous system, as well as a decrease in nerve conduction velocity and action potential.[50].

3. MATERIALS AND METHODS

3.1. Subjects

The sample of the study (n=60) consists of individuals living in Nezih Nursing Home and living in their home from October 2021 to December 2021. Among the subjects who met the inclusion criteria, individuals who accept to participate in the study were seperated into two groups.

The study group was divided into participants involved in the Elderly Living in a Nursing Home (Group 1) and the Elderly Living at Home (Group 2).

3.1.1. Inclusion Criteria

3.1.1.1. Inclusion Criteria For Individuals Living In Nursing Home

- Participating in the study voluntarily,
- Have verbal communication skills to answer questions,
- Being ≥ 65 years old,
- Having score from MMSE ≥ 24,
- Being right hand dominant.

3.1.1.2. Inclusion Criteria For Individuals Living at Home

- Participating in the study voluntarily,
- Have verbal communication skills to answer questions,
- Being ≥ 65 years old,
- Having score from MMSE ≥ 24,
- Being right hand dominant,
- Living at home with at least one family member.

3.1.2. Exclusion Criteria

- History of CVO within 3 months prior to the study,
- Within 3 months prior to the study history of hospitalization due to an acute medical situation (e.g. heart disease, stroke etc.)
- Motor/neuromuscular diseases (hand tremor etc.),
- Serious vision and hearing problems,
- Having a neurological disease affecting the hand (e.g. Parkinson, CVO etc.),
- Having an orthopaedic disease affecting the hand (e.g. trauma, fracture, osteoarthritis etc.)

3.1.3. Flow of Chart

We planned to have 60 individuals who satisfied interventions. As for the first step, we separated the participants according to involved the Elderly Living in a Nursing Home (Group 1) and the Elderly Living at Home (Group 2).

After the assessments were finished, five people voluntarily stopped sharing their information.

3.1.4. Study Protocol

The study was carried out at Nezih Nursing Home Elder Care Center and at their home. The assessment protocol was planned to be 45 minutes for Group 1 (n=27) and Group 2 (n = 28) once a time. After the informed consent form was given to all volunteer participants, they were asked to fill in the demographic information questionnaire. Cognitive function, hand dexterity, sensory evaluation of hand, HGS Assessment and ROM Assessment (right hand) were performed.

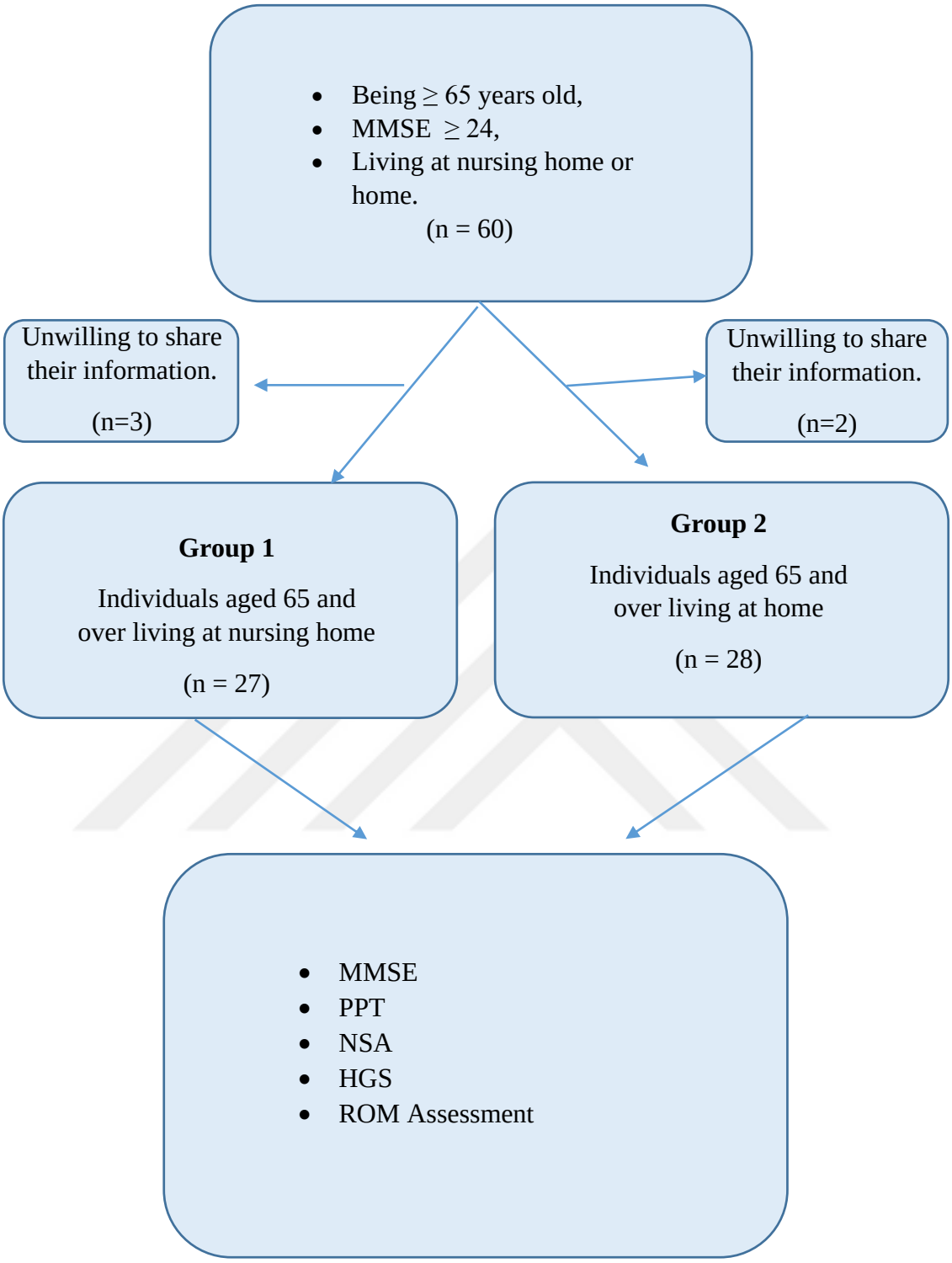

Figure 3.1 The Protocol of Study

3.2. Evaluations

3.2.1. Structured Questionnaire for Patient's Demographic Characteristics

The structured questionnaire prepared by researchers applied face-to-face interviews. The questionnaire included gender, age, height, weight, body mass index, marital status, dominant hand,chronic diseases, smoking, drugs, hand surgery to understand the socio-demographic conditions of volunteers. (APPENDIX 3)

3.2.2. Mini-Mental State Examination (MMSE)

MMSE evaluated cognitive functions globally. Dementia stages are 24-30 points normal, 20-23 mild stage, 10-19 middle stage, 0-9 advanced. The MMSE takes only 5-10 minutes to apply and is so practical to use repeatedly and regularly. Older with cognitive impairment, community-dwelling, hospitalized, and institutionalized adults may assess performance. The total score was evaluated out of 30 points. Questions consisting of eleven components under five main captions, namely recording memory, orientation, calculation, attention and, recall and language, were asked to the participants and answered orally. Scores were noted [51].

3.2.3 Purdue Pegboard Test (PPT)

The Purdue Pegboard Dexterity Test evaluates the fine motor skills of the fingers and fingertips, as well as the gross motor skills of the hands and fingers. It consists of 19.7 × 44.9 cm plank with 25 holes in a 5 × 5 array. Subjects are asked to place pins as fast as feasible for 30 seconds without the choice to pick up the fallen pins, starting with the top hole in the right row, depending on the right hand. For the right hand, to participants have given 3 practice sessions (Figure 3.2.) For each trial, the number of correctly inserted pins is checked in 30 seconds and the average of the two trials is used for evaluation. [52].

Figure 3.1 Purdue Pegboard

Figure 3.2 Application of PPT

3.2.4. Nottingham Sensory Assessment (NSA)

The right hand of the participant was evaluated sensory with NSA. Tactile sensation (pressure, light touch, temperature, needle stick, touch position and bilateral simultaneous touch), kinaesthetic sensation and stereognosis are evaluated. The objects used for the tactile sensation are cotton, pen (pointy-blunt test), two test tubes (for hot-

cold water) and powder. Objects used for stereognosis test: 0.05 TL, 0.10 TL and 1.00 TL (Turkish Lira), ballpoint pen, comb, pencil, sponge, scissors, a mug, a piece of cloth, and a cup. It was performed with the participant's eyes closed with three repeated tests for the right hand and wrist region (Figure 3.3) [53].

Figure 3.3 Application of NSA A) Tactile Sensation Part, B) Kinaesthetic Sensation, and C) Stereognosis

3.2.5. Evaluation of Hand Grip Strength (HGS)

Grip strength is considered to be an sign of the muscle strength of the upper limb. Dominant hand was evaluated with the JAMAR Hand dynamometer (Figure 3.5.). Maximum grip strength was evaluated with three repetitions while the shoulder was in neutral position and the elbow was in 90 flexion and extension. A 15-second rest was given between 3 attempts. The average of the three measurements was recorded as handgrip strength in kilograms (kg) [54].

Figure 3.4 Jamar Hand Dynamometer

Figure 3.5 Application of HGS Assessment

3.2.6. Evaluation of Range of Motion (ROM)

Only the right wrist ROM measurement of the participants was made. One measurement was made for each movement. The participant was sitting with the forearm pronated, supported at the edge of a table. The styloid process of the ulna was pivot point. The fixed arm was put parallel to ulna, the mobile arm of the goniometer followed the 5th metacarpal bone for measurement of wrist flexion and extension movements. The participant was sitting with the forearm pronated and the volar side of the hand supported

on the table. Proximal to the third metacarpal and carpometacarpal joint midpoint was the pivot point. Arm of the goniometer was put parallel to middle of the ulna with radius, the mobile arm of the goniometer was held parallel to the third metacarpal bone for measurement of wrist radial and ulnar deviation movements[55, 56].

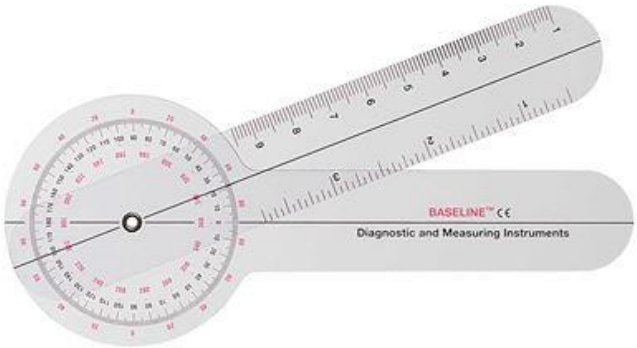

Figure 3.6 Goniometer

3.3. Data Analysis

In the calculation of the data obtained from our study, SPSS (Statistical Package for Social Sciences) Version 21.0 was used. The quantitative variables were presented with mean and standard deviation. Qualitative variables (categorical variables) are given with frequency and percentage values. The Kolmogorov-Smirnov test was used to examine the normal distribution of the variables. Chi-Square test was used to compare the qualitative variables. In the analysis, Independent Sample t test was used if the data were parametric and Mann-Whitney U test was used if the data were not parametric. In all statistical analyses, $p< 0.05$ was defined as significant.

4. RESULTS

4.1. Descriptive Characteristics of Participants

The study included elderly individuals (n=55, 38 Female/ 17 Male) who were living in Nezih Nursing Home and living in their home in Istanbul, Turkey. The individuals were separated into two groups.

The age range of people in the study population was between 65-88. The mean value of age, height, weight, body mass index in the study groups were given in Table 4.1. There were no statistical differences in age, height, weight, body mass index in two groups. (Table 4.1, p>0,05)

Table 4.1 Baseline characteristics of participants

	Groups			
	Group-1 (n=27) Mean±SD	**Group-2 (n=28) Mean±SD**	**t / z**	**p***
Age (years)	79.3±7.52	75.32±7.25	-1.82	0.069
Height (cm)	165.33±8.73	163.86±7.02	0.69	0.49
Weight (kg)	66.6±9.79	66.9±9.60	-0.1	0.92
BMI (kg\m^2)	24.35±3.00	24.97±3.31	-0.7	0.48

Group-1: The Elderly Living in a Nursing Home Group; Group-2: The Elderly Living at Home Group.

Abbreviations: BMI, body mass index; *Independent Sample t-test, the level of significance set at p<0.05.

4.2. Comparison of Gender and Marital Status

In the study population, there were 17 females, 10 males (n=27) in Group 1, and 21 females, 7 males (n=28) in the Group 2. The gender distribution of the study population was 69% for females versus 31% for males.

Table 4.2 is showing that the socio-demographic characteristics of gender, marital status of the study population. A Chi-square test was used to compare socio-demographic characteristics. There were statistically significant differences according to marital status between groups. (Table 4.2, p<0,05) There were no statistically significant differences according to gender between groups.(Table 4.2, p>0,05).

Table 4.2 A comparison of Gender and Marital Status Between Groups

		Group 1 **% (n)**	**Group 2** **%(n)**	**X^2**	**p**
Gender	**Female**	63 (17)	75 (21)	0,334	0,933
	Male	37 (10)	25 (7)		
Marital Status	**Single**	100 (27)	50 (14)	18,11	**0,00***
	Married	0 (0)	50 (14)		

Data expressed as % (n).

4.3. Distribution of Chronic Problem in Participants

Table 4.3 is showing that the distribution of chronic problems. Only participants with one disease have n=7 (%25,9) people in Group 1, while n=11 (%39,3) participants in Group 2. In the first group, the number of elderly with two chronic diseases was n=3 (%11,1), and in the second group, the number of elderly with two chronic diseases was n=4 (%14,3). While hypertension is the most common chronic problem, the least goiter and asthma in Group 1. Besides, while hypertension is the most common chronic problem, the least goiter and asthma in Group 2.

Table 4.3 Distribution of chronic problem in participants

	Group 1 % (n) (n=27)	Group 2 % (n) (n=28)
Number Of Chronic Problems		
One	25,9 (7)	39,3 (11)
Two	11,1 (3)	14,3 (4)
Three and Above	3,7 (1)	3,57 (1)
Name Of Chronic Problem		
Hypertension	37 (10)	39,3 (11)
Diabetes Mellitus	18,5 (5)	14,3 (4)
Chronic Heart Failure	3,7 (1)	14,3 (4)
Goiter	-	7,1 (2)
Asthma	-	3,6 (1)

Data expressed as % (n)

4.4. Comparison of MMSE, NSA, PPT, HGS, ROM Findings Between the Groups

An independent samples t-test was used to compare variables between Group 1 and Group 2 (Table 4.4). The results showed that RHUD in ROM had statistically significant differences between groups (Table 4.4, $p<0,05$). The results showed that there were no significant statistical differences in the RHF, RHE and RHRD in ROM ($p>0,05$).

A Mann-Whitney U test was used to contrast variables between Group 1 and Group 2 (Table 4.4). The results showed that tactile sensation and stereognosis in NSA, PPT and HGS had statistically significant differences between groups (Table 4.4, $p<0,05$). The results showed that there were no significant statistical differences in the

MMSE scores and kinaesthetic sensation in NSA (p>0,05). The differences between groups measurement of NSA-tactile, NSA-stereognosis, PPT, HGS, and RHUD of ROM scores had significantly higher results in Group 2 (p<0,05) (Table 4.4).

Table 4.4 Comparison of MMSE, NSA, PPT, HGS, ROM Findings Between the Groups

		Group 1 mean±SD	**Group 2 mean±SD**	**p value t / z**
MMSE		25.7±1.54	26.43±1.85	p= 0,177 z= -1,35
NSA	**Tactile Sensation**	10.11±1.09	11.03±1.14	**p= 0,003*** z= -2,951
	Kinaesthetic Sensation	2.20±0.48	2.39±0.5	p= 0,132 z= -1,506
	Stereognosis	18.52±2.33	20.21±1.99	**p= 0,007*** z= -2,712
PPT		8.70±3.01	11.9±3.91	**p= 0,00*** z= -3,55
HGS		14.51±7.3	19.95±7.02	**p= 0,004*** z= -2,906
ROM	**RHF**	75,89±7,25	78,92±6,29	p= 0,119 t= -1,586
	RHE	62,81±4,50	64,6±4,34	p= 0,139 t= -1,502
	RHUD	29,55±4,72	36,35±5,26	**p= 0,00*** t= -5,043
	RHRD	15,7±3,16	16,36±2,04	p= 0,365 t= -0,914

SD: Standard Deviation, Mini-Mental Scale (MMSE), Nottingham Sensory Assessment (NSA), Purdue Pegboard Test (PPT), Hand Grip Strength (HGS), Range of Motion (ROM), Right Hand Flexion (RHF), Right Hand Extension (RHE), Right Hand Ulnar Deviation (RHUD), Right Hand Radial Deviation (RHRD) *Independent sample t-test significance p<0.05, *Mann-Whitney U test significance p<0.05.

5. DISCUSSION

The aim of this study was to examine the effects of the residence style of elderly individuals on the hand functions of the home environment and the nursing home. For this purpose; we evaluated the hand function of the elderly with NSA, PPT, HGS, and ROM.

In the present study; there were no statistical differences between the groups in terms of the means of age, weight, height, BMI variables. The most important results of our study revealed that the differences between groups measurement of NSA-Tactile, NSA-Stereognosis, PPT, HGS, ROM Scores of RHUD had greater results in elderly living at home.

In the literature, it has been observed that there is not enough evidence about the effect of residence style on hand functions in the elderly. Therefore, this study aims to contrast the hand functions of the elderly living at home and in a nursing home.

With aging, the integrity of our senses diminishes. In most cases, changes in sensory perception are studied in relation to specific parts of the body (for example the knee joint area only), while sensory changes in other important parts of the body, such as the hand, are neglected [9]. In our study, a statistically significant difference was found between the existing groups in terms of tactile sensation and stereognosis of NSA. According to one study, the elderly may rely more on visual and tactile afferents for movement, since muscle proprioception is impaired relatively more than younger ones. [57]. In addition, Silva et al. in their longitudinal study showed that the awarenesss of the salty and bitter taste, heat sense to cold on the face and hand, tactile sense of the hand and the vibration sense of the face revealed a statistically significant rises after two years contrasted with the initial-1 year, initial-2 years and 1 year-2 years periods evaluated[58]. In a similar study, Kaneko et al. As a result of their evaluations, they stated that the two-point discrimination sense of the participants over the age of 60 decreased[59]. According to the results of our study, we think that the sensory difference at hand is related to the type of residence.

According to the results of our study, we observed that a statistically significant difference was found between the existing groups in terms of PPT. In a previous study, Desrosiers et al. performed a study with thirty-five older adults over 60 years old and

separeted into three groups which were 60-69, 70-79, 80+ years old. In their study. They found that there was a significant reduce in fine motor ability with age [60]. Furthermore, Rule et al. studied 128 community-dwelling elderly between 60 and 99 years of age. Participants were evaluated the PPT. They showed no statistically significant differences in scores between gender. But there was a statistically significant difference between the age groups[61]. Simply; the decrease in PPT scores may be affected by the increase in age.

In our study, HGS was compared to based on types of residence. There was found a statistically significant difference between the groups in terms of HGS. Being independent in active daily living is an important factor in fulfilling functions such as taking a role in different areas of life in old age, being productive and maintaining participation in society, and being physically active[62]. According to the study of Kitiş et al. of the participants who were living with spouse and family at home; They argue that it is a more advantageous option than living in a nursing home in terms of keeping the cognitive level at acceptable levels, preventing old-age depression, and participating in social activities with ADL[63]. In another study, Göz et al. carried out a study that included 122 volunteers with a mean age of 69.76. They investigated the link between activity quality of the elderly living at home and at home and their physical activity levels. According to their results, when physical activity levels were contrast between the groups; A significant difference was found in favour of those living in their own home[64]. Moreover, Marmon et al. performed a manual dexterity utilizing the Grooved Pegboard test throughout with evalutes of strength. They showed that rised age was linked with lower performance and that gradually decreased strength[34]. In a similar study, Incel et al. conducted the study with living in nursing home 24 geriatric volunteers participants aged between 64 to 79 years. A elaborate physical inspection of the upper limbs including ROM, neurological examination, and muscle testing was performed by the clinicians. They found significant differences between groups in HGS.[65]. We observed that the HGS score decreased with increasing age. We also noticed that living in a nursing home lowered the HGS score compared to living at home.

In the present study, there were statistically significant differences between groups in terms of RHUD of ROM scores. The decrease in ROM may have an impact on hand function and fine dexterity. Decreased ROM of the hand and wrist can put older adults in a difficult position in terms of hand function and dexterity[55]. Fine hand skills are

important in activities of daily living and can be measured with specific tests. Ceceli et al. used the PPT and ROM. Pain, deformity, swelling of the joints, and decrement in joint ROM may have an effect on hand functions and fine hand skills.[66]. Moreover, Taştekin et al. reported that active ROM is affected by decreased muscle strength as well as by conditions where joint integrity is compromised, such as deformities and narrowing of the joint space. Disruption of anatomical integrity, limitations in ROM, loss of muscle strength, possible sensory problems and pain impair the ability to use hands in rheumatoid arthritis[67]. We conclude that the ROM of the hand may vary depending on the physical activity of the elderly according to their residence type.

Limitations of this study; the number of elderly individuals participating in the study was small. As the participants were in the elderly population in the Covid-19 risk group, it was difficult to apply the assessments.

This study was conducted to clearly understand the effect of elderly people living in a nursing home and at home on hand functions. No other study was found in the literature; which was evaluated to compare the hand functions of 27 elderly people living in a nursing home and 28 elderly living at home. The study is the first study on this subject.

6. CONCLUSION

Consistent with a hypothesis, we found that there is a statistically significant difference between the hand functions of the elderly living at home and those living in the nursing home.

In the field of physiotherapy, more studies are needed to elucidate on the evaluation of hand functions according to the environment in which the elderly live. In our study we found that;

- The tactile, stereognosis senses, handgrip strength and manual dexterity of the elderly living at home were better than those living in a nursing home.
- Right-hand ulnar deviation of ROM of the elderly living at home was better than those living in a nursing home.

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8. APPENDIX

8.1. Appendix 1. Informed Voluntary Consent Form

ARAŞTIRMAYA KATILIM ONAY FORMU

"Evde veya Huzurevinde Yaşayan Yaşlıların El Fonksiyonları Açısından Karşılaştırılması" isimli bu çalışma; Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Fizyoterapi ve Rehabilitasyon Bölümü tarafından yürütülmektedir ve yüksek lisans öğrencisi Fzt. Mehmet Musa IŞIK'ın uzmanlık tez çalışmasıdır. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Fizyoterapi ve Rehabilitasyon Anabilim Dalı'nda Dr. Öğr. Üyesi Çiğdem YAZICI MUTLU gözetiminde yapılacaktır.

Araştırma Yeditepe Üniversitesi Fizyoterapi ve Rehabilitasyon Anabilim Dalı tez çalışmasıdır. Bu çalışmanın amacı, Evde veya Huzurevinde Yaşayan Yaşlıların El Fonksiyonları Açısından Karşılaştırılmasıdır. Çalışmaya huzurevinde ve evde yaşayan 60 birey dahil edilecektir. Çalışmamıza katılmayı Kabul eden gönüllü bireylerin; yaşı, cinsiyeti, eğitim düzeyi, mesleği, sosyo-demografik koşulları, var olan kronik hastalıkları, sigara alışkanlıklarını sorgulayan anket düzenlenmiştir. Bu amaçla kullanılan değerlendirmelerin sonuçları yalnızca araştırma kapsamındaki çalışmalarda kullanılacaktır.

Araştırma ile ilgili sizden doldurmanızı istediğimiz formları doğru bir şekilde doldurmanız ve herhangi bir şikayetiniz ya da rahatsızlığınız olduğunda bizi bilgilendirmeniz gerekmektedir. İstediğiniz zaman çalışma dışına çıkma hakkınız olduğunu bilmenizi isteriz. Bu araştırma kapsamında uygulanacak olan uygulamalarda herhangi bir risk bulunmamakta ve yapılacak hiçbir uygulama size zarar vermeyecektir. Bu araştırma dahilinde sizden herhangi bir ücret talep edilmemektedir. Bu araştırmada yer almanız nedeniyle size hiçbir ödeme yapılmayacaktır. **Kişisel bilgileriniz herhangi bir amaçla, kurum yöneticileri veya üçüncü kişilerle paylaşılmayacaktır.**

Katılımınız için teşekkür ederiz.

Sorumlu Araştırmacı:

Dr. Öğr. Üyesi Çiğdem YAZICI MUTLU

Yardımcı Araştırmacı:

Fzt. Mehmet Musa IŞIK- (24 saat ulaşılabilecek kişi)

"Evde veya Huzurevinde Yaşayan Yaşlıların El Fonksiyonları Açısından Karşılaştırılması" isimli çalışmada katılımcıya/gönüllüye verilmesi gereken bilgileri okudum ve katılmam istenen çalışmanın kapsamını ve amacını, gönüllü olarak üzerime düşen sorumlulukları tamamen anladım. **Çalışma hakkında yazılı ve sözlü açıklama adı belirtilen araştırmacı tarafından yapıldı.** Bu çalışmayı istediğim zaman ve herhangi bir neden belirtmek zorunda kalmadan bırakabileceğimi ve bıraktığım takdirde herhangi bir olumsuzluk ile karşılaşmayacağımı anladım.

Bu koşullarda söz konusu araştırmaya kendi isteğimle, hiçbir baskı ve zorlama olmaksızın katılmayı kabul ediyorum.

Gönüllünün Adı/Soyadı/İmzası/Tarih :

Açıklama Yapan Kişinin Adı/Soyadı/İmzası/Tarih :

Tanık Adı/Soyadı/İmzası/Tarih :

8.2. Appendix 2. Ethical Committee Approval

BAŞVURU NUMARASI: 202108088

KARAR 15.10.2021

☒ **KABUL**	☐ **RET** ☐ *KAPSAM DIŞI (GİRİŞİMSEL)* ☐ *BİLİMSEL VE/VEYA ETİK KURALLARA AYKIRI* ☐ *BİR SORUMLU ARAŞTIRMACININ (TEZ İSE TEZ DANIŞMANI), BİR TOPLANTIYA **İKİ (2) ADETTEN FAZLA ÇALIŞMA BAŞVURUSUNDA** BULUNMASI* ☐ *KURUM İÇİ BAŞVURULARINDA **YEDİTEPE UZANTILI E-POSTA HESABI** İLE GİRİŞ YAPILMAMIŞ OLMASI* ☐ *ŞARTLI KABULDE BELİRTİLEN REVİZYONLARIN ZAMANINDA VE/VEYA İSTENİLDİĞİ ŞEKİLDE YAPILMAMIŞ OLMASI*

Prof. Dr. Didem ÖZDEMİR ÖZENEN **Başkan**				**Doç. Dr. Gökhan ERTAŞ** **Başkan Yardımcısı**				**Doç. Dr. Elif SUNGURTEKİN EKÇİ** **Raportör**			
Katılım		İlişki		Katılım		İlişki		Katılım		İlişki	
☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok
Prof. Dr. Feryal SUBAŞI **Üye**				**Doç. Dr. Mehmet Engin CELEP** **Üye**				**Dr. Öğr. Üyesi E. Çiğdem KELEŞ** **Üye**			
Katılım		İlişki		Katılım		İlişki		Katılım		İlişki	
☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok
Dr. Öğr. Üyesi Binnur OKAN BAKIR **Üye**				**Dr. Öğr. Üyesi E. Nur ÖZDAMAR** **Üye**				**Dr. Öğr. Üyesi SEVİM ŞEN** **Üye**			
Katılım		İlişki		Katılım		İlişki		Katılım		İlişki	
☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok	☐Var	☐Yok

Araştırmanın Başlığı	Evde veya huzurevinde yaşayan yaşlıların el fonksiyonları açısından karşılaştırılması
Araştırmacılar	Işık M, Mutlu-Yazıcı Ç

KARAR FORMU

15.10.2021

ETİK KURUL BİLGİLERİ	Etik Kurulun Adı	Yeditepe Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu
	Açık Adres	Yeditepe Üniversitesi Diş Hekimliği Fakültesi, Bağdat Cad. No. 238 Göztepe 34728 Kadıköy, İstanbul
	İnternet Sayfası	
	Telefon	
	E-posta	

DEĞERLENDİRİLEN BELGELER	Islak imzalı başvuru dosyası, CD'si ve elektronik başvuru	☒
	Araştırma başlığı ve araştırmacıların isimleri	☒
	Başvuru dilekçesi	☒
	Araştırmanın;	☒
	• Niteliği	☒
	• Önemi ve özgün değeri	☒
	• Amaç ve hedefleri	☒
	• Yöntemi	☒
	• Yönetimi	☒
	• Yaygın etkisi	☒
	• Araştırma bütçesi (Mevcutsa)	☒
	• Süresi ve uygunluğu (Zaman cetveli)	☒
	• Kaynakları	☒
	Araştırma izin belgesi / belgeleri	☒
	Bilgilendirilmiş Gönüllü Olur Formu (yapılan araştırmaya özel olarak hazırlanmış)	☒
	Taahhütname-1 Dünya Tıp Birliği Helsinki Bildirgesinin son versiyonunun ve Sağlık Bakanlığı'nın ilgili tüm kılavuzlarının okunmasına dair taahhüt	☒
	Taahhütname-2 Daha önce yapılmış etik kurul başvuruları mevcut olup olmadığına dair taahhüt	☒
	Taahhütname-3 Araştırma sırasında araştırma bütçesinde yer almayan ve gönüllünün kendisine veya Sosyal Güvenlik Kurumuna ek yük getirecek hiçbir işlem uygulanmayacağına dair taahhüt	☒
	Taahhütname-4 COVID-19 hastalarında tedavi yaklaşımları ve bilimsel araştırmalar genelgesi okunmasına dair taahhüt	☒
	Araştırmacıların her birisine ait özgeçmiş formu	☒
	Ek belgeler (Varsa kullanılan ölçek izinleri vb.)	☒

KARAR BİLGİLERİ	Başvuru Numarası	202108088
	Toplantı Tarihi	15.10.2021
	Toplantı Yeri	Çevirim içi (Google Meet)
	Karar No	5

Araştırmanın Başlığı	Evde veya huzurevinde yaşayan yaşlıların el fonksiyonları açısından karşılaştırılması
Araştırmacılar	Işık M, Mutlu-Yazıcı Ç

8.3. Appendix 3. Demographic Form

DEMOGRAFİK ÖZELLİKLER VE GENEL SAĞLIK DURUMU ANKETİ

Tarih: …/…/…

1) Katılımcının Adı Soyadı:

Telefon Numarası (Cep/Ev):

Adres:

2) Yaş:

3) Cinsiyet: ( ) Kadın ( ) Erkek

4) Çalışma durumu:

5) Medeni hali:

6) Boy uzunluğu (cm):

7) Vücut ağırlığı (kg) :

8) BMI:

9) Dominant taraf: El ( ) sağ ( ) sol

10) a) Sigara kullanıyor musunuz?

( )Hiç içmedim ( )Sigara içtim ama bıraktım ( )Halen içiyorum

b) Günde kaç adet sigara içiyorsunuz? adet/gün

Sigara: Paket/Yıl

11) Herhangi bir sürekli hastalığınız var mı? Varsa hangileri?

( ) Sürekli bir hastalığım yok

( ) Romatizma ( ) Ortopedik hastalık ( ) Nörolojik problemler

( ) Travma ( ) Diğer:……

12) Sürekli kullandığınız ilaçlar var mı?

( ) Evet: ..... ( ) Hayır

12) El-el bileğiyle ilgili herhangi bir ameliyat geçirdiniz mi?

( ) Evet: ..... ( ) Hayır

8.4. Appendix 4. Mini-Mental State Examination

Hastanın Adı Soyadı: ..... Tarih: ...../...../.....

	Puanı
Oryantasyon (Her soru 1 puan, toplam 10 puan)	
Hangi yıl içindeyiz?	.....
Hangi mevsimdeyiz?	.....
Hangi aydayız?	.....
Bu gün ayın kaçı?	.....
Hangi gündeyiz?	.....
Hangi ülkede yaşıyoruz?	.....
Şu an hangi şehirde bulunmaktasınız?	.....
Şu an bulunduğunuz semt neresidir?	.....
Şu an bulunduğunuz bina neresidir?	.....
Şu an bu binada kaçıncı kattasınız?	.....
Kayıt Hafızası (Toplam puan 3)	
• Size birazdan söyleyeceğim üç ismi dikkatlice dinleyip ben bitirdikten sonra tekrarlayın (Masa, Bayrak, Elbise) (20 sn. süre tanınır). Her doğru isim 1 puan.	.....
Dikkat ve Hesap Yapma (Toplam puan 5)	
• 100'den geriye doğru 7 çıkartarak gidin. Dur deyinceye kadar devam edin. (Her doğru işlem 1 puan: 100, 93, 86, 79, 72, 65)	.....
Hatırlama (Toplam puan 3)	
• Yukarıda tekrar ettiğiniz kelimeleri tekrar söyleyin (Masa, Bayrak, Elbise) (Her kelime 1 puan)	.....
Lisan (Toplam puan 9)	
a. Bu gördüğünüz nesnelerin isimleri nedir? (saat, kalem) 1'er puan toplam 2 puan (20 saniye süre ver)	.....
b. Şimdi size söyleyeceğim cümleyi dikkatle dinleyin ve ben bitirdikten sonra tekrar edin. "Eğer ve fakat istemiyorum" (10 saniye süre ver) 1 puan	.....
c. Şimdi sizden bir şey yapmanızı isteyeceğim, beni dikkatle dinleyin ve söylediğimi yapın. "Masada duran kâğıdı elinizle alın, iki elinizle ikiye katlayın ve yere bırakın lütfen" Toplam puan: 3, süre: 30 sn. her bir doğru işlem: 1 puan	.....
d. Şimdi size bir cümle vereceğim. Okuyun ve yazıda söylenen şeyi yapın. (1 puan) -Bir kâğıda "GÖZLERİNİZİ KAPATIN" yazıp hastaya gösterin-	.....
e. Şimdi vereceğim kâğıda aklınıza gelen anlamlı bir cümleyi yazın (1 puan)	.....
f. Size göstereceğim şeklin aynısını çizin; aşağıdaki şekli arka sayfaya (1 puan)	.....

Folstein MF, Folstein SE, McHugh PR (1975) J Psychiatr Res. 1975 Nov;12(3):189-98.

Toplam Puan (0-30): .....

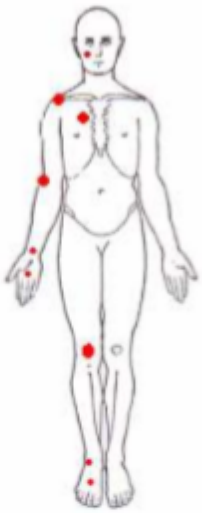
8.5. Appendix 5. Nottingham Sensory Assessment

NOTTINGHAM SENSORY ASSESSMENT

Instructions

The patient should be assessed in sitting and in a suitable state of undress (ideally in shorts & underwear, without TED stockings). It should be ensured the patient is comfortable and in a quiet area with no distractions. Each test is described and demonstrated to the patient before he or she is blindfolded. The blindfold is removed regularly throughout the test to avoid the patient becoming disorientated.

The body area to be tested is as marked on the body chart. Apply the test sensation to the test area, to the left and right side in a random order. The patient is asked to indicate, either verbally or by a body movement, whenever he or she feels the test sensation.



Each part of the body is assessed three times for each of the tests.

Presence of a reflex does not count as awareness of sensation, though this should be commented on in the comment box.

Tactile Sensation

If the patient has problems communicating begin testing light touch, pressure and pinprick sections.

Scoring criteria

0	*Absent*	Fails to identify the test sensation on three occasions
1	*Impaired*	Identifies the test sensation, but not on all three occasions in each region of the body or feels duller
2	*Normal*	Correctly identifies the test sensation on all three occasions
9	*Unable to test*	

Light Touch Touch, not brush, the skin lightly with a cotton wool ball.

Pressure Press the skin just enough to deform the skin contour using the index finger.

Pinprick Prick the skin with a neurotip, maintaining even pressure.

Temperature Touch the skin with the side of one of two test tubes, one filled with hot water, one filled with cold water (use the sides, not the bases of the test tubes). Apply hot and cold tubes in random order.

Tactile localisation Only test those areas on which the patient has scored 2 on the pressure section. Record all others as 9.
Repeat the pressure test with the index fingertip coated with talcum powder to mark the spot touched and ask the patient to point to the exact spot that has been touched. If communication permits, the test may be combined with the pressure test. 2cm of error are allowed.

Bilateral Simultaneous Touch Touch corresponding sites on one or both sides of the body using the fingertips and ask the patient to indicate if both or one (and which) have been touched. Only test those items on which patient has scored 2 on pressure section. Record all others as 9.

Equipment required: Blindfold, cotton wool ball, Neurotip, two test tubes, hot and cold water, talcum powder.

Kinaesthetic Sensations

All three aspects of movement are tested: appreciation of movement, its direction and accurate joint position sense are assessed simultaneously. The limb on the affected side of the body is supported and moved by the examiner in various directions but movement is only at one joint at a time. The patient is asked to mirror the change of movement with the other limb. Three practice movements are allowed before blindfolding.

The upper limb is tested in sitting, and the lower lying supine.

Scoring

0	*Absent*	No appreciation of movement taking place.
1	*Appreciation of movement taking place*	Patient indicates on each movement that a movement takes place but the direction is incorrect.
2	*Direction of movement sense*	Patient is able to appreciate and mirror the direction of the test movement taking place each time, but is inaccurate in its new position.
3	*Joint Position sense*	Accurately mirrors the test movement to within 10°of the new test position
9	*Unable to test*	

Equipment required: Blindfold.

Stereognosis

The object is placed in the patient's hand for a maximum of 30 seconds. Identification is by naming, description or by pair-matching with an identical set. Affected side of the body is tested first. The object may be moved around the affected hand by the examiner.

Scoring for each object

2	*Normal* Item	is correctly named or matched.
1	*Impaired*	Some features of object identified or attempts at descriptions of objects.
0	*Absent*	Unable to identify the object in any manner.
9	*Unable to test*	

Equipment required: Blindfold, 2p coin, 10p coin, 50p coin, biro (score 2 if labelled "pen"), pencil, comb, scissors, sponge, flannel (score 2 if labelled "cloth" or "face cloth"), cup, glass (score 2 if labelled "beaker").

8.6. Appendix 6. Purdue Pegboard Test Mean Performance Scores

Table 14-25
Mean Performance of Adults for the Purdue Pegboard (Three Trials per Subtest)

	Age Groups				
	40-49	50-59	60-69	70-79	80-89
Males					
n	19	20	24	17	11
Preferred Hand	14.6	14.4	13.6	13.0	10.8
SD	2.08	2.15	1.74	1.90	1.33
Nonpreferred Hand	14.4	13.9	13.1	12.4	10.6
SD	2.35	2.19	1.56	1.48	1.84
Both Hands	12.2	11.9	10.9	10.4	8.5
SD	2.43	2.22	1.46	1.27	1.21
Purdue Assembly	34.9	33.8	28.0	27.5	21.5
SD	7.66	9.66	5.06	5.06	4.81
Pref. minus nonpref.	0.16	0.23	0.44	0.59	0.18
SD	1.19	1.21	1.86	0.93	1.46
Females					
n	21	27	29	31	13
Preferred Hand	15.9	15.0	14.6	13.8	12.9
SD	1.45	1.56	2.03	1.27	1.80
Nonpreferred Hand	15.2	14.4	13.9	12.9	11.3
SD	1.48	1.69	1.78	1.52	2.05
Both Hands	13.1	12.1	11.6	10.5	9.2
SD	1.56	1.30	1.87	1.19	1.92
Purdue Assembly	39.8	34.6	31.7	29.1	21.9
SD	4.54	8.21	6.83	4.85	4.54
Pref. minus nonpref.	0.73	0.63	0.71	0.94	1.56
SD	1.05	1.31	1.23	1.39	1.24

Source: Agnew et al., 1988. Reprinted with permission of Lawrence Erlbaum Assocates, Inc.

8.7. Appendix 7. Jamar Hand Dynamometer Mean Performance Scores

Unit : lb

Age Group	Female Scores				Male Scores			
	Right Hand		Left Hand		Right Hand		Left Hand	
	From	To	From	To	From	To	From	To
6-7	20	39	16	36	21	42	18	38
8-9	18	55	16	49	27	61	19	63
10-11	37	82	32	59	35	79	26	73
12-13	39	79	25	76	33	98	22	107
14-15	30	93	26	73	49	108	41	94
16-17	23	126	23	87	64	149	41	123
18-19	46	90	41	86	64	172	54	149
20-24	46	95	33	88	91	167	71	150
25-29	48	97	48	97	78	158	77	139
30-34	46	137	36	115	70	170	64	145
35-39	50	99	49	91	76	176	73	157
40-44	38	103	35	94	84	165	73	157
45-49	39	100	37	83	65	155	58	160
50-54	38	87	35	76	79	151	70	143
55-59	33	86	31	76	59	154	43	128
60-64	37	77	29	66	51	137	27	116
65-69	35	74	29	63	56	131	43	117
70-74	33	78	23	67	32	108	32	93
75+	25	65	24	61	40	135	31	119
All Subjects	25	137	23	115	32	176	27	160

NOTE : The mean scores for individuals, aged 14-19 years, may be slightly low (0-10 lb. lower than they should be) due to instryment error detedted after the study.

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(2) Everett P., Sils F., "The Relationship of Grip Strength to Stature, Somatolype Components, and Anthropometric Measurements of The Hand." *The Research Quarterly* 23: 161-6, 1952

(3) Mathiowetz V., Federman S., Wiemer D. "Grip and Pinch Strength: Norms for 6 to 19 Tear Olds." *The American Journal of Occupational Therapy* 40:705-11, 1986.

Unit : kg

Age Group	Female Scores				Male Scores			
	Right Hand		Left Hand		Right Hand		Left Hand	
	From	To	From	To	From	To	From	To
6-7	9.07	17.69	7.26	16.33	9.53	19.05	8.16	17.24
8-9	8.16	24.95	7.26	22.23	12.25	27.67	8.62	28.58
10-11	16.78	37.19	14.51	26.76	15.88	35.83	11.79	33.11
12-13	17.69	35.83	11.34	34.47	14.97	44.45	9.98	48.53
14-15	13.61	42.18	11.79	33.11	22.23	48.99	18.60	42.64
16-17	10.43	57.15	10.43	39.46	29.03	67.59	18.60	55.79
18-19	20.87	40.82	18.60	39.01	29.03	78.02	24.49	67.59
20-24	20.87	43.09	14.97	39.92	41.28	75.75	32.21	68.04
25-29	21.77	44.00	21.77	44.00	35.38	71.67	34.93	63.05
30-34	20.87	62.14	16.33	52.16	31.75	77.11	29.03	65.77
35-39	22.68	44.91	22.23	41.28	34.47	79.83	33.11	71.21
40-44	17.24	46.72	15.88	42.64	38.10	74.84	33.11	71.21
45-49	17.69	45.36	16.78	37.65	29.48	70.31	26.31	72.57
50-54	17.24	39.46	15.88	34.47	35.83	68.49	31.75	64.86
55-59	14.97	39.01	14.06	34.47	26.76	69.85	19.50	58.06
60-64	16.78	34.93	13.15	29.94	23.13	62.14	12.25	52.62
65-69	15.88	33.57	13.15	28.58	25.40	59.42	19.50	53.07
70-74	14.97	35.38	10.43	30.39	14.51	48.99	14.51	42.18
75+	11.34	29.48	10.89	27.67	18.14	61.23	14.06	53.98
All Subjects	11.34	62.14	10.43	52.16	14.51	79.83	12.25	72.57

NOTE : The mean scores for individuals, aged 14-19 years, may be slightly low (0-10 lb. lower than they should be) due to instryment error detedted after the study.

(1) Gill D., Reddon J., Renny C., Stefanyk W. "Hand Dynamoter: Effects of Trials and Sessions" *Percptual and Motor skills* 61: 195-8, 1985

(2) Everett P., Sils F., "The Relationship of Grip Strength to Stature, Somatolype Components, and Anthropometric Measurements of The Hand." *The Research Quarterly* 23: 161-6, 1952

(3) Mathiowetz V., Federman S., Wiemer D. "Grip and Pinch Strength: Norms for 6 to 19 Tear Olds." *The American Journal of Occupational Therapy* 40:705-11, 1986.

9. CV

Kişisel Bilgiler

Adı	Mehmet Musa	**Soyadı**	IŞIK
Doğum Yeri		**Doğum Tarihi**	
Uyruğu		**TC Kimlik No**	
E-mail		**Tel**	

Öğrenim Durumu

Derece	Alan	Mezun Olduğu Kurumun Adı	Mezuniyet Yılı
Doktora			
Yüksek Lisans	FTR	Yeditepe Üniversitesi	2022
Lisans	FTR	Kütahya Dumlupınar Üniversitesi	2015
Lise	Sayısal	Siirt Atatürk Anadolu Lisesi	2010

Bildiği Yabancı Dilleri	Yabancı Dil Sınav Notu (#)
İngilizce	
Arapça	

Başarılmış birden fazla sınav varsa(KPDS, ÜDS, TOEFL; EELTS vs), tüm sonuçlar yazılmalıdır

Görevi	Kurum	Süre (Yıl - Yıl)
Fizyoterapist	Özel Medlife Binsina Hastanesi	2015 -2017
Fizyoterapist	Özel Modern Tıp Merkezi	2017-2019

İş Deneyimi (Sondan geçmişe doğru sıralayın)

Bilgisayar Bilgisi

Program	Kullanma becerisi

*****Çok iyi, iyi, orta, zayıf olarak değerlendirin

Bilimsel Çalışmaları

SCI, SSCI, AHCI indekslerine giren dergilerde yayınlanan makaleler

Diğer dergilerde yayınlanan makaleler

Uluslararası bilimsel toplantılarda sunulan ve bildiri kitabında (*Proceedings*) basılan bildiriler

Hakemli konferans/sempozyumların bildiri kitaplarında yer alan yayınlar

Diğer (Görev Aldığı Projeler/Sertifikaları/Ödülleri)
